

Agenda Board of Trustees

November 5, 2019 | 4:15-5:45 p.m. Eastern

(Please note the Schedule may be adjusted real-time should meetings conclude early and/or extend past their scheduled end time.)

The Whitley
3434 Peachtree Rd NE
Atlanta, GA 30326

Conference Room: Salons 1,2,6,7,8 (1st Floor)

Call to Order

NERC Antitrust Compliance Guidelines and Public Announcement*

Introductions and Chair's Remarks

Consent Agenda – Approve

1. Minutes*

- a. August 15, 2019 Meeting

2. Committee Membership and Charter Amendments*

- a. Personnel Certification Governance Committee Membership
- b. Standards Committee Membership
- c. Critical Infrastructure Protection Committee Membership
- d. Compliance and Certification Committee Membership

Regular Agenda

3. Remarks and Reports

- a. Report on November 5, 2019 Semiannual Meeting of NERC Trustees and Regional Entity Boards and Board of Trustees Closed Session – **Information**

4. Board Committee Reports

- a. Corporate Governance and Human Resources
- b. Compliance
- c. Finance and Audit
 - i. Third Quarter Statement of Activities* – **Accept**

- d. Enterprise-wide Risk
- e. Technology and Security
- f. Nominating
- g. Report by Trustee Rob Manning on Standards Quarterly Activities

5. Standards Quarterly Report and Actions*

- a. 2020-2022 Reliability Standards Development Plan – **Approve**
- b. BAL-003-2 Frequency Response and Frequency Bias Setting – **Adopt**
- c. PRC-006-NPCC2 Automatic Underfrequency Load Shedding – **Adopt**

6. Other Matters and Reports*

- a. Policy Input and Member Representatives Committee Meeting
- b. 2019 ERO Reliability Risk Priorities Report – **Accept**
- c. EMP Task Force Strategic Recommendations – **Accept**
- d. Reliability and Security Technical Committee Charter, Chair and Vice Chair Appointments* – **Approve**
- e. SERC Bylaws Amendments* – **Approve**
- f. ReliabilityFirst Bylaws Amendments* – **Approve**
- g. 2019 and 2020 ERO Enterprise Dashboard Update* – **Update**
- h. RC Function in the Western Interconnection* – **Update**

7. Adjournment

*Background materials included.

Antitrust Compliance Guidelines

I. General

It is NERC's policy and practice to obey the antitrust laws and to avoid all conduct that unreasonably restrains competition. This policy requires the avoidance of any conduct that violates, or that might appear to violate, the antitrust laws. Among other things, the antitrust laws forbid any agreement between or among competitors regarding prices, availability of service, product design, terms of sale, division of markets, allocation of customers or any other activity that unreasonably restrains competition.

It is the responsibility of every NERC participant and employee who may in any way affect NERC's compliance with the antitrust laws to carry out this commitment.

Antitrust laws are complex and subject to court interpretation that can vary over time and from one court to another. The purpose of these guidelines is to alert NERC participants and employees to potential antitrust problems and to set forth policies to be followed with respect to activities that may involve antitrust considerations. In some instances, the NERC policy contained in these guidelines is stricter than the applicable antitrust laws. Any NERC participant or employee who is uncertain about the legal ramifications of a particular course of conduct or who has doubts or concerns about whether NERC's antitrust compliance policy is implicated in any situation should consult NERC's General Counsel immediately.

II. Prohibited Activities

Participants in NERC activities (including those of its committees and subgroups) should refrain from the following when acting in their capacity as participants in NERC activities (e.g., at NERC meetings, conference calls and in informal discussions):

- Discussions involving pricing information, especially margin (profit) and internal cost information and participants' expectations as to their future prices or internal costs.
- Discussions of a participant's marketing strategies.
- Discussions regarding how customers and geographical areas are to be divided among competitors.
- Discussions concerning the exclusion of competitors from markets.
- Discussions concerning boycotting or group refusals to deal with competitors, vendors or suppliers.
- Any other matters that do not clearly fall within these guidelines should be reviewed with NERC's General Counsel before being discussed.

III. Activities That Are Permitted

From time to time decisions or actions of NERC (including those of its committees and subgroups) may have a negative impact on particular entities and thus in that sense adversely impact competition. Decisions and actions by NERC (including its committees and subgroups) should only be undertaken for the purpose of promoting and maintaining the reliability and adequacy of the bulk power system. If you do not have a legitimate purpose consistent with this objective for discussing a matter, please refrain from discussing the matter during NERC meetings and in other NERC-related communications.

You should also ensure that NERC procedures, including those set forth in NERC's Certificate of Incorporation, Bylaws, and Rules of Procedure are followed in conducting NERC business.

In addition, all discussions in NERC meetings and other NERC-related communications should be within the scope of the mandate for or assignment to the particular NERC committee or subgroup, as well as within the scope of the published agenda for the meeting.

No decisions should be made nor any actions taken in NERC activities for the purpose of giving an industry participant or group of participants a competitive advantage over other participants. In particular, decisions with respect to setting, revising, or assessing compliance with NERC reliability standards should not be influenced by anti-competitive motivations.

Subject to the foregoing restrictions, participants in NERC activities may discuss:

- Reliability matters relating to the bulk power system, including operation and planning matters such as establishing or revising reliability standards, special operating procedures, operating transfer capabilities, and plans for new facilities.
- Matters relating to the impact of reliability standards for the bulk power system on electricity markets, and the impact of electricity market operations on the reliability of the bulk power system.
- Proposed filings or other communications with state or federal regulatory authorities or other governmental entities.
- Matters relating to the internal governance, management and operation of NERC, such as nominations for vacant committee positions, budgeting and assessments, and employment matters; and procedural matters such as planning and scheduling meetings.

November 5, 2019

To: Board of Trustees

Re: President's Report

It remains appropriate for us to pause at our November Board of Trustees meeting to remember the anniversary of the 1965 blackout that brought awareness of the reliability coordination needs of the international interconnected bulk power system in North America and ultimately the rise of NERC and the ERO Enterprise. Electricity is fundamental to modern society and nearly 400 million North American citizens rely on an uninterrupted electricity supply to support their way of life. Electric reliability and security depends on a complex fabric of utilities, suppliers, generators, and public/private entities. NERC and the ERO Enterprise strengthens that fabric through our critical role in reliability, resilience, and security.

Given the abbreviated schedule for this quarter's open Board meeting, my report is being provided in written form. In it, I will focus this quarter on external engagement.

CEO Outreach

Since we met in Quebec City, I have had the opportunity to meet with the CEOs of three critical trade associations (EEI's Reliability and Security Committee, NRECA's G&T Managers Association, and the Large Public Power Council). Key discussion topics included an update on the *E-ISAC Long-Term Strategic Plan*, information sharing with the E-ISAC, the status of the Align project, and the current FOIA/CIP NOP administrative proceeding underway at FERC. Roy Thilly joined me at the G&T Managers Meeting and the EEI meetings. Janet Sena attended EEI, and Bill Lawrence accompanied at the G&T Managers and LPPC meetings. I continue to be impressed with the broad level of support I sense from the leaders of the industry across these three trade groups on the mission of the E-ISAC.

Align

There is strong appreciation across the industry for our decision to delay the rollout of the Align tool and focus now on the database security strategy (which was originally targeted to be resolved in 2020). A recent (October 15) meeting with the trade associations, a number of stakeholders, and the Regional Entity CMEP leadership hosted in Atlanta have allowed us to kick start efforts toward resolving a number of key security architecture issues as we move forward with the development of this transformational work management tool. Stan Hoptroff will brief the Board in more detail in our closed TSC meeting on November 6; however there is a path forward that is beginning to clarify that will meet our ERO Enterprise needs and gain the confidence of the stakeholder community.

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Atlanta, GA 30326
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International

We continue to focus on strengthening engagement and connectivity with our international partners. Bill Lawrence and I were invited to participate in the IESO's (Ontario) annual security forum and I provided keynote comments at EEI International's annual conference in September. We participated along with MRO in the E-ISAC's outreach efforts with Manitoba and continue to gain important insights on how to improve the value proposition of the E-ISAC to our international members.

E-ISAC

The E-ISAC team continues to grow in number and capability. The October 3 ESCC Member Executive Committee and Working Group meetings were generally acknowledged as "the best yet" with substantial staff-led discussions on key topics ranging from our evolving view of performance metrics, state of voluntary information sharing and options for increasing it, roll out of planned 24/7 security watch operations, continued expansion and evolution of CRISP and our collaboration with our government partners at DOE and our exploratory work with the Financial Services' Systemic Risk and Resiliency Center (the F-SARC).

We are now actively engaged with the IESO staff in support of the mutual collaboration and information sharing objectives incorporated in the agreement we executed in August. We also executed an MOU with the Oil and Natural Gas ISAC and are finalizing the terms of a more formal collaboration arrangement with the Multi-State ISAC. These arrangements will allow us to work more intentionally and fulsomely to enable important cross-sector situation and international awareness and visibility. We are increasingly engaged in the President's National Infrastructure Advisory Committee (NIAC) and our relationships with our government partners at DOE and DHS, as well as the intelligence community and DOD, continue to strengthen.

Major Security Events

As I write this report in October, we are preparing to co-host our annual Grid Security Conference with SERC in Atlanta. The E-ISAC Engagement and Policy Coordination team has once again designed an outstanding conference agenda for security professionals across the industry to gather, learn, and participate in secure briefings from our government intelligence partners. Keynotes will be provided by Tom Fanning, CEO of the Southern Company; Brian Harrell, Assistant Director, at DHS' Cybersecurity and Infrastructure Security Agency (CISA); and Karen Evans, Assistant Secretary of Energy and the leader of DOE's Office of Cybersecurity, Energy Security, and Emergency Response (CESER). Training and education and staying current on the state of the art in security is a key part of the electricity industry's security posture.

A second aspect of building the industry's security posture is exercising and on November 12-14 we will be conducting the 5th biennial continent-wide grid security exercise, GridEx V. During the two-day distributed play simulation, we, along with industry, will be exercising our crisis action plans. We are particularly excited about a different concept we have developed for the executive tabletop on day three of the drill that will focus on a regional attack with a table top focused on developing a more operational (as opposed to policy) understanding of the cross-sector challenges that would be presented in working to restore the system from such a devastating coordinated attack.

Conclusion

To wrap, I would like to acknowledge both the strength of the NERC officer team, which has demonstrated strong resilience while undergoing a significant transformation over the past year, as well as the Executive Committee of the ERO Enterprise. Both leadership teams are coming together and building alignment around priorities and our “golden circle” value creation model. Seeing both teams develop heightened focus on the mission and our central “why,” as well as how we add value to the industry fabric, has been very gratifying to me over the past 10 months.



November 2019 Regional Report to NERC Trustees

ERO Enterprise working group leaders will meet in Atlanta November 6-7 as part of our continuing transformation efforts. This two day meeting will build upon the work done by the leadership teams across the ERO earlier this year by now involving those who collaborate and work on ERO business on a day-to-day basis, providing a foundation for working group members to understand the ERO Enterprise leadership's vision of the transformation and their role to make that vision a reality. The conference also provides an excellent opportunity for continued relationship building and will foster even greater teamwork.

Important progress is being achieved on not just the structure of the Align tool, but also on the *business processes* behind the Align tool. This will add efficiency and consistency across the ERO Enterprise and is a real and tangible benefit to the development of the tool. The Regions have worked very hard to seek commonality in business practices, often making individual compromises for the betterment of the whole.

The Regions strongly support the proposed ERO Enterprise Long Term Strategy, were instrumental in its drafting, and are committed to ensuring that the strategy is implemented and its vision is realized. We encourage the NERC Board of Trustees to approve and adopt the Strategy.

Regions are working in collaboration with NERC and the North American Transmission Forum (NATF) to better understand some recent facility ratings issues and to promote good supply chain risk practices.

In closing, the relationships, collaboration, teamwork and commonality of purpose across the ERO Enterprise is stronger than it has ever been and continues to improve each day. The Regions appreciate the efforts made by NERC in this area and especially note Jim Robb's tremendous leadership towards an effective and efficient ERO Enterprise.



DRAFT Minutes Board of Trustees

August 15, 2019 | 8:30 a.m.–12:00 p.m. Eastern

Hilton Québec
1100 Boulevard René-Lévesque E
Québec, QC G1R 4P3

Call to Order

Mr. Roy Thilly, Chair, called to order the duly noticed open meeting of the Board of Trustees (the “Board”) of the North American Electric Reliability Corporation (“NERC” or the “Corporation”) in Quebec City, Quebec on August 15, 2019, at 8:30 a.m. Eastern, and a quorum was declared present. The agenda is attached as **Exhibit A**.

Present at the meeting were:

Board Members

Roy Thilly, Chair
Janice B. Case, Vice Chair
Robert G. Clarke
Kenneth W. DeFontes, Jr.
Frederick W. Gorbet
David Goulding
George S. Hawkins
Suzanne Keenan
Robin E. Manning
James B. Robb, President and Chief Executive Officer
Jan Schori
Colleen Sidford

NERC Staff

Charles A. Berardesco, Senior Vice President, General Counsel, and Corporate Secretary
Tina Buzzard, Associate Director
Howard Gugel, Vice President and Director of Engineering and Standards
Sonia C. Mendonça, Vice President, Deputy General Counsel, and Director of Enforcement
James Merlo, Vice President and Director of Reliability Risk Management
Mark G. Lauby, Senior Vice President and Chief Engineer
Janet Sena, Senior Vice President and Director of Policy and External Affairs

NERC Antitrust Compliance Guidelines

Mr. Thilly noted the public nature of the meeting and directed the participants' attention to the NERC Antitrust Compliance Guidelines included with the advance meeting materials. He stated that any additional questions regarding these guidelines should be directed to Mr. Berardesco.

Chair's Remarks

Mr. Thilly welcomed all of the attendees to the meeting, including Mr. Francis Dodge of the Canadian Electricity Association ("CEA"), Mr. Bruce Walker of the U.S. Department of Energy ("DOE"), Mr. David Morton of CAMPUT, Mr. Andy Dodge of the Federal Energy Regulatory Commission ("FERC"), and the Canadian regulators in attendance at the meeting.

Mr. Robb recognized Mr. Berardesco, who will be retiring as NERC's Senior Vice President, General Counsel, and Corporate Secretary on August 31, 2019. He thanked Mr. Berardesco for his years of service to NERC and presented him with the following resolution approved by the Board:

WHEREAS, Charles (Charlie) A. Berardesco has served as Senior Vice President, General Counsel, and Corporate Secretary of the North American Electric Reliability Corporation (NERC) since 2012, including having served as interim President and Chief Executive Officer from November 2017-April 2018;

WHEREAS, Mr. Berardesco in his tenure elevated and enhanced NERC's legal, enforcement, and corporate governance functions in the mission of reliability and security of the grid, and steered the organization through a delicate management transition;

WHEREAS, Mr. Berardesco was integral in developing comprehensive governance guidelines and enhancing the corporate governance processes used by NERC, overseeing the implementation of a risk-based approach to compliance and enforcement of NERC Reliability Standards, and transforming the structure of the ERO Enterprise through the successful integration of two Regional Entity footprints, among many accomplishments; and

WHEREAS, Mr. Berardesco has been a valued colleague and friend to NERC's Board of Trustees and management;

NOW, THEREFORE, BE IT RESOLVED, that the Board of Trustees of the North American Electric Reliability Corporation does hereby convey its deepest gratitude to Charlie Berardesco for his years of commitment and exemplary service and honors him on the occasion of his retirement as Senior Vice President, General Counsel, and Corporate Secretary.

Consent Agenda

Upon motion duly made and seconded, the Board approved the consent agenda as follows:

Minutes

The draft minutes for the June 13, 2019 and May 9, 2019 meetings were approved as presented to the Board at this meeting.

Committee Membership and Charter Amendments

Compliance and Certification Committee Membership

RESOLVED, that the Board hereby approves the appointments of the following individuals to the Compliance and Certification Committee, each for a three-year term effective upon the date of Board approval, as follows:

- Keith Comeaux, Cleco Cajun, Electricity Marketer
- James Crawford, Burns & McDonnell, Small-End-use Electricity Customer
- Mark Hegerle, Federal Energy Regulatory Commission, U.S. Federal
- Kimberly Jones, NC Utilities Commission, U.S. State
- Leigh Mullholland, Capital Power, Merchant Generator
- Thad Ness, Xcel Energy, Investor-Owned Utility
- Jamie Young, MISO, Regional Entity (MRO)

Operating Committee Membership

RESOLVED, that the Board hereby approves the following Operating Committee appointments each for a term of two years, except as noted below:

Operating Committee Annual Election Results – 2019-2021 Term

Sector	Elected Member	Company
Chair	David Zwergel	MISO
Vice Chair	Doug Hils	Duke Energy
1. Investor-Owned Utility	Darryl Yohnk	ITC Holdings
	David Cullum <i>(filling vacancy; term ends September 2020)</i>	American Transmission Company, LLC
2. State/Municipal Utility	Doug Peterchuck	OPPD
3. Cooperative Utility	Keith Carman	Tri-State G&T
4. Federal or Provincial Utility/Federal Power Marketing Administration	Lloyd Linke	WAPA
	Jason Boniface	Hydro One
	Stephane Desbiens	Hydro-Québec TransÉnergie
5. Transmission Dependent Utility	John Stephens	City Utilities of Springfield
6. Merchant Electricity Generator	David Ball	American Electric Power

Sector	Elected Member	Company
7. Electricity Marketer	Greg Darnell	Southern Company
8. Large End-Use Electricity Customer	None	
9. Small End-Use Electricity Customer	Luke Weber	MSOE University
	Robert Blohm	Keen Resources Ltd.
	Garry Baker <i>(filling vacancy; term ends September 2020)</i>	JEA
10. Independent System Operator/Regional Transmission Organization	Wes Yeomans	NYISO
12. State Government	Ryan Laruwe	Michigan Public Service Commission

Planning Committee Membership

RESOLVED, that the Board hereby approves the following Planning Committee appointments each for a term of two years, except as noted below:

Planning Committee Annual Election Results – 2019-2021 Term

Sector	Elected Members	Company
Chair	Brian Evans-Mongeon	Utility Services Inc.
Vice Chair	Joseph Sowell	Georgia Transmission Corp.
1. Investor-Owned Utility	William Allen	Exelon
2. State/Municipal Utility	Gary McAdam	MEAG
3. Cooperative Utility	Paul McCurley	NRECA
	Gordon Pietsch <i>(filling vacancy; term ends September 2020)</i>	Great River Energy
4. Federal or Provincial Utility/Federal Power Marketing Administration	Robert Reinmuller	Hydro One
	Ian Grant	Tennessee Valley Authority
5. Transmission-Dependent Utility	Carl Turner	Florida Municipal Power Agency
6. Merchant Electricity Generator	Todd Snitchler	Electric Power Supply Association
7. Electricity Marketer	Gwen Frazier	Southern Company

Sector	Elected Members	Company
8. Large End-Use Electricity Customer	Suzanne Lemieux	American Petroleum Institute
9. Small End-Use Electricity Customer	Darryl Lawrence	Pennsylvania Office of Consumer Advocate
	Gary Brownfield	Self-employed
10. Independent System Operator/Regional Transmission Organization	Charles Hendrix	Southwest Power Pool
	David Short	Independent Electric System Operator (Ontario)
12. State Government	Christine Ericson	Illinois Commerce Commission

Critical Infrastructure Protection Committee Charter Amendments

RESOLVED, that the Board hereby approves the amended Critical Infrastructure Protection Committee (“CIPC”) charter, substantially in the form presented to the Board at this meeting, to replace the CIPC charter approved by the Board on February 8, 2018.

Appointment of Interim General Counsel, Corporate Secretary

RESOLVED, that the Board hereby appoints Sonia C. Mendonça as Interim General Counsel and Corporate Secretary, effective September 1, 2019.

Regular Agenda

Remarks by Francis Bradley, President and CEO, CEA

Mr. Thilly introduced Mr. Bradley, President and Chief Executive Officer of CEA. Mr. Bradley remarked upon the need to adapt to the changing environment and the need to work together to address challenges facing the interconnected bulk power system. He remarked upon the need to support NERC as it seeks to become more effective and efficient. Mr. Bradley commended NERC for holding costs given industry pressures, but he noted that overall budget increases are higher than inflation. He stated that with increases in E-ISAC costs, NERC must show value to Canadian stakeholders. Mr. Bradley commended NERC for its engagement with Canadian entities and recognition of Canadian efforts.

Remarks by Bruce Walker, Assistant Secretary, DOE

Mr. Thilly introduced Mr. Walker, Assistant Secretary, Office of Electricity, at DOE. Mr. Walker remarked that NERC and DOE continue to work together to address resilience and reliability. He discussed upcoming projects funded by DOE and noted the importance of the Grid Storage Launchpad, a new public-project to support large –scale energy storage.

Remarks by David Morton, CAMPUT Representative to NERC

Mr. Thilly introduced Mr. Morton. Mr. Morton began his remarks by welcoming the attendees to Quebec. He discussed highlights from the August 13, 2019 meeting between the Board and regulators from five

Canadian provinces. Mr. Morton complimented NERC on managing its budget given industry pressure and expressed his appreciation for the outreach being conducted with Canadian entities.

President's Report

Mr. Robb began his report by discussing a recent visit to a Hydro Quebec hydro project and thanking Sylvain Clermont. He noted the importance of having an annual meeting in Canada. Mr. Robb also noted the anniversary of the 2003 blackout and the international aspect of reliability. He recognized Mr. Bradley as the new President and CEO of CEA. Mr. Robb noted the new Memorandum of Understanding with the Ontario Independent Electricity System Operator ("IESO"), and he thanked Peter Gregg working on how to coordinate the work of the E-ISAC and IESO.

Mr. Robb took a moment to remember Mike Assante, who passed away in July, for his outstanding contributions to the security of the bulk power system. He also recognized Commissioner Cheryl LaFleur of FERC upon her upcoming departure from the Commission, noting her strong support of NERC and reliability.

Mr. Robb noted the impact of Mr. Sharp and his service as Interim Chief Financial Officer. He asked that the Board appoint Mr. Sharp as Vice President and Controller. Upon motion duly made and seconded, the Board approved the following resolution:

RESOLVED, that the Board, upon recommendation of the President and the CGHRC, hereby appoints the following individual as an officer of the Corporation:

- Andy Sharp, Vice President and Controller

Mr. Tim Gallagher, co-chair of the ERO Executive Committee, then provided remarks. He noted the anniversary of the 2003 blackout and the importance of working together on reliability. Mr. Gallagher noted the increase in CIP violations across the regions and rising penalties. He stated that the Regional Entities all have voluntary programs to help companies, and he was unaware of any negative effect on a company from participating in these programs. Mr. Gallagher noted the need to provide more consistency amongst the regions and highlighted efforts by the regions under Mr. Robb's leadership to enhance coordination and consistency. He congratulated Jason Blake and the SERC team on the successful integration of FRCC and thanked Stacy Dochoda for her service to the ERO. Mr. Gallagher also wished Commissioner LaFleur and Mr. Berardesco well and thanked them for their service.

Report on Board of Trustees August 13, 2019 Closed Session

Mr. Thilly reported that the Board met with Canadian regulators on August 13, 2019. He noted the importance of these meetings in terms of educating the NERC Board on the history and structure of the Canadian approaches.

Mr. Thilly also reported that, as is its custom, the Board met in closed session with NERC management, and subsequently in executive session without NERC management, to review NERC management activities. In these sessions, the Board discussed confidential matters, including contract, personnel, and

security issues. The Board also discussed legal and regulatory issues. He reported the attention paid to cybersecurity issues and the Board's oversight role.

Board Committee Reports

Corporate Governance and Human Resources Committee

Mr. DeFontes, Committee Chair, reported that the Committee met in open session on August 14, 2019 to review progress on the 2019 work plan priorities and draft 2020 priorities, review draft Board assessment documents and progress in accomplishing the 2019 work plan, and receive an update on staffing and recruiting.

Mr. Clarke then reviewed the process for selecting a new Board chair. He noted that he would be overseeing the process, given Mr. DeFontes's interest in the position. Mr. Clarke noted that Mr. Thilly plans to step down as chair in February 2021, and all trustees have agreed that Mr. DeFontes is the best candidate to succeed him as chair. He reported that Mr. DeFontes will be elected vice chair and chair-elect in February 2020 and will assume the role of chair in February 2021.

Compliance Committee

Ms. Schori, Committee Chair, reported that the Committee met in executive session on June 18, 2019 and on August 13, 2019. She noted that the Committee approved Notices of Penalty and received a presentation on ERO implementation issues in Canada. She also noted the Committee's continued focus on CIP issues, implementing the Align program, and streamlining processes for low risk violation issues.

Finance and Audit Committee

Mr. Clarke, Committee Chair, reported on the open meeting of the Committee held on August 14, 2019 to review the second quarter 2019 unaudited results of operations. Upon motion duly made and seconded, the Board approved the following resolution:

RESOLVED, that the Board, upon recommendation of the Finance and Audit Committee, hereby accepts the Second Quarter 2019 NERC, Combined ERO Enterprise, and Regional Entity Unaudited Results, as presented to the Board at this meeting.

Mr. Clarke also reported that the Committee reviewed the NERC and Regional Entity Proposed 2020 Business Plans and Budgets and associated assessments. After discussion, and upon motion duly made and seconded, the Board approved the following resolutions:

RESOLVED, that the Board hereby approves the following, substantially in the form presented to the Board at this meeting:

- i. The proposed 2020 NERC Business Plan and Budget;
- ii. The proposed 2020 Business Plans and Budgets of the Regional Entities and the Western Interconnection Regional Advisory Board; and

- iii. The proposed 2020 assessments to recover the costs of the approved 2020 budgets, subject to adjustments to reflect final Net Energy for Load numbers, together with such other adjustments as may be necessary.

FURTHER RESOLVED, that NERC management is hereby authorized to make the appropriate filings with ERO governmental authorities and take such further actions and make such further filings as are necessary and appropriate to effectuate the intent of the foregoing resolutions.

Mr. Clarke thanked Ms. Schori for her service as past chair of the Committee.

Enterprise-wide Risk Committee

Mr. Goulding, Committee Chair, reported the Committee met in closed session on August 6, 2019. At its meeting, the Committee reviewed: (1) the status of the 2018 audit plan and status of management responses; (2) the status of the 2019 audit plan; and (3) CCC activities. He highlighted discussion on: (1) Regional Entity consistency in the internal controls evaluation process; and (2) risk evaluation.

Nominating Committee

Mr. Hawkins, Committee Chair, reported on the Committee's ongoing work to identify a new trustee. He noted that while two trustees are stepping down, only one position is being filled as the Board's recent expansion to twelve members was intended to be temporary. Mr. Hawkins reported that the Committee will meet in September to select a list of candidates for interviews.

Technology and Security Committee

Ms. Keenan, Committee Chair, reported that the Committee met in open session on August 14, 2019 to discuss items including: (1) ERO technology efforts, including the Align CMEP technology project, the entity registration tool ("CORES"), and the situational awareness tool ("SAFNR"); and (2) E-ISAC activities, including member information sharing.

Ms. Keenan reported that the rollout of Align is being delayed to allow further work on security and to address stakeholder feedback. With respect to the E-ISAC, she highlighted that the forthcoming Grid Security Conference, scheduled for October 22-25, 2019 in Atlanta, Georgia, will have a focus on diversity and include a women-focused event.

Report by Trustee Rob Manning on Standards Quarterly Activities

Mr. Manning reported on the recent Standards Committee conference calls and meetings, including actions taken by the Committee to authorize initial postings of Reliability Standards, Standard Authorization Requests, and appointment of drafting teams. He noted the work of the Committee on new standards, including those addressing protection systems and supply chain risks, and the ongoing work under Phase II of the Standards Efficiency Review. Mr. Manning also remarked on efforts to address resiliency to electromagnetic pulses following the publication of the EPRI report.

At the conclusion of the reports, Mr. Thilly thanked the NERC staff responsible for supporting each of these meetings.

Standards

Mr. Gugel presented on several Reliability Standards-related projects.

Supply Chain Section 1600 Data Request

Mr. Gugel presented a request for data or information related to supply chain risks, recalling the presentation made at the August 14, 2019 Member Representatives Committee meeting. After discussion, and upon motion duly made and seconded, the Board approved the following resolution:

WHEREAS, in May 2019, the Board accepted in substantial form NERC staff's final report titled *Cyber Security Supply Chain Risks: Staff Report and Recommended Actions*;

WHEREAS, this report recommended that NERC issue a request for data or information under Section 1600 of the NERC Rules of Procedure to obtain information that would enable NERC to better understand the potential supply chain risks associated with low impact BES Cyber Systems;

WHEREAS, the Board, in accepting this report, stated its expectation that NERC would move expeditiously to collect the necessary data and report back to the Board;

WHEREAS, the Board authorized a shortened comment schedule for the proposed request for data at its June 13, 2019 meeting;

NOW, THEREFORE, BE IT RESOLVED that the Board, pursuant to NERC's authority under Section 1600 of the NERC Rules of Procedure, hereby approves the supply chain risk assessment data request as presented to the Board at this meeting and authorizes NERC to issue it to reporting entities.

Mr. Thilly noted the importance and urgency of this data request and urged industry to use its best efforts to respond fully. He also thanked the North American Transmission Forum for their recent publications to help industry address supply chain cybersecurity issues.

Reliability Standard PRC-006-NPCC-2 – Automatic Underfrequency Load Shedding

Mr. Gugel stated that no Board action is being requested on the NPCC Regional Reliability Standard at this time due to the identification of an errata issue that will be resolved through the NPCC standard development process.

Regional Reliability Standard BAL-002-WECC-3 – Contingency Reserve

Mr. Gugel presented the proposed WECC Regional Reliability Standard. After discussion, and upon motion duly made and seconded, the Board approved the following resolutions:

RESOLVED, that the Board hereby adopts the proposed Regional Reliability Standard BAL-002-WECC-3, as presented to the Board at this meeting.

FURTHER RESOLVED, that the Board hereby approves the associated implementation plan, as presented to the Board at this meeting.

FURTHER RESOLVED, that the Board hereby approves the Violation Risk Factors and Violation Severity Levels for the proposed Regional Reliability Standard, as presented to the Board at this meeting.

FURTHER RESOLVED, that the Board hereby approves the proposed retirement of Regional Reliability Standard BAL-002-WECC-2a, as presented to the Board at this meeting.

FURTHER RESOLVED, that NERC management is hereby authorized to make the appropriate filings with ERO governmental authorities and take such further actions and make such further filings as are necessary and appropriate to effectuate the intent of the foregoing resolutions.

Other Matters and Reports

Policy Input and Member Representatives Committee Meeting

Mr. Thilly thanked the MRC for its policy input provided at the August 14, 2019 MRC meeting. Mr. Gorbet thanked those participating in the committee restructuring proposal, including Mr. Lauby and his team and the leadership of Jennifer Sterling and Greg Ford.

ReliabilityFirst Bylaws Amendments

Ms. Mendonça presented proposed amendments to the ReliabilityFirst bylaws. She explained that the amendments are intended to allow ReliabilityFirst to adopt the NERC hearing process. After discussion, and upon motion duly made and seconded, the Board approved the following resolutions:

RESOLVED, that the Board hereby approves the proposed amendments to the Bylaws of ReliabilityFirst Corporation, as presented to the Board at this meeting.

FURTHER RESOLVED, that NERC management is hereby authorized to make the appropriate filings with ERO governmental authorities and take such further actions and make such further filings as are necessary and appropriate to effectuate the intent of the foregoing resolution.

2019 ERO Enterprise Dashboard Update

Mr. Merlo provided an update on the 2019 ERO Enterprise Dashboard, including reviewing each of the metrics on the dashboard and performance through the second quarter of 2019. He thanked the Regional Entities for providing data in a timely and accurate manner.

Mr. Thilly remarked that this is the first year of the Dashboard, and that the Board intends to review it in February to determine whether any refinements need to be made.

Task Force to Address Resilience to Electromagnetic Pulses

Mr. Gugel reported that a task force was formed to provide high level leadership and guidance to address resiliency to electromagnetic pulses. He reviewed the phased approach, timeline, and working groups.

Mr. Gugel reported that the task force hopes to provide a report to the Board in the fourth quarter of 2019.

SERC/FRCC Integration

Jason Blake, CEO of SERC, provided an update on the SERC/FRCC integration efforts. He reported that the transition was virtually seamless for registered entities in SERC and FRCC, and he noted that all remaining FRCC staff accepted offers to join SERC. Mr. Blake also noted the inclusion of former FRCC directors on the SERC board. He discussed the importance of support provided by NERC, SERC staff, and Stacy Dochoda in achieving a successful integration.

Mr. Blake introduced Greg Ford, Chair of the SERC Board of Directors, who reported on the work the SERC Board has done to enhance its overall governance approaches and consider best practices. Mr. Ford reported that SERC is transitioning its large member board to an 18-member board with sector representation. He noted SERC's goal to have its new governance approach in place by January 2021.

Reliability Coordinator Function in the Western Interconnection

Melanie Frye, WECC president and CEO, provided an update on the Western Reliability Coordinator issues. She reviewed the current proposed Reliability Coordinator map and transition timelines, noting that Gridforce is not shown at this time. Ms. Frye reviewed the makeup of the Reliability Coordinator certification teams, noting that they are broad based and include NERC staff and FERC observers. She reported that FERC recently approved the WECC Variance to the IRO-002 standard, which will require the development of a common Interconnection-wide methodology for monitoring and modeling. Ms. Frye reviewed the remaining steps and complimented the Peak Reliability team for its work in ensuring a successful transition.

Committee Reports

Representatives of the Standing Committees provided reports to the Board highlighting items from their written reports, which had been included with the advance meeting materials.

Operating Committee

David Zwergel, Committee Chair, referenced the written report and highlighted certain items, including the Committee's approval of a reference document and a revised guideline.

Planning Committee

Brian Evans-Mongeon, Committee Chair, referenced the written report and highlighted the Committee's work on industry transformation issues. He also noted that the Committee is reviewing its work flow processes and work with subgroups.

Critical Infrastructure Protection Committee

Marc Child, Committee Chair, referenced the written report and highlighted the Committee's work on supply chain risk management issues, security and cloud-based services, and its support of the supply

chain data request. He also discussed work being done to support the move to the new proposed integrated committee structure.

Personnel Certification Governance Committee

Michael Anderson, Committee Chair, provided an update on the activities of the Committee, referencing the materials provided in the advance agenda package. He thanked NERC staff for their support of recent meetings and announced that he will be stepping down from his position. Mr. Thilly thanked Mr. Anderson for his service.

Member Representatives Committee

Mr. Ford, Committee Chair, summarized the matters addressed at the August 14, 2019 MRC meeting, including: (1) the Nominating Committee report; (2) policy input to the Board on the budget; (3) E-ISAC activities; (4) Align implementation; and (5) the NERC committee restructuring effort. He thanked the attendees for their contributions.

Standards Committee

Amy Casuscelli, Committee Vice Chair, referenced the quarterly report included in the advance agenda package and summarized recent Committee activities, including the initiation of new standard development projects and ongoing monitoring of the Standards Efficiency Review project.

Reliability Issues Steering Committee

Nelson Peeler, Committee Chair, provided an update on the activities of the Committee, referencing the report provided at the August 14, 2019 MRC meeting. He stated that he appreciated the discussion at the MRC meeting and that he looks forward to delivering a final 2019 ERO Risk Priorities report in November.

Compliance and Certification Committee

Jennifer Flandermeyer, Committee Chair, referred to the written report included in the advance agenda package and the Committee's report at the August 14, 2019 MRC meeting.

She also presented two revised CCC procedure documents for the Board's approval. After discussion, and upon motion duly made and seconded, the Board approved the following resolutions:

RESOLVED, that the Board hereby approves the revised procedure document CCCPP-001, Monitoring Program for NERC's Adherence to NERC's Rules of Procedure for Compliance Monitoring and Enforcement, as presented to the Board at this meeting.

RESOLVED, that the Board hereby approves the revised procedure document CCCPP-011-2, Procedure to Become a Prequalified Organization Eligible to Submit Implementation Guidance to the ERO, as presented to the Board at this meeting.

Electricity Subsector Coordinating Council

Mr. Robb reported on activities of the ESCC, noting the ESCC's focus on the cyber threats to the electricity sector. He highlighted the ESCC's state outreach efforts, support of DOE in its vision of broader data sharing across industry, and continued strong support of the E-ISAC. Mr. Robb noted that the ESCC is

focused on the upcoming Grid Security Exercise, including using the table top portion to enhance real operational coordination across multiple sectors.

Forum and Group Reports

North American Energy Standards Board (NAESB)

Michael Desselle, Chair of the NAESB Board of Directors, discussed NAESB's work on items of mutual interest, including addressing issues surrounding the dissolution of Peak Reliability and addressing cyber-related business practices.

North American Transmission Forum

Tom Galloway, Forum Chief Executive Officer, referenced the written report and highlighted certain items, including the Forum's work on supply chain issues and the development of practices for grid security emergencies. He discussed recent meetings with NERC on future collaboration, including a new Memorandum of Understanding, and he stated that he hopes to broaden interaction with the Regional Entities in the future.

North American Generator Forum

Mr. Shriver, Forum Chief Operating Officer, referenced the written report and thanked NERC for its support for its annual meeting and the upcoming workshop on battery storage.

Adjournment

There being no further business, and upon motion duly made and seconded, the meeting was adjourned.

Submitted by,



Charles A. Berardesco
Corporate Secretary

Personnel Certification Governance Committee Membership

Action

Approve

Background

The Personnel Certification Governance Committee is seeking Board of Trustees approval to name Cory Danson, Western Area Power Administration, as the new chair of the PCGC for a term of two years.

The current chair, Mike Anderson, AEP, served a two-year term from 2018-2019. Mike is not seeking renewal due to his position change at AEP.

Margaret Quispe from SPP, will continue on as vice-chair.

Standards Committee Membership

Action

Approve

Summary

The Board of Trustees is requested to approve the following leadership appointments to the Standards Committee for a term of two years:

- Amy Casuscelli of Xcel Energy, to serve as chair; and
- Todd Bennett from Associated Electric Cooperative, Inc. to serve as vice chair.

Critical Infrastructure Protection Committee Membership

Action

Approve

Summary

- The CIPC charter calls for elections for the chair and vice-chairs to occur at the September meeting in odd-numbered years.
- This year's nomination and election processes were conducted with the expectation that the proposed restructuring of the technical committees could mean the duration of the coming term is limited.
- At the CIPC meeting on September 17-18, the designated nominating subcommittee presented its recommendation that the current chair and two vice-chairs remain in those positions for the upcoming term.
- There were no further nominations, and CIPC members voted unanimously to approve the recommendation of the nominating subcommittee
- Request Board approval for the following individuals to serve in the designated positions for the term that commences on January 1, 2020:
 - Chair: Marc Child, Great River Energy
 - Vice-Chair: David Grubbs, City of Garland
 - Co-Vice Chair: David Revill, Georgia Systems Operations Corporation
- The remaining positions on the Executive Committee will be filled at the December meeting.

Compliance and Certification Committee Membership

Action

Approve

Background

The CCC is recommending that the Board of Trustees approve the following membership appointments for a term of three years.

- Justin MacDonald, Midwest Energy, Inc., Cooperative
- Ashley Stringer, Oklahoma Municipal Power Authority, Transmission Dependent Utility

2020-2022 Reliability Standards Development Plan

Action

Approve the 2020-2022 Reliability Standards Development Plan (RSDP) and authorize NERC staff to file with applicable regulatory authorities.

Background

The annual RSDP sets out a plan for Reliability Standards development over a three-year horizon and is prepared in accordance with Section 310 of the NERC Rules of Procedure. The 2020-2022 RSDP focuses on addressing Federal Energy Regulatory Commission directives, emerging risks, and the Standards Efficiency Review. The RSDP also includes time frames and anticipated resources for each project under development as well as considerations for cost effectiveness. NERC and the Standards Committee (SC) will continue to work with the other NERC committees and task forces to bridge any potential reliability gaps and risks.

The 2020-2022 RSDP was posted for a public comment period from August 14, 2019 through September 5, 2019. Modifications were made to the RSDP based on industry comments. The SC endorsed the RSDP at its September 18, 2019 meeting.

Additional Information

A link to the 2020-2022 RSDP is included for reference: [2020-2022 RSDP](#).

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Reliability Standards Development Plan

2020-2022

November 5, 2019

RELIABILITY | RESILIENCE | SECURITY



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Table of Contents

Background	iii
Executive Summary.....	Error! Bookmark not defined.
2019 Progress Report.....	1
FERC Directives.....	1
Projects Completed in 2019.....	1
2020 Projects.....	2
Projects Continuing into 2020	2
High Priority.....	2
Medium Priority.....	2
Low Priority.....	3
Other Projects Continuing into 2020	3
NERC Reliability Standards Efficiency Review Continuation	3
Other Projects Commencing	3

Background

As described herein, the 2020-2022 Reliability Standards Development Plan (RSDP) builds upon the goals of the previous RSDPs with an additional objective of implementing changes based on the Standards Efficiency Review (SER) efforts that began in 2018.

Pursuant to Section 310 of the NERC Rules of Procedure, NERC is required to develop and provide to applicable governmental authorities an annual RSDP for Reliability Standards development. Each annual RSDP must include a progress report comparing results achieved to the prior year's RSDP. NERC is required to consider the comments and priorities of the applicable governmental authorities in developing and updating the annual RSDP. NERC also provides the RSDP to the NERC Standards Committee (SC) for review and posts the RSDP for industry comment.

Executive Summary

This 2020-2022 RSDP provides insight into standards development activities anticipated at the time of publication, so that stakeholders may make available resources needed to accomplish the standards development objectives. Additional activities such as Requests for Interpretation and Regional Variance development may impact the plan, but are not included at this time. In order to help the industry understand resource requirements for each project, the RSDP now shows time frames and anticipated resources for each project under development.

The 2020–2022 RSDP recognizes the diligent work over the last few years in transforming the body of NERC Reliability Standards into a mature state while shifting the focus of the standards program to Periodic Reviews, Federal Energy Regulatory Commission (FERC) directives, emerging risks, Standards Authorization Requests (SARs), and the SER. The 2020-2022 RSDP also contemplates that the work of the various NERC technical committees and working groups thereunder, may result in one or more SARs and subsequent standards projects. The 2020-2022 RSDP also includes plans for completing the Periodic Reviews initiated in prior years.

Periodic Reviews and initiatives, such as the next steps of Phase 2 of the SER project, also enable NERC to identify requirements that do little to promote reliability, and should therefore be retired. As with the 2019-2021 RSDP, Periodic Reviews will occur at a measured pace compared to the level of activity and pace of standards development during recent years. Additionally, Periodic Reviews will be aligned with the strategic consideration of reviewing standard families that are interrelated.¹ Also, the Standards Grading that was paused due to the SER project will resume in 2020.

While most of the work in the next three years will focus on Periodic Reviews, SER implementation, and Standards Grading, there may be new or emerging risks identified that could generate new standards development projects. NERC will continue to seek input and recommendations from the Reliability Issues Steering Committee (RISC) with regard to emerging or potential risks to Bulk Electric System (BES) reliability that may require revisions to existing standards or new standards development.

To help determine impact of potential risk to BES reliability, NERC will use a variety of feedback mechanisms, including but not limited to, the Compliance Monitoring and Enforcement Program, RISC profiles, Events Analysis, and Compliance violation statistics, as well as any published “Lessons Learned.” The Regional Entities also have feedback mechanisms in place to solicit comments from industry and to help identify approaches to meet concerns and provide input to the standards. Input into standards will also continue to be coordinated with the North American Energy Standards Board as appropriate. In assessing feedback to create new or revised standards, NERC will focus on risk, reliability or security data, and enforcement information to determine whether a standard revision is the best tool to initially address the reliability risk.

¹ The Periodic Review standing review team grades the standards prior to conducting Periodic Reviews. The team includes representatives from NERC, the Regional Entities, and NERC technical committees. If the standard is revised through the standard development process in response to a Periodic Review recommendation(s), the Periodic Review standing review team will re-grade the standard with the revised language.

2019 Progress Report

Pursuant to Section 310 of the NERC Rules of Procedure, NERC offers the following progress report on Reliability Standards development in 2018.

FERC Directives

As of August 31, 2019, there are 12 outstanding FERC directives, 6 of which are related to standards and being resolved through the standards development process. The status of the Standards directives are reported quarterly to the NERC Board of Trustees (Board).

Projects Completed in 2019

All of the projects from the previous RSDP are complete or expected to be complete this year, except the following which will continue into 2020:

1. Project 2015-09 [Establish and Communicate System Operating Limits](#),
2. Project 2016-02 [Modifications to CIP Standards](#),
3. Project 2017-01 [Modifications to BAL-003-1.1](#) (phase 2),
4. Project 2017-07 [Standards Alignment with Registration](#),
5. Project 2017-03 [FAC-008-3 Periodic Review](#),²
6. Project 2017-04 [Periodic Review of Interchange Scheduling and Coordination Standards](#), and
7. Project 2017-05 [NUC-001-3 Periodic Review](#).

Additional project information is available on the NERC website on the Standards web page.³ Also, the SER completed an initial assessment of the entire body of standards in 2018 prior to initiating the Standards development process to consider any changes to the body of Reliability Standards in 2019. The next phase of the SER is set to continue into 2020.

The following projects have been or are planned to be completed in 2019 (actual and anticipated Board adoption dates are noted):

1. Project 2016-02 [Modifications to CIP Standards](#) (CIP-003 directive on malicious code) (adopted by the Board in May 2019)
2. Project 2018-01 [Canadian-specific Revisions to TPL-007-2](#) (adopted by the Board in February 2019)
3. Project 2018-02 [Modifications to CIP-008 Cyber Security Incident Reporting](#) (adopted by the Board in February 2019)
4. Project 2018-03 [Standards Efficiency Review Retirements](#) (adopted by the Board in May 2019)
5. Project 2017-01 [Modifications to BAL-003-1.1](#) (phase 1) (projected to be adopted by the Board in November 2019)

² Final recommendations will be brought to the Board in 2020 for any outstanding periodic reviews, but the periodic review teams did complete an initial assessment. However, the teams were paused to allow the SER project to complete initial retirements.

³ As of the date of publication, the subject web page resides at <http://www.nerc.com/pa/Stand/Pages/default.aspx>.

2020 Projects

Projects Continuing into 2020

In determining high, medium, or low priority designations for projects as listed in this RSDP, the following factors were taken into consideration:

1. Outstanding regulatory directives with filing deadlines (High Priority)
2. RISC category rankings of high impact with consideration of probability of occurrence (High or Medium Priority)
3. Potential reliability risks from stakeholders provided through feedback mechanisms (High, Medium, or Low Priority, based on the risk)
4. Outstanding regulatory directives without regulatory deadlines or “soft directives” such as considerations (High or Medium Priority)
5. Outstanding requirements that are known candidates for retirement (Medium or Low Priority)
6. Any known adverse content and quality assessments (likely Low Priority, as any reliability gaps identified have already been addressed)

High Priority

- Project 2016-02 Modifications to CIP Standards (virtualization) (drafting estimated to be completed by November 2020 requiring approximately 11 industry subject matter experts for approximately 120 work hours each for the remaining part of this project)
- Project 2015-09 Establish and Communicate System Operating Limits - FAC-010, FAC-011, FAC-014 (drafting estimated to be completed by May 2020 requiring approximately 10 industry subject matter experts for approximately 50 work hours each for the remaining part of this project)
- Project 2018-04 Modifications to PRC-024-2 (drafting estimated to be completed by February 2020 requiring approximately 10 industry subject matter experts for approximately 50 work hours each for the remaining part of this project)
- Project 2019-01 Modifications to TPL-007-3 (drafting estimated to be completed by May 2020 requiring approximately nine subject matter experts for approximately 70 work hours each for this project)
- Project 2019-03 Cyber Security Supply Chain Risks (drafting estimated to be completed by December 2020 requiring approximately nine subject matter experts for approximately 90 work hours each for this project)
- Project 2019-06 Cold Weather Preparedness (drafting estimated to be completed by December 2020 requiring approximately nine subject matter experts for approximately 90 work hours each for this project)

Medium Priority

- Project 2017-01 Modifications to BAL-003-1.1 (phase 2) (drafting estimated to be completed by November 2020 requiring approximately ten subject matter experts for approximately 40 work hours each for this project)
- Project 2019-02 BES Cyber System Information Access Management (drafting estimated to be completed by August 2020 requiring approximately ten subject matter experts for approximately 40 work hours each for this project)
- Project 2019-05 Modifications to PER-003-2 (drafting estimated to be completed by August 2020 requiring approximately eight subject matter experts for approximately 40 work hours each for this project)

Low Priority

- Project 2019-04 Modifications to PRC-005-6 (drafting estimated to be completed by August 2020 requiring approximately eight subject matter experts for approximately 40 work hours each for this project)

Other Projects Continuing into 2020

NERC Reliability Standards Efficiency Review Continuation

In 2018, NERC began using both internal ERO Enterprise resources and industry resources to evaluate candidates for potential Reliability Standard retirements. NERC solicited industry participants to evaluate possible candidate requirements that may no longer be necessary to support reliability or address current risks to the Bulk Power System (BPS). Through open and transparent industry participation, the SER teams submitted a SAR to the SC in order to implement recommended changes to the body of Reliability Standards. The SAR was accepted at the August 2018 SC meeting, and the effort retired numerous standards. The next phase of the SER project will determine if there are additional requirements that could be retired by making small modifications to the standard. The next phase will also review the CIP family of standards.

NERC will continue to coordinate with the industry team to ensure all of the information developed through previous Standards Grading efforts, which includes consideration of content, quality, cost, and reliability impact analysis, align with the SER projects. Thus, some projects such as the Standards Alignment with Registration and periodic reviews may have some natural synergies that allow for other projects to be combined with the SER initiative.

Other Projects

Currently, no Reliability Standards are due for periodic review in 2020, but any outstanding or paused Periodic Review projects will be completed. The Periodic Reviews will coordinate timing with the next phase of the SER project to ensure the initiatives work together to review the standards that may need to be modified. Additionally, SARs, emerging risks to the BPS, and FERC regulatory directives that may occur subsequent to publishing this RSDP may prompt additional projects. Additionally, all new projects will continue to attempt to transition the current Guidelines and Technical Basis to a separate Technical Rational documents when applicable. Finally, as noted above, the Standards Grading effort will resume in 2020 and will be attached in the corresponding RSDP.

Reliability Standard BAL-003-2 – Frequency Response and Frequency Bias Setting

Action

Adopt the following standard documents and authorize staff to file with applicable regulatory authorities:

- **Reliability Standard - BAL-003-2 – Frequency Response and Frequency Bias Setting**

[\[BAL-003-2 Standard\]](#) [\[Redline to last approved\]](#)

VRFs and VSLs

[\[VRF/VSL Justification\]](#)

Retirements

[BAL-003-1.1 - Frequency Response and Frequency Bias Setting](#)

Implementation Plan for BAL-003-2 – Frequency Response and Frequency Bias Setting

[\[Implementation Plan\]](#)

Adopt the revised Reference Document and authorize staff to file with applicable regulatory authorities:

[\[Procedure for ERO Support of Frequency Response and Frequency Bias Setting Standard\]](#)

Background

Reliability Standard BAL-003-1 became effective in 2015. Supporting documents for BAL-003-1 were developed using engineering judgment on the data collection and process needed to determine the Interconnection Frequency Response Obligation (IFRO), as well as the processing of raw data to determine compliance. In the course of implementing the standard, minor errors in assumptions and process inefficiencies have been identified. Further, it was anticipated that as frequency response improves, the approaches embedded in the standard for collecting annual samples would need to be modified.

In addition to fixing the inconsistencies identified in the Frequency Response Annual Analysis Report¹ (FRAA) supporting procedural and process steps have been removed from Attachment A and reassigned to the Procedure for ERO Support of Frequency Response and Frequency Bias Setting Standard, an ERO and NERC Operating Committee approved Reference Document, such that timely process improvements can be made as future lessons are learned.

Summary

The BAL-003-2 Phase I portion of the project revises the BAL-003-1.1 standard and process documents to address: (1) the inconsistencies in calculation of IFROs due to Interconnection Frequency Response performance changes of Point C and/or Value B; (2) the Eastern Interconnection Resource Contingency Protection Criteria; (3) the frequency of nadir point limitations (currently limited to t0 to t+12); (4) clarification of language in Attachment A, i.e.

¹ See e.g., FRAA Report, at p. v, available at, http://www.nerc.com/comm/OC/Documents/2016_FRAA_Report_2016-09-30.pdf (discussing IFRO calculations).

related to Frequency Response Reserve Sharing Groups (FRSG) and the timeline for Frequency Response and Frequency Bias Setting activities; and (5) the BAL-003-1.1 FRS Forms enhancements that include the ability to collect and submit FRSG performance data. The revisions address the inconsistencies identified in the FRAA.

Further, and as noted above, supporting procedural and process steps have been removed from Attachment A to the standard and placed in the *Procedure for ERO Support of Frequency Response and Frequency Bias Setting Standard* to allow NERC to make timely process improvements in the future as new information is learned.² The proposed revisions to this procedure were posted alongside the draft BAL-003-2 standard and were discussed during the March 27-28, 2019 Standard Drafting Team (SDT) meeting and the April 30-May2, 2019 SDT meeting. The revised procedure was presented to the Operating Committee for informational purposes on March 5, 2019.

Proposed Reliability Standard BAL-003-2 was posted for a 45-day comment and ballot period from December 4, 2018 to January 17, 2019, with 96.41% approval and 92.02% quorum. The proposed standard was posted for final ballot from October 10 to October 21, 2019. The results of the final ballot will be reviewed with the Board at the meeting.

² As provided in the Procedure, any changes must be:

...[S]ubmitted to the ERO or its designee for consideration. The request must provide a technical justification for the suggested modification. The ERO shall publicly post the suggested modification for a 45-day formal comment period and discuss the request in a public meeting. The ERO will make a recommendation to the NERC Board of Trustees (BOT), which may adopt the revision request, reject it, or adopt it with modifications. Any approved revision to this Procedure shall be filed with the Federal Energy Regulatory Commission (FERC) for informational purposes.

NERC Staff Analysis

To evaluate the target IFROs in the proposed standard, NERC staff performed dynamic simulations for the Eastern, Texas, and Western Interconnections. These results of these simulations are described below. They should be considered conservative in nature since load response was not modeled in the simulations.

Table 1: Comparison of Proposed RLPCs and IFROs					
	Eastern (EI)	Western (WI)	Revised WI	ERCOT (TI)	Units
Current RLPC	4,500	2,626	2,626	2,750	MW
Current IFRO	1,015	858	858	381	MW/0.1 Hz
Proposed RLPC	3,209	2,626	2,850	2,750	MW
Proposed RLPC Description	Manitoba DC tie plus Grand Gulf Nuclear Unit		NW RAS maximum loss of 2,850 MW	South Texas Project Nuclear Units 1 & 2	
Proposed IFRO	784	1,018	835	380	MW/0.1 Hz

Dynamic simulations successfully validated an EI IFRO as low as 787 MW/0.1 Hz with a resulting minimum Point C frequency nadir of 59.511 Hz; which is 11 mHz above the EI UFLS of 59.500 Hz.

Dynamic simulations successfully validated a TI IFRO as low as 378.1 MW/0.1 Hz with a resulting minimum Point C frequency nadir of 59.302 Hz; this is 2 mHz above the TI UFLS of 59.300 Hz.

Dynamic simulations were performed for the Western Interconnection (WI) and successfully validated a WI IFRO as low as 1,013 MW/0.1 Hz with a resulting minimum Point C frequency nadir of 59.534 Hz; this is 34 mHz above the WI UFLS of 59.500 Hz.

The Project 2017-01 standard drafting team determined that the above-listed results supported the proposed IFRO target values and that no further studies are necessary.

Pertinent FERC Directives

None

Unresolved Minority Issues

There were no unresolved minority issues.

Additional Information

A link to the project history and files is included here for reference:

[\[Project 2017-01 Modifications to BAL-003-1.1\]](#)

Regional Reliability Standard PRC-006-NPCC-2 – Automatic Underfrequency Load Shedding

Action

Adopt the following standard documents and authorize NERC staff to file with applicable regulatory authorities:

- Regional Reliability Standard – PRC-006-NPCC-2 – Automatic Underfrequency Load Shedding
- [\[PRC-006-NPCC-2\]](#) [\[Redline to last approved\]](#) [\[Summary of Changes\]](#) [\[Mapping Document\]](#)
- VRFs/VSLs
[\[VRFs and VSLs\]](#)
- Implementation Plan
[\[Implementation Plan\]](#)
- Retirement
[\[PRC-006-NPCC-1 – Automatic Underfrequency Load Shedding\]](#)

Background

On March 21, 2015, the Northeast Power Coordinating Council (NPCC) received a Regional Standards Authorization Request seeking a review of Regional Reliability Standard PRC-006-NPCC-1 for redundancy with the implementation of PRC-006-1, PRC-006-2, PRC-024-1 and PRC-024-2.

Proposed Regional Reliability Standard PRC-006-NPCC-2 was approved by the NPCC Board of Directors on May 1, 2019. On September 5, 2019, the NPCC Board of Directors approved a revised version of the proposed Regional Reliability Standard PRC-006-NPCC-2 that corrected an errata involving a mathematical expression in one of the figures in the proposed Regional Reliability Standard.

Summary

The NPCC drafting team reviewed Regional Reliability Standard PRC-006-NPCC-1 and made the following changes:

1. Removed redundancies with the most recent continent-wide NERC Reliability Standard, PRC-006-3. Some of the redundancies removed from the Regional Standard PRC-006-NPCC-2 are those related to:
 - a. The Québec Interconnection portion of NPCC shall implement an automatic UFLS program in accordance with Attachment C Table 4;
 - b. Requirements for a UFLS Database;
 - c. Notification of changes to load distribution needed to satisfy UFLS program performance characteristics; and

- d. Development of an implementation plan when changes to load distribution are needed.
2. Ensured that UFLS island boundaries, once identified, are provided upon request, to affected entities.
3. Added minimum time UFLS relay time delay to Attachment C tables and removed as a separate requirement.
4. Added the ability for a Transmission Owner or Distribution Provider to calculate net load shed for UFLS if direct metering is not available.
5. Made a number of minor clarifications, such as requiring the Underfrequency trip relay must to be set to operate “on or below” the appropriate curve. (In Version 1 it currently states “below”, and questions arose whether settings on the curve were considered in compliance.)
6. Clarified that any compensatory load shedding for non-conformance with the Underfrequency trip specification for generation (in service prior to July 1, 2015) must be within the same island as the generator resides.

NERC staff supports the proposed Regional Reliability Standard. NERC posted proposed PRC-006-NPCC-2 for a 45-day comment period from May 8, 2019 through June 21, 2019. No adverse comments were received.

Pertinent FERC Directives

None.

Additional Information

Links to the relevant project history pages and files are included here for reference:

[\[NPCC Standards in Development: PRC-006-NPCC: Automatic Underfrequency Load Shedding\]](#)

2019 ERO Reliability Risk Priorities Report

Action

Accept

Summary

The Reliability Issues Steering Committee (RISC) is an advisory committee to the NERC Board of Trustees (Board). The RISC provides key insights, priorities, and high-level leadership for issues of strategic importance to BPS reliability. The RISC advises the Board, NERC standing committees, NERC staff, regulators, REs, and industry stakeholders to establish a common understanding of the scope, priority, and goals for the development of solutions to address emerging reliability issues. The RISC provides guidance to the ERO Enterprise and the industry to effectively focus resources on the critical issues to improve the reliability of the bulk power system (BPS).

The ERO Reliability Risk Priorities Report (RISC Report) presents the results of the RISC's continued work to strategically define and prioritize risks to the reliable operation of the BPS and thereby provide recommendations to the Board regarding the approach that NERC and industry representatives should take to enhance reliability and manage those risks.

The RISC reviewed the proposed final RISC report, which included recommended amendments based on stakeholder input, at their meeting on October 22, 2019 and with quorum approved the report and recommended for Board of Trustees acceptance at the November 5, 2019 open Board of Trustees meeting.



2019 ERO Reliability Risk Priorities Report

November 2019



Table of Contents

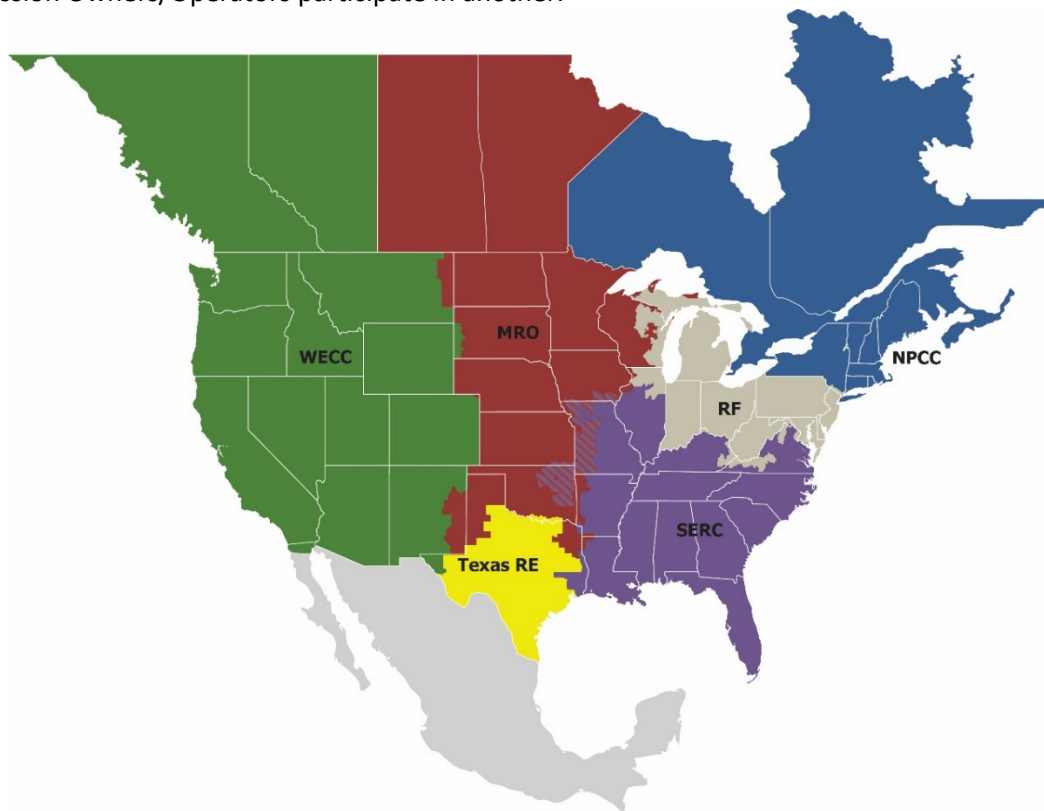
Preface	iii
Executive Summary	5
Common Themes and Emerging Trends.....	6
Background and Introduction	8
Inputs to the Risk Profiles.....	8
Prioritization of Inherent Priority Risks	12
Risk Groupings	12
Risk Profiles	14
Risk Profile #1: Grid Transformation.....	14
Risk Profile #2: Extreme Natural Events	18
Risk Profile #3: Security Risks	21
Risk Profile #4: Critical Infrastructure Interdependencies	24

Preface

Electricity is a key component of the fabric of modern society and the Electric Reliability Organization (ERO) Enterprise serves to strengthen that fabric. The vision for the ERO Enterprise, which is comprised of the North American Electric Reliability Corporation (NERC) and the six Regional Entities (RE), is a highly reliable and secure North American bulk power system (BPS). Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.

Reliability | Resilience | Security
Because nearly 400 million citizens in North America are counting on us

The North American BPS is divided into six RE boundaries as shown in the map and corresponding table below. The multicolored area denotes overlap as some load-serving entities participate in one Region while associated Transmission Owners/Operators participate in another.



MRO	Midwest Reliability Organization
NPCC	Northeast Power Coordinating Council
RF	ReliabilityFirst
SERC	SERC Reliability Corporation
Texas RE	Texas Reliability Entity
WECC	Western Electricity Coordinating Council

The Reliability Issues Steering Committee (RISC) is an advisory committee to the NERC Board of Trustees (Board). The RISC provides key insights, priorities, and high-level leadership for issues of strategic importance to BPS reliability. The RISC advises the Board, NERC committees, NERC staff, regulators, REs, and industry stakeholders to establish a common understanding of the scope, priority, and goals for the development of solutions to address emerging reliability issues. The RISC provides guidance to the ERO Enterprise¹ and the industry to effectively focus resources on the critical issues to improve the reliability of the BPS.

This ERO *Reliability Risk Priorities Report* (RISC Report) presents the results of the RISC's continued work to strategically define and prioritize risks to the reliable operation of the BPS and thereby provide recommendations to the Board regarding the approach that NERC, the ERO, and industry should take to enhance reliability and manage those risks.

¹ ERO Enterprise is interpreted to mean NERC, the Regional Entities, and the technical committees of NERC.

Executive Summary

The primary objective of the *2019 ERO Risk Priorities Report* is to highlight risks that merit attention and recommend actions that align with those risks. This report differs from other ERO reports in that it is a forward-looking view of the BPS. For example, this is in contrast to the *State of Reliability*² report, which reviews data from previous years to draw objective conclusions about emerging risks and monitors their mitigation.

On September 13, 2019, an initial draft of the report was posted for stakeholder comments.

This report reflects the collective opinion of the RISC membership regarding the priorities. The RISC reviewed and assembled information from ERO Enterprise stakeholders and policymakers³ and focused subgroup work to develop an initial composite set of risk profiles. Further review and consolidation resulted in four high level risks: Grid Transformation, Extreme Natural Events, Security Risks, and Critical Infrastructure Interdependencies. The image below illustrates the encapsulation of the identified risks that are further detailed in the [Risk Profiles](#) section.

Grid Transformation



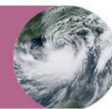
- A. Bulk Power System Planning
- B. Resource Adequacy and Performance
- C. Increased Complexity in Protection and Control Systems
- D. Situational Awareness Challenges
- E. Human Performance and Skilled Workforce
- F. Changing Resource Mix

Security Risks



- A. Physical
- B. Cyber
- C. Electromagnetic Pulse

Extreme Natural Events



- A. Extreme Natural Events, Widespread Impact
 - GMD
- B. Other Extreme Natural Events

Critical Infrastructure Interdependencies



- A. Communications
- B. Water/Wastewater
- C. Oil
- D. Natural Gas

² 2019 State of Reliability Report: https://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/NERC_SOR_2019.pdf

³ Policymakers is used generally to mean any organization that can impact the legal or regulatory framework in place at various levels, including local, state, federal, and provincial governmental authorities in addition to various trades and lobbying organizations.

For the 2019 report, the RISC also significantly reduced the number of recommendations. This was completed by consolidating overlapping recommendations and removing recommendations that reflected ongoing activities; though these activities are important, they are already well underway and monitored as part of NERC's Long-Term Strategy Plan and applicable NERC committee plans. The graphic below depicts the classification for each of the identified risks.

MANAGE	1. Changing Resource Mix	MANAGE	6. Loss of Situational Awareness
MANAGE	2. Bulk Power System Planning	MONITOR	7. Extreme Natural Events
MANAGE	3. Resource Adequacy and Performance	MONITOR	8. Physical Security Vulnerabilities
MONITOR	4. Increasing Complexity in Protection and Control Systems	MANAGE	9. Cybersecurity Vulnerabilities
MONITOR	5. Human Performance and Skilled Workforce	MANAGE	10. Critical Infrastructure Interdependencies

The **Risk Profiles** section of this report provides a statement of risk, descriptors of risk, and recommendations for mitigating the risk for each profile. Through the risk profiles, the RISC recommends actionable mitigating activities that enable the ERO Enterprise and industry to use the composite risk profiles and the risk map for baseline and recurring reliability risk evaluations.

When possible, the RISC also identified the group or organization that it believes should lead the mitigating action. However, some recommendations do not present a clear owner or responsible party. In these cases, the recommendation is presented as a more generalized action item that can apply to numerous entities, including policymakers, industry, and the various organizations within the ERO Enterprise. The RISC did not assess resource needs for the mitigating actions that will be addressed with industry during the annual ERO Enterprise Business Plan and Budget activities.

Additionally, the committee evaluated risks based on impact to the BPS regardless of the source or location of the risk. To evaluate key risks to the system, the RISC recognized emerging issues emanating from different areas of the grid (e.g., resources like distributed energy resources (DERs) that may not be located or directly connected to the BPS). Operators and planners of the BPS are aware of the need to have a wide-area view of changes to the system to provide an understanding of external conditions that can affect them; therefore, the profiles identify several risks where the BPS can be impacted at interfaces (e.g., customers distributed resources, resources located on the electric distribution system, natural gas delivery system, telecom system, water system). The RISC determined it is important to illuminate external factors that increase BPS risk and offer recommendations to address those risks.

Common Themes and Emerging Trends

For risks that the committee recommends active monitoring for, it is important to note that a convergence of centralized themes and emerging trends is present. These themes and trends underscore not only the increasing interdependency between identified BPS risks but also an increase in potential magnitude of emerging risks. Common themes and emerging trends are indicated as follows:

- Interdependencies between industries and fuel types
- Increased security risks (both cyber and physical)
- The increase in natural gas and renewable generation coupled with the decline in nuclear and coal-fired generation

- The importance of emerging technologies and how to best incorporate those into a reliable and secure BPS
- Significant changes to the grid require new models and tools for reliable integration
- Development of credible and centralized data sharing along with the right tools to proactively analyze system conditions is becoming more critical

Background and Introduction

This report documents the results of the RISC’s continued work to identify key risks to the reliable operation of the BPS and provide recommendations to mitigate those risks. This report includes recommendations regarding relative priorities to further assist the Board and NERC management as well as industry and its stakeholders.

The RISC’s efforts are both responsive to and in support of the Board’s resolutions in connection with the initial 2013 RISC recommendations⁴ that direct continued work by the RISC to define and prioritize risks, develop mitigating activities, and identify accountable parties for those risks.

There are important linkages between the risk priorities and the recommended actions for the ERO Enterprise and industry. While the risk profile recommendations in this report are presented individually, there are interdependencies between many of the risks that present unique challenges to the electric industry. These interdependencies have been acknowledged in the report. Further, many of these risks have been long recognized with commensurate NERC and industry monitoring for proper mitigation whereas others are newly emerging, requiring active management with a more aggressive immediate approach necessary for effective foresight and mitigation. The RISC acknowledges and appreciates the increased reliance of the Board and ERO Enterprise leadership on the results of the RISC’s activities as an input for the ERO Enterprise’s Long-Term Strategy Plan and Business Plan and Budget. The RISC did not assess the resource impacts of the recommendations that will be addressed with industry during the annual ERO Enterprise Business Plan and Budget activities.

The RISC participants include representatives from the NERC committees, the Member Representatives Committee, and “at large” industry executives. The observations, findings, and guidance presented in this report include input from industry forums, trade associations, and other industry groups through multiple channels. The RISC also received feedback through an Emerging Risks Survey that garnered over 150 responses.

This report relies on and extends the comprehensive initial assessment and corresponding recommendations to the Board made in February 2018 that have been updated and refined. This report and recommendations also reflect discussions with representatives from the NERC committees, the discussion with leaders at the NERC Reliability Leadership Summit, and the many technical reports and assessments conducted by NERC and industry.

Inputs to the Risk Profiles

Reliability Leadership Summit

On March 14, 2019, NERC and the RISC hosted a summit with leaders of the reliability community, including top industry executives, state and federal regulators, and NERC and Regional Entity senior leadership. The summit focused on three specific areas: regulatory and policymaking during unprecedented change, identifying and mitigating significant existing and emerging landscape of risks to reliability, and providing assurance for the availability of adequate fuel delivery to satisfy energy needs. Open discussion at the end of the summit was held to address these and any other risks that required deeper investigation. Below are the pictograph summaries of each of these sessions.

⁴ See minutes from the Board’s February 7, 2013, meeting:

<http://www.nerc.com/gov/bot/Agenda%20highlights%20and%20Mintues%202013/BOT%20-%20February%207%202013%20Minutes.pdf>

Reliability Leadership Summit

Regulatory and Policymaking during Unprecedented Change

2019 RELIABILITY LEADERSHIP SUMMIT

PANEL 1: REGULATORY AND POLICYMAKING DURING UNPRECEDENTED CHANGE

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

CHANGING RESOURCE MIX

BULK POWER SYSTEM PLANNING (BPS)

CYBERSECURITY VULNERABILITIES

RESOURCE PLANNING + SYSTEM PLANNING

INTEGRATION

MAJOR CHANGES:

- 1. LINEAR SYSTEM TO DC-BASED BY MARKET
- 2. DISTRIBUTING ENERGY RESOURCES
- 3. SYNCHRONOUS + UN SYNCHRONOUS (WIDER)

NOT TRANSFORMED BY REGULATION BUT MARKET

MAJOR THREATS:

- SERIOUS, DISCUSSION TREAT, INFLUENCED BY POLITICAL DISCOURSE
- CAN HAPPEN DURING TRANSMISSION + DISTRIBUTION
- UTILITIES MUST LOOK BEYOND THEIR WALLS, TAKE ACTIONS TO MITIGATE RISK
- RE-EVALUATE PROTECTIONS AND SOPHISTICATED TARGETS AND THREATS

TECHNOLOGY MUST BE NEUTRAL + INNOVATIVE

COMMUNICATION WITHIN DEPTS.

sketch effect /
CREATING COMMUNICATION SOLUTIONS

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MARCH 2019 | WASHINGTON, DC

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Identifying and Mitigating Significant Existing and Emerging Landscape of Risks to Reliability

PANEL 2: IDENTIFICATION AND MITIGATION OF SIGNIFICANT RISKS TO RELIABILITY

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

TRANSMISSION CHALLENGES AND NEEDS

CISA MAINTAINING PHYSICAL CYBER SECURITY
CYBERSECURITY AND INFRASTRUCTURE SECURITY AGENCY

3D GRID

DECENTRALIZATION

DECARBONIZING

DIGITALIZATION

SOLUTIONS

IMPROVEMENTS

MAJOR THREATS

Q&A TOPICS:

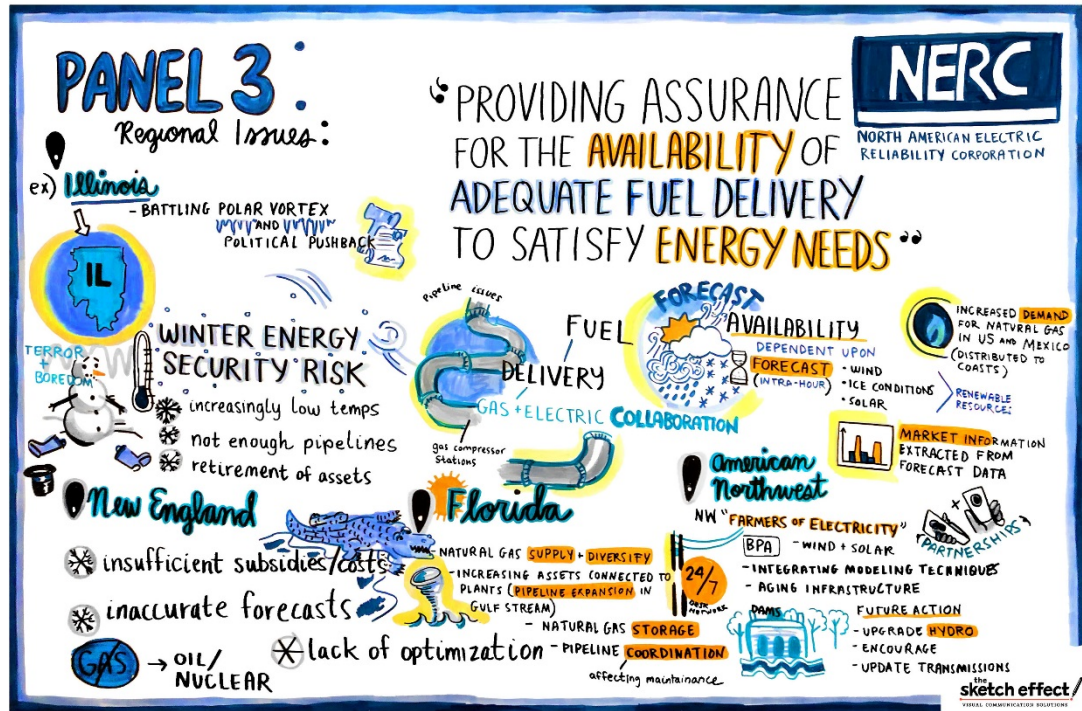
- SUPPLY CHAIN**
- INTERNET CONTROL/MONITORING**

sketch effect /
CREATING COMMUNICATION SOLUTIONS

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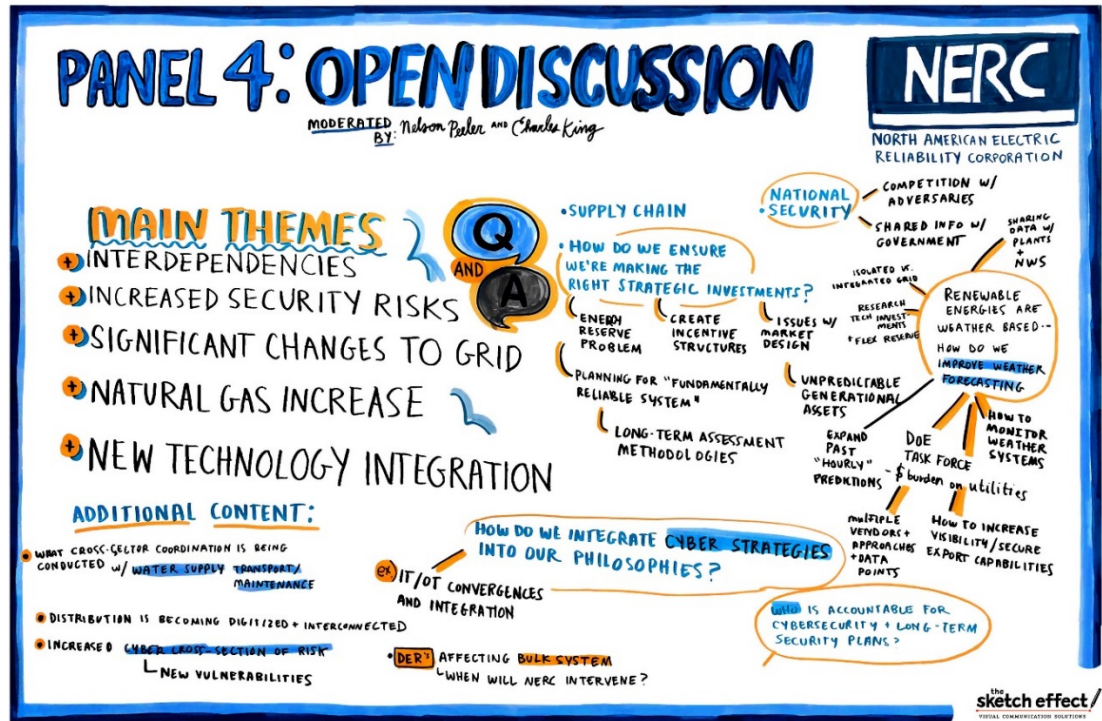
Providing Assurance for the Availability of Adequate Fuel Delivery to Satisfy Energy Needs



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Open Discussion



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The panel discussions underscored the importance of conducting cross-sector coordination with other industries. The potential impact on reliability from the accelerating proliferation of DERs was discussed along with potential NERC efforts to assess the effects of DERs on the reliable operation of the BPS.

Recognizing that the performance of renewable energy resources is affected by weather, the discussions reiterated the importance of improving weather forecasting to mitigate risks associated with its uncertainty. With large increases in renewable resources and natural-gas-fired units, continued retirements of coal and nuclear units is expected. All resources must be integrated into the BPS while ensuring sufficient levels of grid essential reliability services (ERSs) are maintained.

While planning for a fundamentally reliable system and recognizing the impacts of grid transformation, it is important to continue to evaluate reserve margins and the appropriate mechanisms for establishing adequate reserve margins, particularly given the changing dynamics of the BPS. The operation of the grid and the relationship between Generator Operators and Balancing Authorities has changed due to proliferation of DERs and the creation of larger Balancing Authorities operated by centralized Regional Transmission Organizations markets.

Lastly, the need for higher levels of cyber security will continue to create additional intricacies to BPS reliability. It is important to understand which organizations are accountable for cyber security and long-term security plans. Information technology and operational technology convergences should be recognized and adequate levels of cyber security should be planned for prospectively. For effective implementation of existing and future cyber security standards developed for each of the critical infrastructure sectors, harmonization may be required. Cross-sector communication will be critical to effective management of cyber risks.

Prioritization of Inherent Priority Risks

Risk Groupings

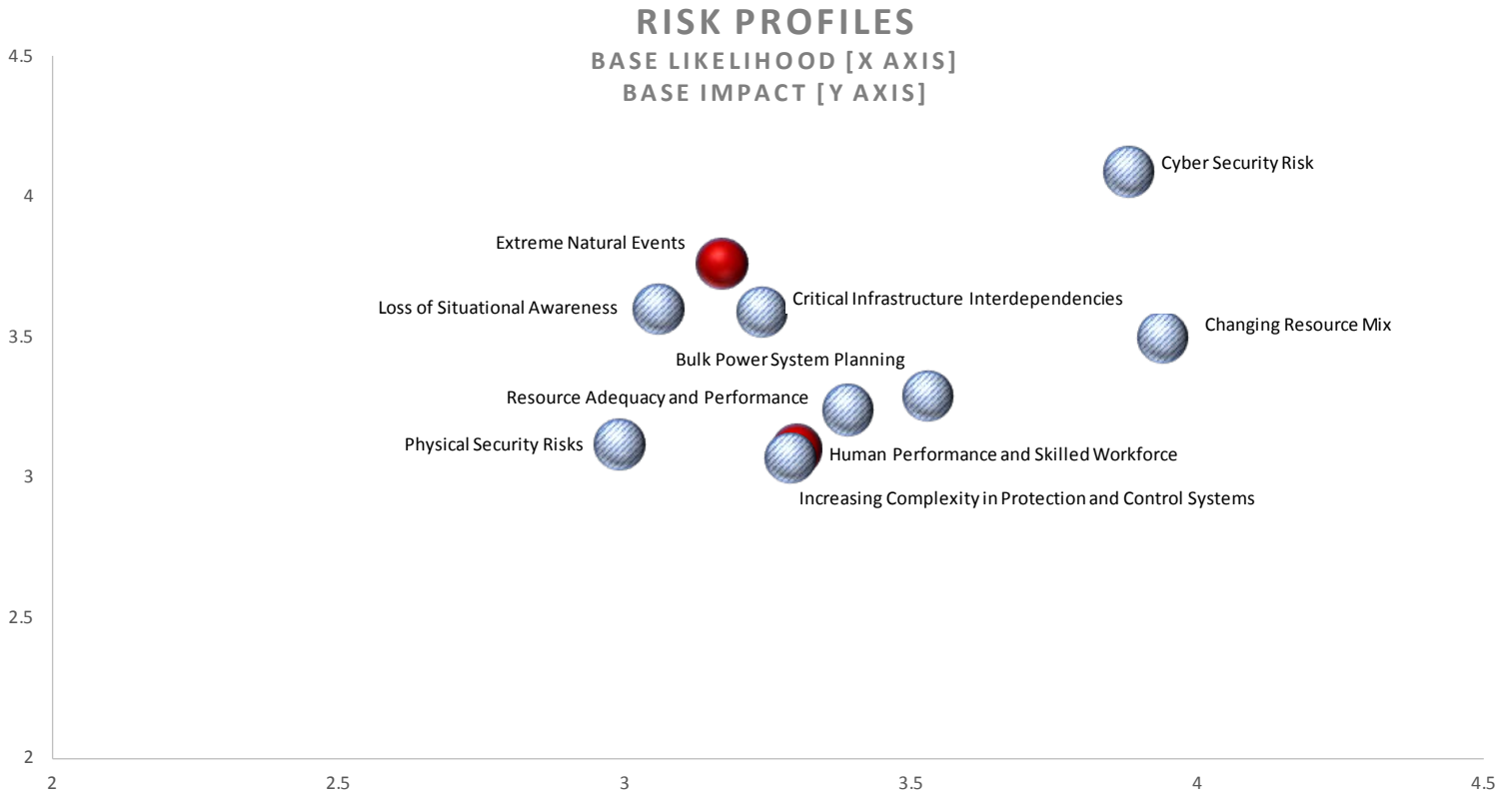
This year is transitional for the RISC Report and includes industry input on each risk profile as well as a new format. In 2018, input was requested from industry for each of the prior year risk profiles. Unlike previous RISC reports where the risk likelihood and impact was derived from the expertise of the RISC members, the 2019 risk mappings of impact and likelihood were derived by using a comprehensive survey provided to industry leaders across the ERO footprint. The survey results have been used to establish a 2020 base line of impacts and likelihood that can be used to trend and benchmark against subsequent RISC reports and analyses. Survey results provided the RISC with a two-fold benefit: a prioritization of the existing risk profiles and the ability to consolidate the profiles from nine⁵ to four. The 2018 survey did not provide an overarching data collection for each stated risk profile. The survey data is considered relevant and has been reviewed with the expertise and judgement of the RISC members.

The prioritization by industry did align with prior year's heat map placement of each risk profile "bubble." The data now provides a baseline capability from which the RISC can determine over time how each risk is viewed by industry through its evolution and risk profile lifecycle. In addition, survey data provided quantitative information for the RISC members to discuss prior to heat map finalization. Similar to prior years, the heat map is formatted based on an X-Y axis: X representing the potential likelihood or probability of the risk coming to fruition, and Y representing the perceived impact. Risk profile placement is based on 2019 data where 0 = minimal risk/minimal impact, and 5 = severe risk/severe impact.

Consolidation of prior year's risk profiles from nine to four simplifies high-level discussions on risk identification and phased mitigation or remediation processes.

The heat map tracks the risks so industry can consider potential impacts within their organization. The following graphic shows each of the identified individual inherent risk profiles mapped against likelihood and impact scales. The heat map illustrates RISC's assessment of how the inherent risks of the profiles have changed, if any, from the previous report. Extreme Natural Events and Human Performance and Skilled Workforce had the most significant change (identified in **red** on the heat map) while all other risks remained in the same general location as the previous report. The orange color on the **individual** risk heat maps represents the high-level risk profile they are associated with.

⁵ Critical Infrastructure Interdependencies was added as the tenth risk profile mid-year in 2018 while reformatting the report and developing the Industry Risk Profile Survey.



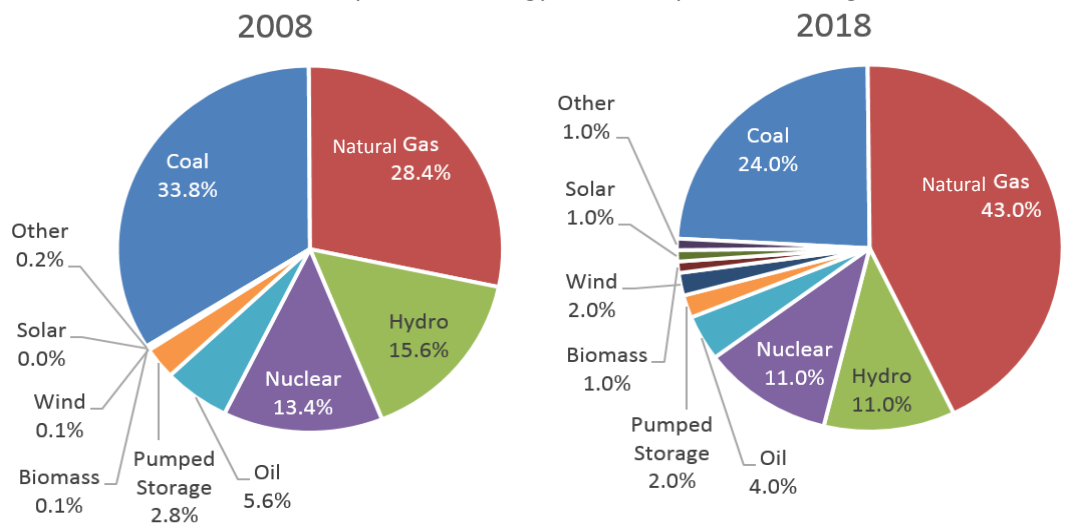
Risk Profiles

Risk Profile #1: Grid Transformation

The transformation of generating resources and fuel sources along with changes in load characteristics is creating new reliability risks from long and short-term planning to real-time operations.

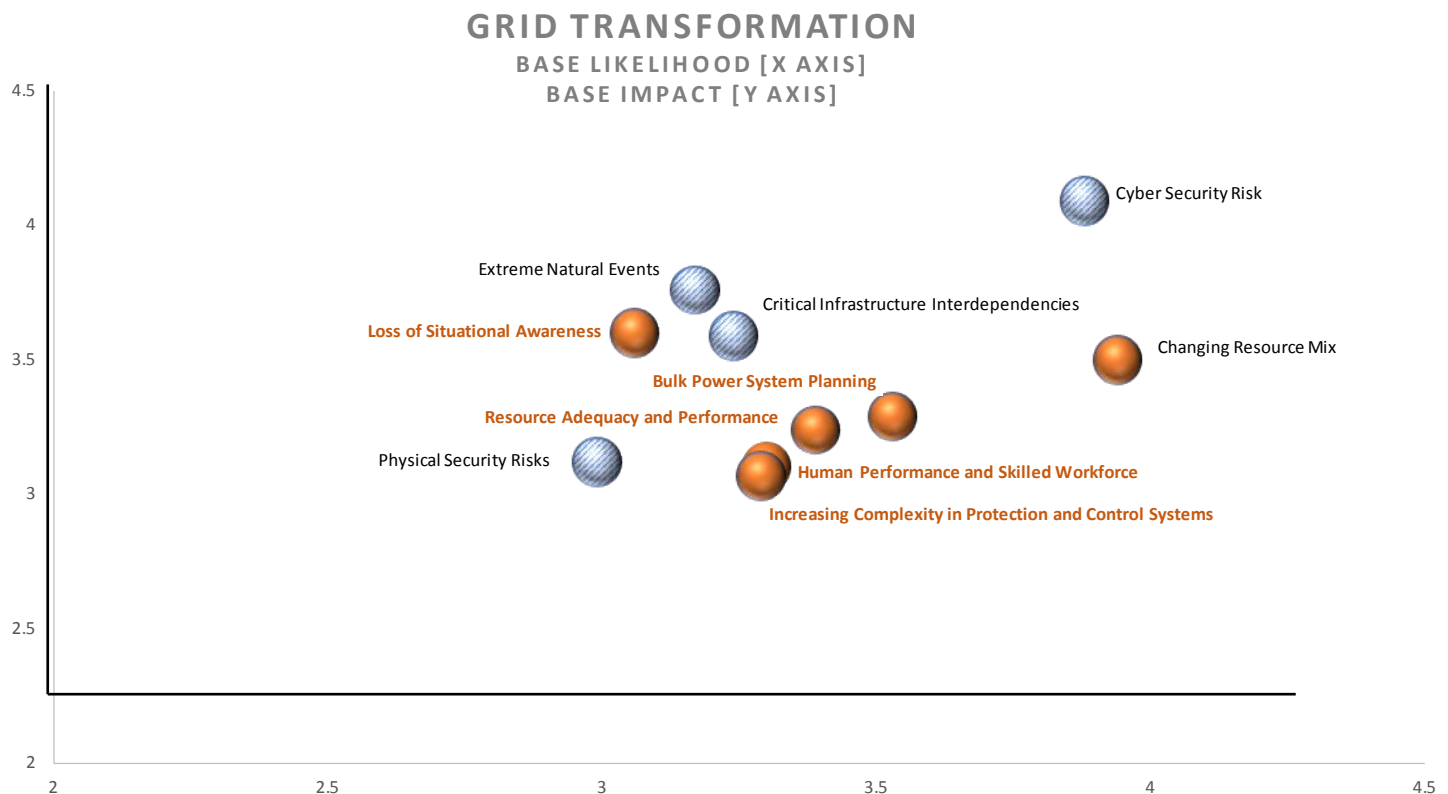
Statement of the Risk

Public inputs along with the influence of regulatory and socioeconomic policies are continuing to drive a significant evolution in the mix of power resources. The shift away from conventional synchronous central-station generators toward a new mix of resources continues to challenge generation and grid planners and operators. This new paradigm of the resource mix includes natural-gas-fired generation; unprecedented proportions of non-synchronous resources, including renewables and battery storage; demand response; smart- and micro-grids; and other emerging technologies. Collectively, the new resources are more susceptible to energy sufficiency issues through common mode contingencies in fuel supply whether the fuel is natural gas or inverter-based. Looking forward, consumers' desire to decarbonize, individual states' legislative and regulatory initiatives, expected lower production costs of new resources, and the aging of existing generation infrastructure all will alter the nature and dispatch of generation, leading to further resource and grid transformation.



This transformation presents a number of potential challenges and opportunities when it comes to reliability of the BPS as detailed in the risk descriptors below.

Risk Mapping



Descriptors of the Risk

- **Changing Resource Mix, Bulk Power System Planning, and Resource Adequacy and Performance**
 - **Potential Impact on Essential Reliability Services:** Transformation of the resource mix can alter the provision of and need for ERSs and other ancillary services needed for BPS reliability and system operations, such as voltage control and reactive support, frequency response, and ramping/balancing. Restoration services, such as blackstart capabilities and procedures, could be affected as well.
 - **Technology with Different Design and Performance Characteristics:** The continued integration of large amounts of new resource technologies (e.g., DERs, grid and distribution system-connected inverter-based resources, and energy storage) could lead to inaccurate forecasting of anticipated demand. Further, this integration can also result in other planning and operational challenges if these resource additions are not observable or predictable or are otherwise not taken into account. The dynamic and transient performance and response of these technologies also brings new challenges.
 - **New Data and Information Requirements:** The need for data and information about new and changing resource characteristics must be incorporated into the long-term planning, operational planning, and operating time horizons. Some of this new information will be from nontraditional sources (e.g., breakout of penetrations of DERs and inverter operating parameters) that in itself may present challenges to those responsible for incorporating the information into models representing future conditions.
 - **Energy Storage Technologies:** Storage capabilities and uses will likely transform both distributed and bulk system operations. Whether in combination with renewables or conventional resources and whether connected to distribution systems or the BPS, storage and hybrid technologies will further magnify the pace of innovation and the evolution of resource capabilities during both steady state and transient conditions.

- **Fuel Supply Considerations:** Fuel sourcing and disruption capabilities, such as from weather events and other nature-based extreme conditions, are driving new scenarios and case studies and broadening the range of dependencies for reliability planning and operations. Fuel constraints and environmental limitations might not be reflected in assessment of resource adequacy.
- **Resource Adequacy Guidelines Consideration:** In addition to fuel sourcing, other elements of resource adequacy (e.g., transmission development, pipeline construction, and environmental permitting) may need much more lead-time in order to assure future reliability and resource adequacy of the system.
- **Ensuring Sufficient Flexible Resources to Meet Demand:** With the volume of wind and solar resources expected and their characteristic fuel-driven commitment and dispatch capabilities as well as the characteristics of other resources that may constrain their near-term ability to respond, sufficient flexible resources will be needed to meet demand when the less flexible resources are unavailable. The flexible resources will need to be dispatchable within the forecasting period of the less flexible resources becoming unavailable.
- **Coordination of Behind-the-Meter DERs with the BPS:** Distributed generation as well as storage, and other DER technologies currently follow local interconnection requirements and operational protocols, posing potential challenges to the BPS from a planning and forecasting perspective.
- **Human Performance and Skilled Workforce:** The BPS is becoming more complex, and the industry will have difficulty staffing and maintaining necessary skilled workers as it faces turnover in technical expertise.
- **Loss of Situational Awareness:** Loss or degradation of situational awareness poses BPS challenges as it affects the ability of personnel or automatic control systems to perceive and anticipate degradation of system reliability and take pre-emptive action.
- **Control and Protection Systems Complexity:** The interaction and performance of control systems during transient events, including the control systems in remedial action schemes (RASs) and other protection systems, must be understood to prevent new common-mode failures that may not have been anticipated (e.g., the inverter performance as demonstrated during the Blue Cut Fire and related events, misoperation of RAS logic and control systems, interdependencies of RAS operations in sequence and follow through).

Recommendations for Mitigating the Risk

As a result of this complex set of factors, the traditional methods of assessing resource adequacy (i.e., by focusing primarily on generating capacity, transmission and pipeline capacity, and fuel availability at traditional peak load times) may not accurately or fully reflect the ability of the new resource mix to supply energy and reserves for all operating conditions. Historic methods of assessing and allocating ancillary services (e.g., regulation, ramping, frequency response, and voltage support during transient, recovery and follow through) may no longer ensure that sufficient ERSs and contingency reserves are available at all times during real time, next hour, and next day operations. Balancing and ramping concerns that up to now have been largely confined to limited locations will likely expand regionally as solar and wind generation continues to grow and provides a larger portion of the energy mix. Such resources provide challenges in counting as available capacity in traditional integrated resource planning to assure reliability of the BPS in near-term to long-term planning horizons.

The combination of these many factors related to resource and grid transformation that offer both challenges and opportunities as a result of the transformation calls for a planned set of NERC activities as described in the following action plan.

Resource and grid transformation will require new and updated tools, methods, and strategies that are used in planning, modeling, and operating the BPS. In order to best achieve those goals, the RISC encourages the following actions:

- **Update data, modeling and assessment requirements to ensure valid and accurate results given resource and grid transformation (ongoing effort):** The ERO's Committees should identify the information and modeling capabilities needed to ensure the efficacy of assessments while taking into consideration the complex and interrelated aspects of the ongoing transformation. The ERO should also pay close attention on settings of controllable devices and power electronics installed to stabilize the system. The risk of cascading continues to increase and more remedial action schemes with its complexity are added to BPS system.
- **The technical committees should establish and implement an approach to evaluate the potential impacts of energy storage on reliability:** Work with industry stakeholders to use available information and experience to support an evaluation of energy storage implications.
- **Improve inverter-based resource BPS interconnection and operation and stay abreast of new technologies, such as storage/hybrid resources:** The ERO Enterprise should continue its effort to address the recommendations of the Inverter-Based Resource Performance Task Force (IRPTF)⁶.
- **Ensure sufficient operating flexibility at all stages of resource and grid transformation:** System operators and planners should ensure sufficient flexible ramping/balancing capacity is available as a tool to meet needs of changing patterns of variability and new characteristics of system performance.

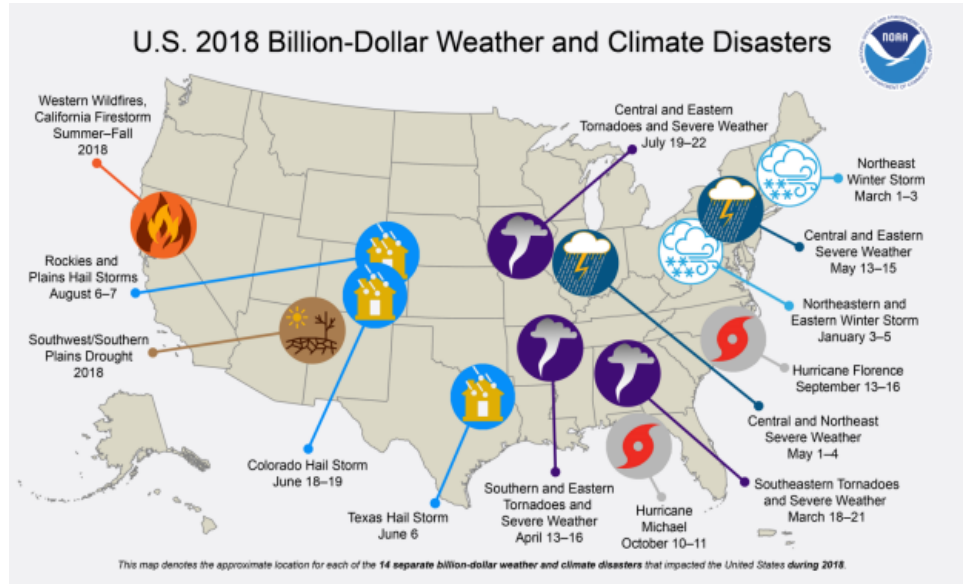
⁶ [IRPTF Recommendations -](https://www.nerc.com/comm/PC_Reliability_Guidelines_DL/Reliability_Guideline_IBR_Interconnection_Requirements_Improvements.pdf)

https://www.nerc.com/comm/PC_Reliability_Guidelines_DL/Reliability_Guideline_IBR_Interconnection_Requirements_Improvements.pdf

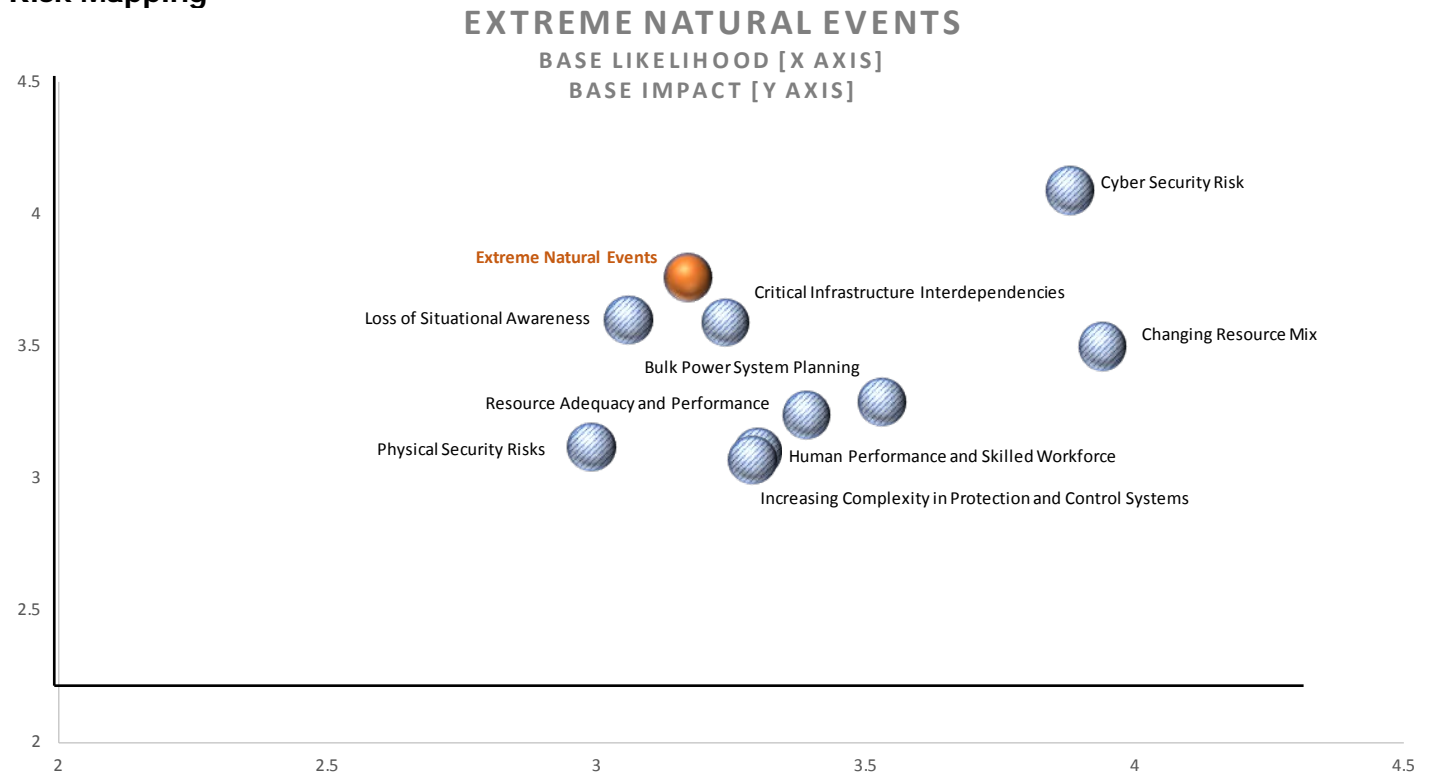
Risk Profile #2: Extreme Natural Events

Statement of the Risk

Extreme natural events (e.g., storms, wildfire) cause a significant proportion of major BPS impacts. For example, NERC’s 2019 *State of Reliability* report⁷ noted weather was responsible for both Category 3 events (there were no Category 4 or 5 events) across the ERO Enterprise’s footprint in 2018. Extreme natural events tend to be regional in nature. Natural events may affect BES equipment, resources, or infrastructure required to operate the BES. Certain events are unique to areas that they impact while others may occur in any area of the BPS. Each type of event brings unique challenges from supply sufficiency, spare-parts availability, delivery, and restoration perspectives. Preparation and proactive planning of procedures and protocols are critical for utilities to assess and determine appropriate steps for both reliability and resiliency.



Risk Mapping



⁷ https://www.nerc.com/pa/RAPA/PA/Performance%20Analysis%20DL/NERC_SOR_2019.pdf

Descriptors of the Risk

Various North American regions routinely incur severe natural events, such as hurricanes and extreme cold weather. While the risk of these events in those regions is high, the relative impact on the BPS is low. See the following examples:

- **Hurricanes:** They can cause widespread destruction to BES equipment, degradation of communication capabilities, loss of load, and damage to generation resources. Recovery and restoration efforts can be hampered due to the size or scope of the storm and damage to interdependent infrastructure.
- **Tornados/Derecho:** They can cause localized destruction to BES equipment, local degradation of communication capabilities, loss of load, and damage to generation resources. Recovery and restoration efforts can be hampered due to local damage to interdependent infrastructure
- **Extreme Heat and Drought:** They can cause higher than anticipated demand, overloading and failure of BES equipment, and degradation of resource availability. There can be limited water available for operating hydroelectric generation or reduced cooling water capacity. Drought can also be a precursor to wild fire risk as described in the next bullet.
- **Wild Fires:** They can be a direct threat to BES equipment. Pre-emptive actions must be taken to de-energize equipment without causing additional cascading effects in areas where wild fire risk is significant.
- **Flooding:** This can occur in any area and in any season of the year. The impacts from flooding include mechanical damage to BES equipment, degradation of clearances, fuel infrastructure, personnel access, and communications capabilities.
- **Extreme Cold Weather (Polar Vortices):** This can cause higher than anticipated demand, overloading and stress failure of BES equipment, and degradation of resource availability via mechanical failure or fuel supply interruption.

Other types of severe natural events, though less likely, could have a higher impact given the potentially broader geographic footprint. See the following examples:

- **Earthquakes:** These are possible in many areas of the United States and Canada. Depending on the scope and magnitude of the event, mechanical damage may occur to BES facilities and interdependent infrastructure (e.g., communications, fuel, transportation). The duration to recover from earthquakes could be long, and further assessment and coordination is required among utilities and the ERO Enterprise.
- **Geomagnetic Disturbances:** These can induce harmonic currents in BES circuits and equipment. The impacts of these induced currents may include overheating of transformers, relay misoperations, and increased reactive demand or damage to reactive resources. GMD events can also affect communications capabilities, fuel delivery, and GPS systems.

Recommendations for Mitigating the Risk

Extreme natural events and their potential impacts on BPS reliability should be monitored and addressed to maintain reliability and improve resiliency. Based on uncertainties predicting some events, it is important for operations and planning personnel to remain vigilant and prepare for high-risk seasons by learning from prior events, practicing recovery efforts, and anticipating impacts of an event to critical infrastructure needed to operate or restore the BES.

In order to best achieve those goals, the RISC encourages the following actions:

- **Special assessments of extreme natural event impacts, including capturing lessons learned, creating simulation models, and establishing protocols and procedures for system recovery and resiliency:** The ERO Enterprise should conduct detailed special assessments of extreme natural event impacts by geographical areas that integrate the following:
 - Infrastructure interdependencies (e.g., telecommunications, water supply, generator fuel supply)
 - Analytic data and insights regarding resilience under severe weather conditions

Based on those assessments, the ERO Enterprise should develop detailed special assessments on possible mitigation plans and provide a roadmap for its implementations. The road map should include specific protocols and procedures for system restoration and system resiliency.

- **Development of tools for BPS resiliency:** The Department of Energy (DOE) is in process of developing appropriate tools for BPS resiliency and NERC, the ERO, the North American Transmission Forum (NATF), and the North American Generator Forum (NAGF) should work with DOE in assessing the tools as well as develop guidelines, industry recommendations, and procedures for industry to follow.
- **Understanding of Geomagnetic Disturbance (GMD) events on BPS:** The ERO Enterprise should continue working with the Electric Power Research Institute (EPRI) and others to conduct research and development to further understand impacts from geomagnetically induced current on BES facilities to support enhancements to models and standards and to facilitate preparedness consider preparing sensitivity analyses to simulate the impacts in a planning area. The ERO Enterprise should assist the industry to implement the necessary protocols and mitigation plans to reduce the risk in maintain reliability and security for the BPS.

Risk Profile #3: Security Risks

Statement of the Risk

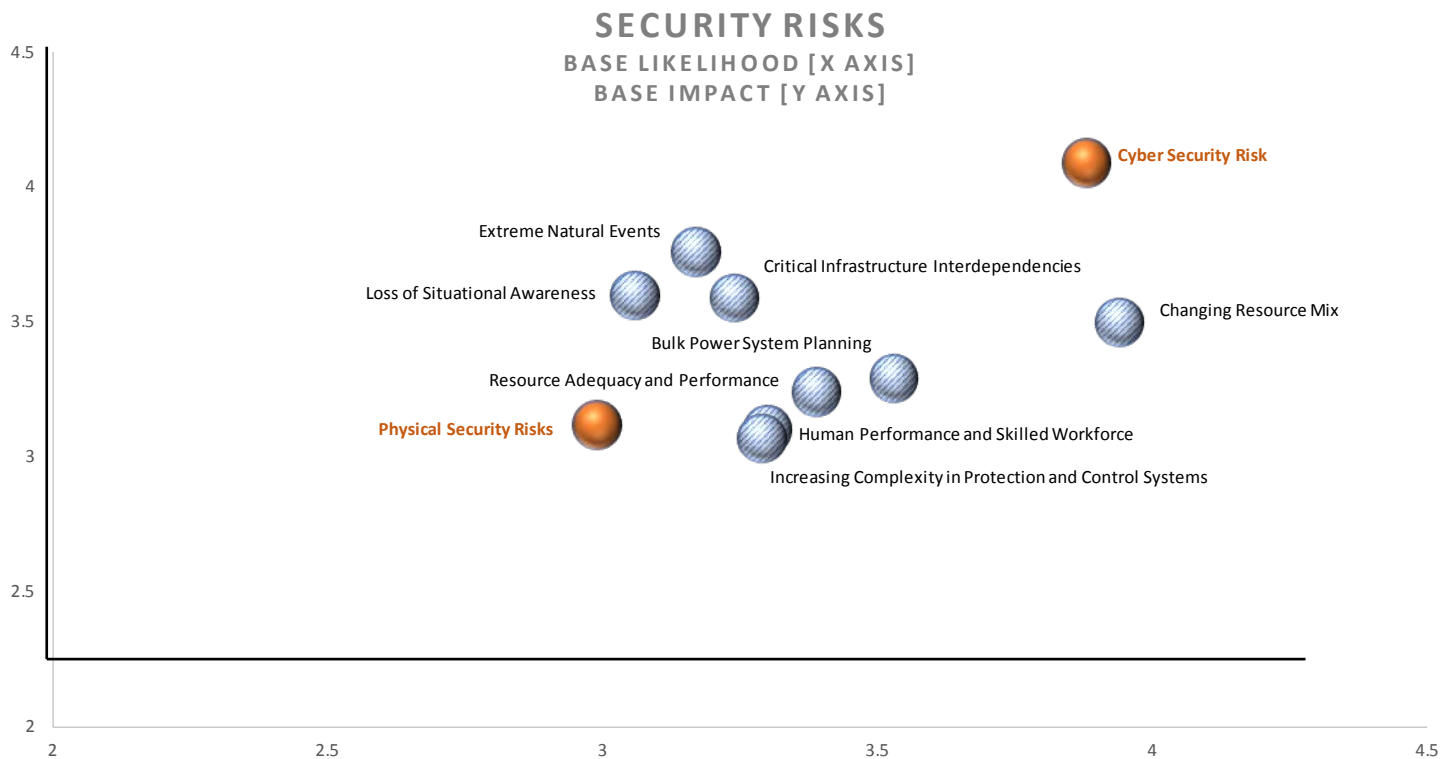
Operational security is an essential component of a highly reliable BPS. Cyber and physical security are interdependent aspects as exploitation of either physical or cyber security risks could be used to compromise the other dimension. Resulting impacts could cause asset damage or loss of functionality and situational awareness needed to reliably operate or restore the BPS. Exploitation could occur directly against equipment used to monitor, protect, and control the BPS or indirectly through supporting systems, such as voice communications or interdependent critical infrastructure sectors⁸ and subsectors (e.g., water supply and natural gas used for electrical power generation). A coordinated cyber and physical attack scenario that is, potentially targeted to occur simultaneously with an extreme natural event, could further impact reliability and/or complicate recovery activities. A man-made electromagnetic pulse (EMP) event targeted at the BPS may impact operations and result in damaged equipment that may require an extended period of time to replace.



The volume, frequency, and sophistication of cyber exploits is increasing and could potentially disrupt a broad (e.g., interconnection-wide) footprint. Significant physical security events have been rare and the impact is likely to be more geographically constrained. EMP events are far less likely to occur but may carry a highly consequential security risk.

⁸ <https://www.dhs.gov/cisa/critical-infrastructure-sectors>

Risk Mapping



Descriptors of the Risk

- Physical Security Risks:** The nature and impact of physical vulnerabilities are better understood than other security risks (e.g., cyber or EMP). The impacts from significant physical attacks are likely to be more localized geographically. There is modest, ongoing evolution of the physical security risk via drones. The largest risk considerations are considered to be the co-dependence with cyber security (e.g., computer controls for physical access) and the prospective impact of replacing long lead-time equipment (e.g., large power transformers) damaged during an attack.
- Cyber Security Risks:** Exploitation of cyber security risks could arise from a variety of external and/or internal sources. Additionally, the operational and technological environment of the electrical grid is evolving significantly and rapidly, potentially increasing the potential cyberattack-surface. Sources of potential exploitation include increasingly sophisticated attacks by nation states, terrorist, and criminal organizations. Vulnerability to such exploits are exacerbated by insider threats, poor cyber hygiene, supply-chain considerations, and dramatic transformation of the grid's operational and technological environment. These transformative changes include convergence of information and operational technology (IT/OT), reliance on cloud-based technology, and potential workforce knowledge gaps.
- Electromagnetic Pulse Risk:** An EMP is a short-duration, high-energy burst that may be disruptive or damaging to electronic equipment. For security purposes, EMP refers to man-made sources. A high-altitude EMP (HEMP) is an electromagnetic pulse stimulated by a nuclear blast in the atmosphere and such action would likely be initiated by a nation-state and thus have clear national security implications. HEMP concerns include the large geographic footprint susceptible to the pulse, range of electric grid equipment at risk (generation, transmission, distribution, and load), and lack of definitive forewarning. Smaller, handheld devices are relatively limited in potential impact and can be considered analogous to a physical attack.

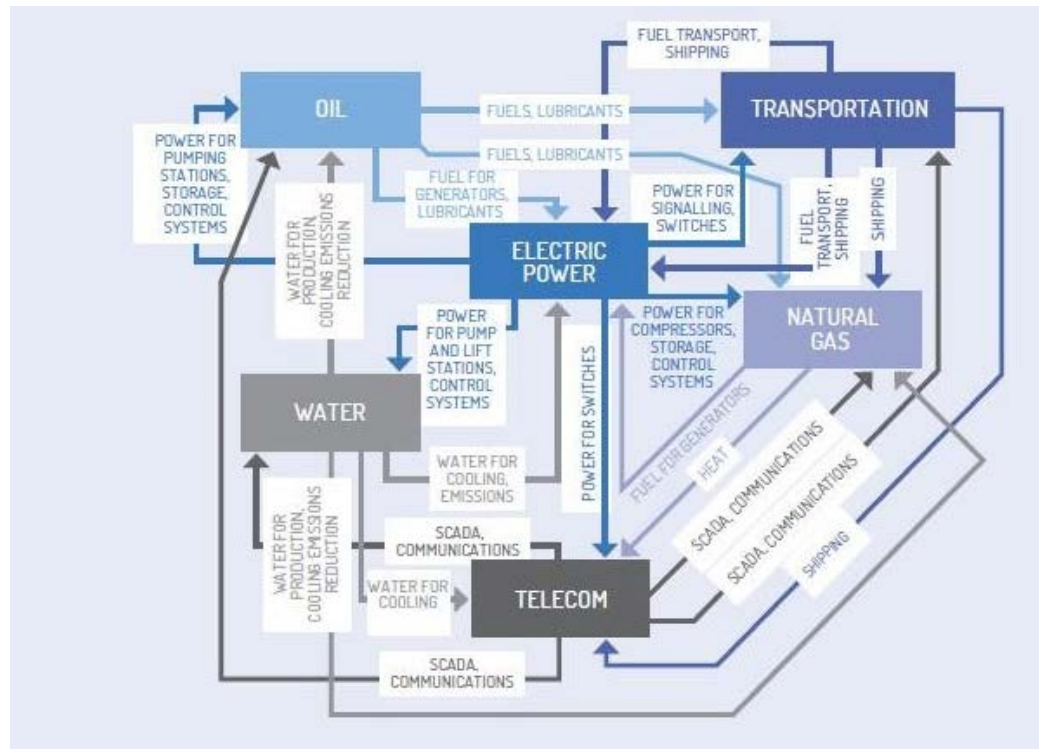
Recommendations for Mitigating the Risk

- NERC, in collaboration with industry, should evaluate the need for additional assessments of the risks of attack scenarios (e.g., vulnerabilities related to drone activity, attacks on midstream or interstate natural gas pipelines or other critical infrastructure).
- The Electricity Information Sharing and Analysis Center (E-ISAC) should encourage continued industry efforts on workforce cyber education to raise awareness of methods and tactics used by cyber attackers (e.g., email phishing, credential theft).
- NATF and NAGF should develop supply chain cyber security superior practices.
- E-ISAC should execute a long-term strategy to improve cyber and physical security information-sharing, protection, risk analysis, and increase engagement within the electric sector as well as with other ISACs.
- NATF, NAGF, Trades Associations, and E-ISAC should develop tiered security performance metrics. Such metrics would track and evaluate events and use predictive analysis to identify and address prospective vulnerabilities on a risk-prioritized basis.
- NERC should facilitate the development of planning approaches, models, and simulation approaches that reduce the number of critical facilities and mitigate the impact relative to the exposure to attack.
- NERC's EMP taskforce should highlight key risk areas that arise from the EPRI's EMP analysis for timely industry action.

Risk Profile #4: Critical Infrastructure Interdependencies

Statement of the Risk

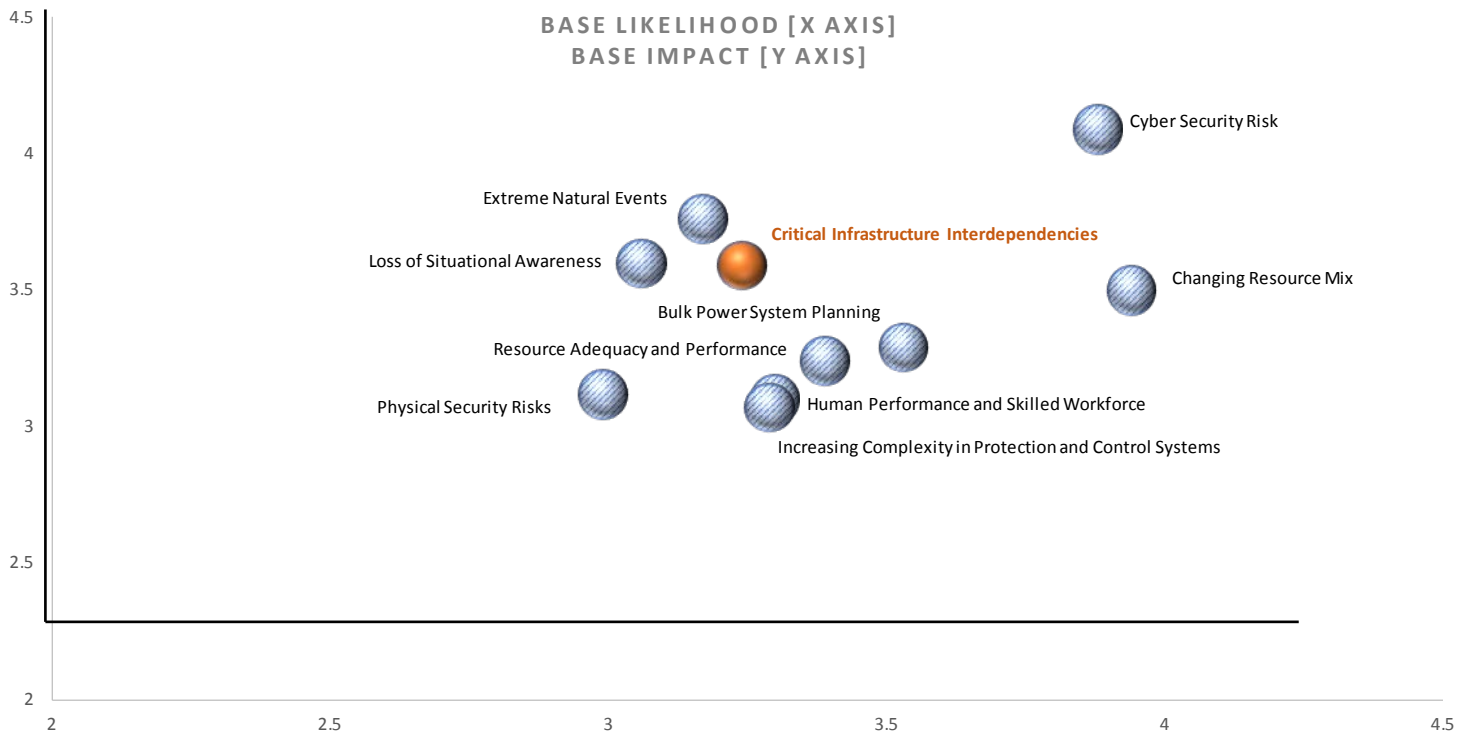
Significant and evolving critical infrastructure sector (e.g., communications, water/wastewater) and subsector (e.g., oil, natural gas) interdependencies are not fully or accurately characterized, resulting in incomplete information about prospective BPS response to disruptions originating from or impacting other sectors or subsectors and resultant reliability and security implications.



Risk Mapping

CRITICAL INFRASTRUCTURE INTERDEPENDENCIES

BASE LIKELIHOOD [X AXIS]
BASE IMPACT [Y AXIS]



Descriptors of the Risk

- Sector interdependence is becoming more critical, such as the added importance of digital communications for electric system protection and control and voice communications for emergency response and restoration.
- Subsector interdependence is increasing (e.g., growing reliance on natural gas as an electrical generation fuel source with potential needs for fuel switching in the event of natural gas unavailability), creating the potential for more limiting contingencies, including single-point failures.
- Cross-sector and subsector implications and coordination are not routinely socialized or thoroughly tested during drills.
- Governmental oversight and regulatory constructs differ widely among the sectors and subsectors, impeding information sharing and alignment.

Recommendations for Mitigating the Risk

- NERC, in collaboration with industry and industry partners, should identify and prioritize limiting conditions and/or contingencies that arise from other sectors that affect the BPS.
- NERC and industry partners should host strategic interactions among critical infrastructure partners (e.g., industry and regulators) to identify and align on mutual priorities.
- NERC and industry partners should increase emphasis on cross-sector considerations in industry drills (e.g., NERC Grid-Ex, DOE drills, utility exercises (e.g., Southern California Edison (SCE) Resilient Grid Exercise)).
- NERC should evaluate the need to conduct special regional assessments that address natural gas availability and pipeline impacts under physical attack scenarios.
- EPRI and the DOE should continue their work on communication alternatives but also the use of same or similar technologies for critical SCADA data. New technologies should be explored that could assist in providing unique and hardened back-up telecommunication methods for the most critical data.
- NERC and industry partners should conduct various meetings and conferences to highlight the importance of cross-sector interdependence and coordination, such as the NERC Reliability Summit, NATF/EPRI resiliency summits, and FERC/DOE technical conferences.

EMP Task Force Strategic Recommendations

Action

Accept the Strategic Recommendations Report prepared by the EMP Task Force.

Background

Protecting the Bulk-Power System and assuring effective reduction of reliability risk is integral to the Electric Reliability Organization mission. Recognizing the risk potential from EMPs, NERC launched efforts to identify reliability concerns associated with EMPs and potential methods for promoting resilience. NERC created the EMP task force in April 2019 to identify key issues and scope areas of improvement for the industry. The task force was announced at the May MRC meeting, and since then the task force has conducted numerous meetings, including a technical workshop in July.

On August 30, the task force issued a draft report outlining strategic recommendations to better understand and address EMP risk. The informal comment period on the strategic recommendations closed on September 30. The final report and recommendations are being presented to the NERC Board of Trustees for acceptance.

Additional Information

A link to the EMP Task Force Initiatives page is included for reference: [EMP Task Force](#)

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

EMP Task Force

Strategic Recommendations

November 5, 2019

RELIABILITY | RESILIENCE | SECURITY



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Table of Contents

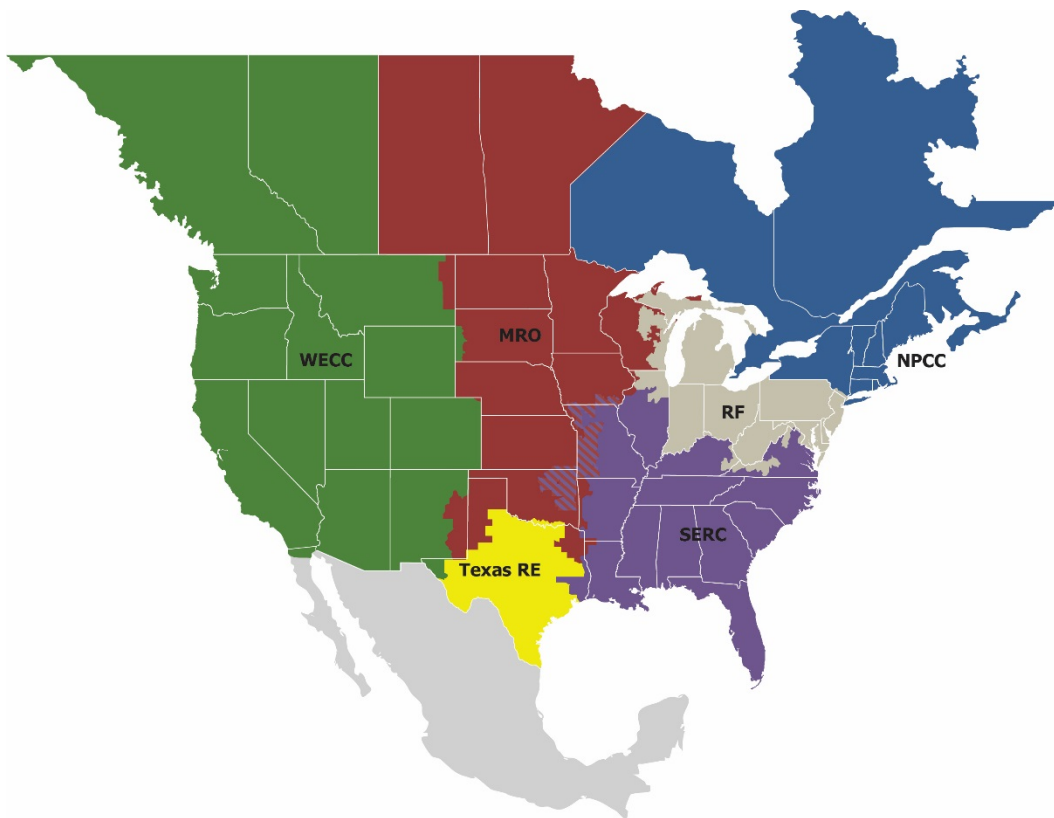
Preface	iii
Executive Summary.....	iv
Introduction	v
Chapter 1 : Policy	1
Chapter 2 : Research and Development	5
Chapter 3 : Vulnerability Assessments.....	8
Chapter 4 : Mitigation Guidelines	11
Chapter 5 : Response and Recovery.....	13
Chapter 6 : Conclusion and Next Steps	17
Chapter 7 : EMP Task Force Roster	18

Preface

Electricity is a key component of the fabric of modern society and the Electric Reliability Organization (ERO) Enterprise serves to strengthen that fabric. The vision for the ERO Enterprise, which is comprised of the North American Electric Reliability Corporation (NERC) and the six Regional Entities (REs), is a highly reliable and secure North American bulk power system (BPS). Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.

Reliability | Resilience | Security
Because nearly 400 million citizens in North America are counting on us

The North American BPS is divided into six RE boundaries as shown in the map and corresponding table below. The multicolored area denotes overlap as some load-serving entities participate in one Region while associated Transmission Owners/Operators participate in another.



MRO	Midwest Reliability Organization
NPCC	Northeast Power Coordinating Council
RF	ReliabilityFirst
SERC	SERC Reliability Corporation
Texas RE	Texas Reliability Entity
WECC	Western Electricity Coordinating Council

Executive Summary

The Electromagnetic Pulse (EMP) Task Force, formed in March of 2019, is an advisory team that is tasked with collaborating with governmental authorities and applicable industry members. Its charge is to provide front-end, high-level leadership, recommendations, and guidance to the NERC Board of Trustees on next steps based on current research. EMP events may pose a risk to the reliability of the BPS. To understand and address these potential risks, the EMP Task Force has formulated a catalogue of strategic recommendations and policy matters.

Importantly, the ERO Enterprise, in collaboration with industry and governmental subject matter experts, must take the lead determining the desired BPS performance for a predefined EMP event (i.e., one event or multiple events). Based on that information, and with model and simulation development, the industry can evaluate BPS reliability and security concerns for the event and make recommendations towards meeting those expectations. However, several regulatory matters outside of the ERO Enterprise can impact the electric sector's ability to address an EMP event. Those regulatory matters include the need for a cost recovery mechanism and access to classified information regarding an EMP threat.

In this report, the EMP Task Force has identified strategic recommendations for next steps in the following areas:

- [Policy](#)
- [Research and Development](#)
- [Vulnerability Assessments](#)
- [Mitigation Guidelines](#)
- [Response and Recovery](#)

Each strategic recommendation identifies suggested lead organizations with NERC serving a prominent role as the lead or co-lead for most of the items. Certain key items, such as access to classified EMP data/environments and cost recovery mechanisms, must be addressed separately with the appropriate entities. Further, as the research is ongoing, the EMP Task Force should be maintained and expanded to provide guidance for further work, particularly projects undertaken through the NERC technical committees to develop vulnerability assessments, mitigation guidelines, and enhanced response and recovery plans. The timing and sequencing of the recommendations and policy matters in this report are crucial, and the ERO Enterprise should ensure a highly organized and coordinated effort is launched to support EMP resilience.

Introduction

Background

Protecting the BPS and assuring the effective reduction of risks to reliability are integral pieces of the ERO's mission. NERC has launched efforts to identify reliability concerns associated with EMPs and potential methods for promoting resilience to this threat. The EMP Task Force was formed in March 2019 to identify key issues and scope areas of improvement for the industry. As stated above, the EMP Task Force is an advisory team that is charged with providing high-level leadership, recommendations, and guidance to the NERC Board of Trustees, and this guidance is intended to address concerns resulting from high-altitude EMP¹ incidents and the potential impacts on BPS reliability. The EMP Task Force may also recommend the development of future best practices and reliability guidelines to mitigate the impacts of EMP incidents.

Scope of the Report

The EMP Task Force has focused its attention on five areas and have offered recommendations or suggested next steps for each in this report. These were identified after numerous meetings and a technical workshop in July 2019. The following are the five areas of focus:

- [Policy](#)
- [Research and Development](#)
- [Vulnerability Assessments](#)
- [Mitigation Guidelines](#)
- [Response and Recovery](#)

This report is intended to address potential EMP risks to the BPS that involve understanding the interactions among load, generation, and transmission. The recommendations contained in the report are not intended to imply obligations outside of NERC's jurisdiction.

Key EMP Initiatives and Studies Considered by the Task Force

The recommendations and actions are based on unclassified reports and information related to the EMP threat as it may affect the reliability of the BPS as well as the experience and expertise of the EMP Task Force members. Two key documents that are referred to in this report are the EPRI EMP research report *High-Altitude Electromagnetic Pulse and the Bulk Power System*² and the Executive Order *Coordinating National Resilience to Electromagnetic Pulses, Executive Order*.³ Both documents are briefly described below.

EPRI: High-Altitude Electromagnetic Pulse and the Bulk Power System—April 2019

In late April 2019, the Electric Power Research Institute (EPRI) released its *High-Altitude Electromagnetic Pulse and the Bulk Power System* report, which defined the EMP threat to the transmission system, assessed vulnerabilities/risks, and made mitigation recommendations. The EPRI report complements a Department of Energy (DOE) action plan⁴ that was released in January 2017 on EMP Resilience. The action plan identified five goals:

- Improve and share understanding of EMP threats, effects, and impacts

¹ The term EMP includes high-altitude EMPs or HEMPs.

² *High-Altitude Electromagnetic Pulse and the Bulk Power System: Potential Impacts and Mitigation Strategies*. EPRI, Palo Alto, CA: 2019. 3002014979: <https://www.epri.com/#/pages/product/3002014979/?lang=en-US>.

³ *Coordinating National Resilience to Electromagnetic Pulses Executive Order*: <https://www.whitehouse.gov/presidential-actions/executive-order-coordinating-national-resilience-electromagnetic-pulses/>

⁴ *U.S Department of Energy Electromagnetic Pulse Resilience Action Plan*: <https://www.energy.gov/sites/prod/files/2017/01/f34/DOE%20EMP%20Resilience%20Action%20Plan%20January%202017.pdf>

- Identify priority infrastructure
- Test and promote mitigation and protection approaches
- Enhance Response and Recovery capabilities
- Share best practices across government and industry (Some additional information on this work by EPRI is discussed further below.)

The April 2019 EPRI report addressed two key research questions:

- What are the potential impacts of an EMP attack on the modern electric transmission system?
- If impacts are of significant concern, what are possible mitigation options and potential costs and benefits of each?

EMPs are divided into three waveform components:

- E1 EMP: It is an intense, short-duration EMP characterized by a rise of 2.5 nanoseconds and amplitude on the order of tens of kV/m (up to 50 kV/m at the most severe location on the ground).
- E2 EMP: It is intermediate duration with an electric field pulse amplitude of 0.1 kV/m and duration of one microsecond to approximately ten milliseconds.
- E3 EMP: It is a low frequency (below 1 Hz) pulse with amplitude on the order of tens of V/km with duration of one second to hundreds of seconds. E3 EMP is compared to severe geomagnetic disturbances, but an E3 EMP can be much more severe. Also, the E3 event is much shorter in duration than geomagnetic disturbance (GMD) events.

Notably, the most recent EPRI report showed a potential effect on transmission lines, substations, and switchyards from the combined E1, E2, and E3 EMPs that could cause regional voltage collapse and damage to equipment. EPRI also found that digital protective relays were generally very resilient to an initial pulse, but these same relays were susceptible to surges from control and communication cables. More testing is needed, and EPRI is currently working with multiple utilities to pilot a field study.

Presidential EMP Executive Order – March 2019

On March 26, 2019, the president of the United States issued an executive order, *Coordinating National Resilience to Electromagnetic Pulses*. The executive order calls for collaboration and information sharing among government agencies and private industry as appropriate to promote resilience to EMP issues, particularly with regards to threat and vulnerability assessment. The executive order also directed the federal government to provide incentives as appropriate to “encourage innovation that strengthens critical infrastructure against the effects of EMPs through the development and implementation of best practices, regulations, and appropriate guidance.”⁵ Various agencies were assigned different areas of focus. Of particular relevance, the secretary of energy was tasked to perform initial research and development and develop pilot programs that would identify potential failure modes, contingency preparedness, and mitigations with regard to the risk to the electric power grid.

Several agencies were identified with key tasks, and notably this EMP Task Force highlights the following efforts under the secretaries of Homeland Security and Energy:

- Among other things, the Department of Homeland Security (DHS) was charged with serving as a coordinator for addressing the response and recover from an EMP and develop a plan to “mitigate the effects of EMPs on the vulnerable priority critical infrastructure systems, networks, and assets.”⁶ The DHS will also “in

⁵ *Executive Order* at §3 (b).

⁶ *Executive Order* at §6 (e).

coordination with the secretaries of Defense and Energy, and informed by intelligence-based threat assessments, develop quadrennial risk assessments on EMPs.”⁷

- The DOE, among other things, was charged with conducting “early-stage research and development, develop[ing] pilot programs, and partner with other agencies and the private sector, as appropriate, to characterize sources of EMPs and their couplings to the electric power grid and its subcomponents, understand associated potential failure modes for the energy sector, and coordinate preparedness and mitigation measures with energy sector partners.”⁸

Both DHS and DOE are identified in discussions later in this report with regard to strategic recommendations.

GMD vs. EMPs

As the EMP Task Force began to meet, it was clear that stakeholders were confusing the EMP efforts with those that address the GMD. It is important to understand that the level of effort required to develop performance requirements and/or guidelines for enhancing EMP resilience is likely to be more extensive than GMD resilience.⁹ The scientific evidence and basis of analysis for EMP events is not as well advanced, and it is likely to require some time to mature sufficiently to be of practical use. Research conducted so far indicates that the impacts of GMD events tend to remain confined to longer lines, operating at transmission voltage levels, and interfaced to large power apparatus (*e.g.*, generators and transformers). In comparison, the disruptive influence of an EMP event seems likely to span across the full spectrum of power system assets, including the transmission system, the distribution system, the protections and controls hardware, and the command and control infrastructure relied upon to monitor and maintain the power system in a stable operating state. Finally, the impact of an EMP event may extend to customer loads since it remains unclear to what extent loads may be disrupted.

⁷ *Executive Order* at §6 (f) (vii).

⁸ *Executive Order* at §5 (e).

⁹ See *e.g.*, *Grid Security: Protecting against EMPs and GMDs*:

<https://www.eei.org/issuesandpolicy/cybersecurity/Documents/Grid%20Security%20Protecting%20Against%20EMPs%20and%20GMDs.pdf>.

Chapter 1: Policy

Background

The EMP Task Force determined that certain unresolved policy matters will impact industry participation in responding to an EMP event. The EMP Task Force developed a list of policy items that, if defined, will help inform the industry in identifying next steps to address EMP vulnerabilities. The items listed below are largely determined by other entities outside of the ERO Enterprise, but the EMP Task Force highlights these matters in an effort to begin further collaboration with government agencies, industry stakeholders, and policy makers.

Considerations

The policy considerations that the EMP Task Force identified include three recommendations versus identified policy matters to be highlighted as issues that will impact the industry's progress on EMP resiliency. The following three policy recommendations are items that the ERO Enterprise can actively address:

- Policy Recommendation #1: Establishing BPS performance expectations for a pre-defined EMP event
- Policy Recommendation #2: Providing industry and public education on EMPs
- Policy Recommendation #3: Coordination with other Critical Infrastructure sectors on EMP matters

The following three items are highlighted as policy matters that will greatly influence the electric sector response to an EMP threat:

- Policy Matter #1: The high costs of EMP mitigations and the lack of cost recovery mechanisms
- Policy Matter #2: Access to classified information on EMP threats and impact
- Policy Matter #3: Declassification of information for industry use

Each policy recommendation and matter is briefly described below with an accompanying suggested lead organization(s) and support organization(s) that would be responsible for acting on or implementing each of the policy matters. Detailed explanations of the policy matters follow the recommendations, but the suggested lead organizations are outside of the ERO Enterprise. However, these matters should be closely monitored for awareness.

Recommendations

Policy Recommendation #1: Establish BPS Performance Expectations for an EMP Event

The ERO Enterprise, through its authority under the Federal Power Act, should work closely with other agencies to establish performance expectations for all sectors of the BPS regarding a predefined EMP event.

Suggested Lead Organization: [NERC](#)

Potential Support Organization(s): [Department of Energy \(DOE\)](#), [Federal Energy Regulatory Commission \(FERC\)](#), [Department of Homeland Security \(DHS\)](#), [Electricity Subsector Coordinating Council \(ESCC\)](#)

The ERO Enterprise should establish performance expectations (for utilities) as required in response to a predefined EMP event, including parameters such as the following:

- Survivability
- Expectations of ride-through versus recovery
- Restoration time frames
- Permissibility of operations in a reduced protection state

This performance expectation will serve as the basis for industry to evaluate BPS reliability and security concerns with regard to where potential mitigation efforts and capital expenditures should be most focused.

Policy Recommendation #2: Industry and Public Education

Provide consistent/endorsed educational materials about EMPs and their impact to electronic devices and BPS stability to industry and general public.

Suggested Lead Organization: NERC and DOE

Potential Support Organization(s): EPRI, Defense Threat Reduction Agency (DTRA), DHS, DOE Office of Science National Laboratories (National Labs),¹⁰ Nuclear Regulatory Commission (NRC)

Consider publishing educational material about the threats posed by EMPs and the expected impacts to electronic devices and BPS stability. This level of education and outreach supports efforts to better educate the electricity subsector owners and operators and the public about the EMP threat generally and its possible impacts, possible mitigations, and response and recovery options. Better education will also ensure that there is a consistent risk-based understanding based on science that can support more effective collaboration in the identification of mitigations that are cost-effective and prudent. Industry and public education could include, but is not limited to the following:

- Developing, publishing, and distributing unclassified educational material about the EMP threat, possible impacts to the electricity grid, possible mitigation actions, and response and recovery considerations
- Developing, publishing, and distributing unclassified educational material about the threats posed by EMPs and the impacts to electronic devices, equipment, and systems

Policy Recommendation #3: Coordination with Other Sectors

Provide guidance to the electricity industry on how to coordinate with interdependent utility sectors (telecommunications, fuel supply, water) as it relates to an EMP event.

Suggested Lead Organization | NERC and DHS

Potential Support Organization(s) | Asset Owners, Trade and Forum Organizations, ESCC, ISO/RTO Council

Consider providing guidance on how to coordinate with other types of inter-dependent utility sectors like the following:

- Telecommunications
- Fuel Supply/Transportation
- Water/Waste Water

NERC and industry should also continue to engage on national level EMP mitigation policy matters through the ESCC, trade organizations, etc., and communicate with the EMP Task Force for alignment of technical development.

¹⁰ There are currently 17 DOE laboratories: <https://www.energy.gov/science/science-innovation/office-science-national-laboratories>.

Policy Matters

The following policy matters are being addressed outside of the ERO Enterprise; however, these items will greatly impact the ability for industry to implement EMP resilience.

Policy Matters #1: Cost Recovery Mechanisms

Provide industry with clear, consistent cost recovery mechanisms (federal financial support) for planning, mitigation, and recovery plans to ensure the performance expectations as it relates to [Policy Recommendation #1](#) are met.

Suggested Lead Organization | DHS¹¹

Potential Support Organization(s) | NERC, FERC, Asset Owners, DOE, National Association of Regulatory Utility Commissions (NARUC), National Conference of State Legislators (NCSL)

Required effective EMP mitigation will span all portions of the electric sector: generation, transmission, and distribution. The EMP Task Force highlights the importance of this recommendation in light of the variety of cost recovery methods that exist across industry today, ranging from open competitive markets to formula transmission rates to traditional cost of service regulation.

Consider establishing federal cost recovery mechanisms for the electric utility industry to proactively address the performance expectations established by NERC (see [Policy Recommendation #1](#)).

Policy Matters #2 | Industry Access to Classified Information

Provide industry with access to relevant currently classified research by the National Labs, DTRA, and any additional third-party research conducted on electric utility equipment by the Department of Energy.

Suggested Lead Organization | DOE and Department of Defense (DOD)

Potential Support Organization(s) | DHS, DTRA, FERC, National Labs

The use of the best available science is a key principle in establishing the basis for considering mitigation actions and response and recovery plans. Relevant classified information might be critical to performing the appropriate analyses from which investment decisions would be made and would impact on cost recovery actions. Therefore, certain governmental authorities could:

- Support efforts to provide key industry personnel with security clearances (at the appropriate levels) so the industry can gain access to data/information related to research on the threats and impacts of EMP incidents
- Support the potential of having industry personnel, having the appropriate clearances, to engage with the government agencies in the research that is being conducted. This would help bridge any gaps in understanding between the government agencies and the industry about the most critical elements of any research as it might apply to the BPS

¹¹ The executive order states, “[t]he Federal Government shall also provide incentives, as appropriate, to private-sector partners to encourage innovation that strengthens critical infrastructure against the effects of EMPs through the development and implementation of best practices, regulations, and appropriate guidance.” The order also states, “[w]ithin 1 year of the date of this order, the Secretary of Homeland Security, in coordination with the heads of relevant SSAs, and in consultation with appropriate regulatory and utility commissions and other stakeholders, shall identify regulatory and non-regulatory mechanisms, including cost recovery measures, that can enhance private-sector engagement to address the effects of EMPs.”

Policy Matters #3 | Declassification of Information

Work to declassify industry-relevant information on E1, E2, and E3 EMP environments and any other research.

Suggested Lead Organization | DOE and DOD

Potential Support Organization(s) | DHS, DTRA, FERC, National Labs

Access to unclassified EMP environments is essential for assessing the impacts of EMP on the BPS. Several unclassified EMP environments are currently available to the electric industry; however, these environments have very limited usability to the industry mainly because there are many parameters that are not shared with industry. The DOE and DOD could support the following efforts:

- Developing additional unclassified EMP benchmarks in a form that is useful to the industry and can be shared with stakeholders
- Declassifying information related to vulnerability assessment on electric utility infrastructure equipment and other pertinent information
- Facilitating information sharing with electric industry to identify and share vulnerabilities

Chapter 2: Research and Development

Background

While significant work has been done to date by various organizations (EPRI, DTRA, National Labs, etc.), there are still many unknowns in areas crucial to the successful operation of the BPS following an EMP event. Ongoing research activities need to be monitored and their results made available to the utilities. Gaps in existing knowledge and planned research should be identified and additional research activities initiated.

Research Considerations

The key research matters that the EMP Task Force identified in its deliberation include the following:

- Research Recommendation #1: Monitoring current research and report on national initiatives
- Research Recommendation #2: Identification of gaps in research that need to be closed to enable movement toward EMP performance requirements and/or guidelines
- Research Recommendation #3: Develop industry specifications for certain equipment

Research Recommendations

Research Recommendation #1: Monitor Current Research and Report on National Initiatives

Monitor and communicate to the industry research pertaining to EMP and EMP-related national security initiatives that impacts the BPS.

Suggested Lead Organization(s) | NERC, DOE, and DHS

Support Organization(s) | DTRA, FERC, National Labs

- Consider establishing a clearing house for declassified information as it pertains to ongoing research projects sponsored by the Department of Defense and Department of Energy.
- Consider establishing a common communication mechanism to make this information available to electric utility industry stakeholders by setting up a committee or governance structure ensuring the information gets into the right hands.
- Consider publishing a timeline of existing research efforts as many parallel projects are currently underway related to EMP. This would provide visibility and additional collaboration with all industry stakeholders and avoid duplication of efforts.

Research Recommendation #2: Identify Gaps in Research

Additional research is needed to close existing knowledge gaps into the complete impact of an EMP event. This is needed to understand vulnerabilities, develop mitigation strategies, and how to plan response and recovery efforts.

Suggested Lead Organization | NERC

Support Organization(s) | DHS, DOE, EPRI, DTRA

The following are areas that would benefit from additional research:

Generating Facilities

- Consider additional research on generating facilities as they are a crucial element to the operation of the BPS. Large synchronous machines are vital to maintaining steady state voltage on the BPS, and properly functioning black start generation is essential in EMP event recovery:
 - What will be the impact to traditional rotating machines and their control systems, and what mitigations would be effective against adverse impacts?
 - Will these facilities ride through and/or be available for post-EMP recovery efforts?
- Consider additional research on the impact to renewables (inverter-based resources) and their possible mitigations.
- Consider additional research on the impact of E2 to low-voltage auxiliary systems critical to the reliable operation of a generating plant.

Transmission and Distribution Facilities

- Consider additional researching (additional) the impact to transmission and distribution facilities, particularly distribution high voltage configurations that coordinate with transmission substations. Areas to be explored include distribution automation circuit reconfiguration (DACR) restoration systems and advanced meter infrastructure (AMI) systems:
 - Of particular interest is whether an EMP would cause these systems to either temporarily or permanently disrupt operations or be degraded in a manner that leads to misoperations.
 - Work should also be done to determine whether E2 will lead to wide-spread distribution disruptions.
- Assess vulnerabilities to non-microprocessor-based relays (i.e., solid-state and electro mechanical relays).
- Assess performance of auxiliary/instrument transformers during an EMP event.
- Consider validation (by test scenarios) of the coupling models and simulations of E1 EMP to transmission/distribution lines in addition to substation yard wiring.
- Consider defining and analyzing the different circuits within a substation, including current transformers (CTs), potential transformers (PTs), trip/close coils, inputs/outputs, serial communications, etc.
- Consider testing of the complete circuits defined (including yard cables, grounding, control house termination/terminal strips, control house wiring, and panel terminal strips).

End-use Facilities

Consider additional research on impact to end-use facilities. It is crucial to know how loads will be impacted by an EMP as this affects recovery efforts. Knowing the nature and availability of load post EMP is crucial to any successful operations plan to restore the BPS.

Research Recommendation #3: Develop Industry Specifications for Equipment

Undertake efforts to design equipment specifications for the electric sector utility industry around EMP hardening and mitigation strategies.

Suggested Lead Organization(s) | IEEE and NERC

Support Organization(s) | DOE, DHS, DTRA, EPRI, National Labs, CIGRE

- Consider initiating work around EMP technical standards development with existing standards organizations such as IEEE, Underwriters Laboratories (UL), National Electrical Manufacturers Association (NEMA), etc. as it relates to commercial level specifications for equipment, maintenance, and installation.
- Assess the merit of implementing or adopting International Electrotechnical Commission (IEC) EMP specifications as they are not traditionally adopted by the electric utility industry.

Chapter 3: Vulnerability Assessments

Background

In its discussions, the EMP Task Force concluded that a number of knowledge gaps exist with regard to the electric utility industry's ability to conduct EMP vulnerability assessment. These gaps include the following:

- Limited access to unclassified EMP environments for the purposes of performing vulnerability assessment
- Lack of access to open-source or commercially available simulation tools that are needed to couple EMP environments into modern BPS infrastructure and to perform wide-area assessments
- Limited availability of BPS-connected electronic components test results needed to better understand component strength levels (damage thresholds)

In addition, there is absence of well-established methods, procedures, and modeling guidelines needed to conduct assessments. The EMP Task Force further determined that additional gaps exist with regard to research findings presented in publicly available literature as study conclusions vary extensively among technical reports, and thus, there continues to be considerable uncertainty in this area.

These knowledge gaps demonstrate that additional work is needed to improve understanding of the potential impacts of an EMP on the modern BPS and to inform EMP vulnerability assessments performed by the industry. As a result, measures to address the aforementioned gaps were identified by the EMP Task Force and presented in the following sections.

Vulnerability Assessments Considerations

The key vulnerability assessment considerations identified by the EMP Task Force include three recommendations that will impact the industry's ability to successfully perform EMP assessments:

- Vulnerability assessment Recommendation #1: Regular collaboration and coordination with Federal Government to procure and effectively disseminate information needed by industry
- Vulnerability assessment Recommendation #2: Development of EMP vulnerability assessment methods and guidelines
- Vulnerability assessment Recommendation #3: Development of guidelines to identify and prioritize hardening of critical assets

Vulnerability Assessments Recommendations

Vulnerability assessment Recommendation #1: Collaboration and Coordination with Federal Government

Consider maintaining an EMP Task Force within the ERO Enterprise Technical Committees to regularly coordinate and collaborate with governmental authorities to procure and effectively disseminate information needed by industry.

Suggested Lead Organization(s) | [NERC](#) and [DHS](#)

Potential Support Organization(s) | [DTRA](#), [FERC](#), [National Labs](#), [DOE](#), [Asset Owners](#)

- Collaborate with the DHS to obtain the recommended unclassified E1, E2, and E3 EMP environments (i.e., benchmark scenarios) that the industry needs to conduct vulnerability assessment on the BPS. This should be an outcome of the work under the March 26, 2019 EMP executive order. Unclassified EMP environments are expected to be released in March 2020.

- Consider establishing a clearinghouse for EMP study results and equipment test data for use by the industry to conduct EMP impact risk assessments. An objective would be to add new results and data as they become available. Another objective would be to establish an agreed upon/approved set of study results and data that the industry would use in its analyses and assessments.
- Sponsor or participate in inter-agency exercises when appropriate to contribute industry technical perspective and gain understanding of the needs of response planners

Vulnerability Assessment Recommendation #2: EMP Vulnerability Assessment Methods

The ERO Enterprise should develop tools and methods for system planners and equipment owners to use in assessing EMP impacts on the BPS.

Suggested Lead Organization | NERC

Potential Support Organization(s) | EPRI, DOE, DTRA, DHS, National Labs, Asset Owners, and System planners

Consider supporting the development of equipment vulnerability assessment tools and methods for the following:

- Enhancing industry response and mitigation to EMP threats
- Computing geomagnetically-induced current (GIC) flows resulting from E3 EMP

The intent of potential tools and methods are to evaluate the potential for equipment damage due to EMP-induced surges and to provide clear and concise direction to the industry on how to evaluate the potential for an EMP to cause voltage collapse and/or transformer thermal damage. Objectives would be to make available an open-source simulation tool for computing the transient voltages and currents that BPS equipment may be exposed to when subjected to EMP.

In addition, the following should be considered:

- Developing an application guide to provide the industry with best practices and realistic approaches for conducting EMP vulnerability assessment so that EMP impacts can be evaluated and factored into traditional power system planning studies. The guide needs to include theoretical background, modeling parameters, methods, and data considerations needed to perform EMP vulnerability assessments.
- Identifying potential unintended consequences of EMP hardening so that system reliability is not adversely affected.

Vulnerability Assessment Recommendation #3: Critical Assets Identification

Provide guidance to the industry on how to identify and prioritize hardening of assets that are needed to maintain and restore critical BPS operations.

Suggested Lead Organization(s) | NERC and Asset Owners

Potential Support Organization(s) | EPRI, DTRA, DHS, National Labs

- Consider developing a method for identifying critical assets for EMP mitigation solutions in planning, operations, and restoration. As an example, consider establishing criteria related to synchronous and non-synchronous resources and their unique roles in real-time operations and resilience as they have great flexibility in maintaining steady state voltage and reactive power on the BPS
- Develop guidance documents aimed at allowing utilities to identify components and infrastructure likely to be at risk of becoming degraded or failing outright as a consequence of an EMP event, therefore needing to be taken into account when developing system restoration plans

- Develop the range of acceptable response options cover the spectrum, from implementing a prescribed level of hardening for certain zones or particular assets (to avoid being disrupted) while strategically allowing disruptions in other zones subject to advance plans for timely post-event recovery

Chapter 4: Mitigation Guidelines

Background

There are various approaches to EMP mitigation. One approach is to harden individual components while another is to harden an entire facility and install unhardened components within the facility:

- There are EMP mitigation techniques used by the defense sector where facilities have been hardened. This has allowed many mission-critical defense sector installations the flexibility to purchase and obtain any kind of device or component for their applications. This approach seeks to eliminate the threat entirely by shielding the facility rather than hardening the components themselves.
- The electric utility industry often takes a different approach to resilience: historically, the industry has hardened its individual components, allowing flexibility to install them in virtually any environment.

Additional research and vulnerability assessments need to be completed on individual electric utility grade components to understand the gap in resilience. Once this is done, mitigation guidelines can be developed to instruct utilities on adjustments that may enhance system resiliency in a cost-effective manner.

Mitigation Considerations

The EMP Task Force acknowledges that research is continuing, and EPRI is currently conducting field trials in an effort to further study mitigations for utilities. Since the research is ongoing, the EMP Task Force is unable to endorse a particular mitigation strategy at this time for all stakeholders. Work should be done to better understand the EMP threat and identify next steps before specific mitigation strategies are recommended.

Mitigation Guidelines Recommendation

Mitigation Recommendation #1: Develop Guidance on EMP Mitigation

The ERO Enterprise should develop guidelines for industry to use in developing strategies for mitigating the effects of an EMP on the BPS (control centers/plant controls, substations, and power plants).

Suggested Lead Organization | [NERC](#)

Support Organization(s) | [Asset Owners](#), [EPRI](#), [DOE](#), [DTRA](#), [DHS](#), [National Labs](#)

BPS Mitigations (for E3 events)

Evaluate existing GMD mitigation strategies to identify synergies for EMP mitigations where applicable, such as the following:

- Voltage collapse
- Impacts to generation transformers
- Evaluating appropriateness and effectiveness for GIC blocking device applications
- Assessment steps for avoiding unintended consequences
- Protection system Misoperation
- Impact to generator resources

Control Center and Plant Control Room Mitigation (E1 and E2 events)

- Consider developing guidelines for operators of the BPS to mitigate the effects of E1 EMP on components supporting Real-time operations to ensure sufficient monitoring and control of the BPS is achieved to meet the performance expectations established from [Policy Recommendation #1](#).
- Control Facility mitigation guidelines should encompass a wide range of items:
 - Ride through (hardening) versus recovery (sparing) of systems/components
 - Control rooms, associated data centers/ energy management system/generation control systems servers, and associated ancillary vital building equipment uninterruptible power supply, on site generation, mechanical electrical plumbing (MEP) systems etc.)
 - Communication and supervisory control and data acquisition (SCADA) infrastructure used for data and voice needed for control facility BPS operation
- Consideration should be given to the development of recommendations for both retrofitting Control Centers and Plant Control Rooms as well as best practices for new installations.

Substation and Power Plant Equipment Mitigation (E1 and E2 events)

- Consider to what extent mitigations identified by EPRI and others would be included in future guidance.
- Consider unique mitigations associated with generating resources and ancillary equipment:
 - Environmental/Emissions control;
 - Instrument and Control (I&C) systems
 - Water/Wastewater control systems
- Consider developing best practices to help Asset Owners design and build transmission and generation installations.
- Consider assessing the practicality of retrofitting existing substation and power plant equipment versus replacement.

Chapter 5: Response and Recovery

Background

An EMP event can potentially cause a voltage collapse resulting in separation, islanding, or blackout of the system where all or a significant portion of the bulk transmission and distribution system is de-energized but may still be tied together through closed breakers.

This chapter describes high-level strategies to be employed during the recovery and restoration from such an event, including minimum criteria for meeting the objectives of a recovery plan. With the guidance of the entities' Reliability Coordinators, and after assessing the status of the grid within its area, system operators will use their blackstart strategies to facilitate restoring their systems.

Response and Recovery Considerations

Restoration following a disturbance resulting from an EMP event is expected to be significantly more challenging and lengthy than prior industry restoration experiences. An EMP event has the likelihood to leave unhardened protection and control systems in an unknown and potentially damaged state, whether energized or not. Additionally, there is a greater likelihood that portions of unhardened load and generation will be damaged and unavailable to aid in restoring the system. The effects of an EMP can disrupt the atmosphere, rendering even protected microwave and satellite communications inoperable for several hours. Restoration following an EMP event will require significantly more validation to confirm proper functioning of protection and control systems to ensure public safety and reliability during recovery and restoration. Damage to other systems, including communications and transportation systems, and other widespread societal impacts may further complicate and delay restoration following an EMP event.

The essential elements of performing a system restoration following an EMP event are similar to a non-EMP restoration; however, each will be more challenging as noted above. These essential elements include the following:

- Establishing communications (externally with RC, TOP, BA, TOs, GOs, etc., and internally with management, employees, and contractors)
- Assessing system status and equipment conditions and identify damage
- Performing restoration (bottom up via blackstart and/or top down with external assistance)

This section provides recommendations intended to aid in developing effective response and recovery strategies for an EMP event.

Response and Recovery Recommendations

Response and Recovery Recommendation #1: Establish National EMP Notification System

The ERO Enterprise should consider partnering with the appropriate agencies to develop a real-time national notification system for the electric sector to System Operators and Plant Operators pertaining to an EMP event and its parameters.

Suggested Lead Organization(s) | [NERC, DHS, and FEMA](#)

Potential Support Organization(s) | [DOE and USGS](#)

- Consider establishing an early warning threat system as it pertains to the probability of an attack from a foreign threat. This would be analogous to the DHS Terrorism Advisory System or the FEMA National Warning

System (NAWAS). This item includes establishing a warning protocol to grid operators to take action if an EMP is imminent.

- Consider developing a notification system protocol to inform system operators and plant operators immediately after an EMP event has occurred. Knowledge of an event and its location will greatly aid those who have the capability to dispatch personnel to look for damaged equipment in substations or within a plant and will expedite the recovery.
- Consider using the DOE notification system established by the 2015 FAST Act where “a malicious act using electronic communication or an electromagnetic pulse” is already defined as a grid security emergency¹² where System Operators and Plant Operators can be immediately warned or notified after a nuclear missile launch or an EMP has occurred. Knowledge of a pending or actual EMP event and its location will greatly aid and expedite system recovery for those who have the capability to dispatch personnel to prepare the BPS for an EMP event or look for damaged equipment in substations or within a plant after an EMP event.

Response and Recovery Recommendation #2: Coordinated Response Planning

Develop response planning guidelines for electric utility industry members for pre and post-contingency of an EMP event that aligns with the DHS and FEMA.

Suggested Lead Organization | NERC

Potential Support Organization(s) | DHS, FEMA, DOE, Asset Owners and Operators

Defining the criteria for EMP response planning in alignment with DHS and FEMA emergency response planning efforts:

- To ensure aligned expectations across community sectors and responders
- To align electric utility industry and personnel with DHS and FEMA recommendations

Response and Recovery Recommendation #3: Enhance Operating Procedures

Work with industry to develop criteria to incorporate into operating plans and procedures and system restoration plans pertaining to EMP event.

Suggested Lead Organization | NERC

Potential Support Organization(s) | EPRI, DHS, DTRA, National Labs, DOE, Asset Owners and Operators

- Work with industry to develop guidance that can be incorporated into operating procedures on actions that should be taken by grid operators if advance warning of an EMP event is known—in order to lessen the EMP impact:
 - Depending on available time horizon, actions to consider include invoking conservative operations (*e.g.*, returning out of service equipment, carrying additional reserves, and ensuring a distributed generation profile) and possibly disconnecting assets and ensuring certain generation is off-line
 - Guidance should also address aspects, such as securing and protecting supporting equipment and spares (such as relay settings and test equipment) that will be needed in event recovery as well as notification and mobilization of personnel
- Work with industry to develop guidance on how to enhance system operator training and operating procedures to aid system operators in recognizing an EMP event and provide direction that should be taken

¹² See *Fixing America's Surface Transportation Act*, Pub. L. No. 114-94, § 61,003, 129 Stat. 1312, 1773-1779 (2015) (codified at 16 U.S.C. 8240-1) (FAST Act).

by operators during and after to lessen an EMP impact. Training should include transmission system vulnerabilities, vulnerabilities of RTU's and protection system components.

- Work with industry to develop guidance on how to enhance generator operator and plant operator training and plant procedures to aid generation personnel in recognizing an EMP event and provide direction that should be taken by generator operators and plant operators during and after to lessen an EMP impact. Training should include generating unit vulnerabilities, vulnerabilities of instrument and control systems, protection systems, and environmental control components.
- Work with industry to develop guidance on elements to add to revised system restoration plans (SRPs) related to an EMP event. Examples include steps to address anticipated communications difficulties, actions to confirm functioning protection and control equipment, adjustments to SRPs to prioritize hardened blackstart units, cranking paths, and other assets, and adjustments to account for load uncertainty.

Response and Recovery Recommendation #4: Incorporate EMP Events into Industry Exercises and Training

Develop training for system and plant operators about EMP events and what to anticipate and incorporate EMP events in industry exercises to test response planning and system restoration recovery efforts.

Lead Organization | [NERC](#)

Potential Support Organization(s) | [Asset Owners, ISO and RTOs, FEMA, DHS](#)

- Develop an industrywide shared understanding to explain an EMP event. This includes standardized operator awareness training for the industry to explain an EMP event, the impact of an EMP on the electric system, what operators in control rooms might experience, and unique challenges operators will face in restoration following an EMP event.
- Consider developing and hosting EMP event exercises around hazard simulation as it relates to DHS efforts under the Executive Order.
- Consider EMP risk and mitigation actions as regular topics of discussion at NERC-hosted security and reliability conferences and workshops, such as GridSecCon, technical committee meetings, and other events.

Response and Recovery Recommendation #5: Strategies for Supporting Recovery

The ERO Enterprise should provide guidance to industry for supporting systems and equipment (including spare equipment strategy) needed for BPS recovery post-EMP event.

Lead Organization | [NERC](#)

Potential Support Organization(s) | [Asset Owners and Operators, RTOs/ISOs, FEMA, DHS](#)

To support effective recovery from an EMP event, industry must ensure needed personnel and equipment will be available. To this end, industry should develop best practices for the following:

- Communication mechanisms are in place to mobilize employees not at work.
- Communications mechanisms are in place to communicate with field personnel and to contact local emergency agencies.
- Identification of the recovery data and information that is needed post EMP is completed.
- Relay settings are stored in a hardened asset and protection and control test and setting equipment is protected.

- Needed company critical information, including personnel contacts and procedures and required spares, are housed in a hardened asset.
- Plans are in place for housing and feeding employees involved in the recovery effort.
- Vehicles and transportation will be available.

Chapter 6: Conclusion and Next Steps

Given the complex nature of addressing the risks associated with an EMP event, many of the recommendations outlined in this report are interrelated. The timing and sequencing of the next steps for industry are contingent on many of the policy items highlighted to be addressed outside of the electric sector or outside of the ERO Enterprise.

Challenges to Moving Forward

Clear expectations must be defined with regard to the acceptable levels of performance for the BPS for a pre-defined EMP event. NERC should take the lead on identifying and communicating these expectations with industry stakeholders. In tandem, progress on the following items will enable industry to prepare and understand the breadth of an EMP threat:

- Industry must be provided access to classified data, and there must be some level of declassification in order to share the appropriate information with stakeholders.
- A federal cost recovery mechanism must be identified for implementing EMP mitigation.
- Research should continue on any identified gaps in EMP knowledge and mitigation strategy.
- Effective EMP mitigation for the electric infrastructure requires the development of guidance (on technical issues, policy, and rate recovery) across multiple jurisdictions (state, federal, and different regulatory authorities/agencies), and
- The development and enhancement of tools and methods for assessing the vulnerabilities of the BPS to EMPs is required.

The EMP Task Force acknowledges that resolving some of these items are outside the authority of the ERO Enterprise, though the organization can influence directions. The EMP Task Force also acknowledges that some of these items are unable to be addressed by a single entity/governmental authority. Nevertheless, work must advance in these areas to support effective EMP mitigation strategies.

Next Steps

The EMP Task Force should be maintained in order to monitor, inform, and facilitate any further actions stemming from the recommendations listed in this report. Due to the magnitude of this threat and the numerous items detailed in this report, membership on the EMP Task Force should be expanded, and the NERC technical committees should commence most, if not all, of the initiatives for research, vulnerability assessment, mitigation guidelines, and the items listed for response and recovery. In addition, NERC will continue to work with the DOE and EPRI to clearly understand EMPs, their effective mitigations, and the proper ways to engage industry.

Chapter 7: EMP Task Force Roster

Chair	Aaron Shaw	AEP
Vice-Chair	Rey Ramos	Southern Company
Members	John Babik	JEA
	Kenneth Braerman	Exelon Corporation
	Brian Evans-Mongeon	Utility Services
	Barry Gustafson	Xcel Energy
	Jason Marshall	Wabash Valley Power Association
	Arun Narang	Hydro One
	Thomas Popik	Resilient Societies
	Joe Sowell	GTC
	John Stephens	City Utilities
	Micah Till	Dominion Energy
	Randy Crissman	NYPA

Creation of the Reliability and Security Technical Committee to Replace the Operating, Planning, and Critical Infrastructure Protection Committees

Action

- Approve the creation of a new committee called the Reliability and Security Technical Committee (RSTC) to replace the existing three technical committees – Operating Committee (OC), Planning Committee (PC), and the Critical Infrastructure Protection Committee (CIPC).
- Approve the RSTC Charter.
- Approve and appoint the Chair and Vice Chair of the RSTC.

Attachment 1: RSTC Proposal

Attachment 2: RSTC Charter

Background

The NERC Board of Trustees (Board) called for a comprehensive review of the existing technical committee structure to determine how to improve the effectiveness and efficiency of those committees. As a result of that request, a stakeholder engagement team (SET) was formed to develop a recommendation. The SET is comprised of members of the Board, leadership and representatives from the Member Representatives Committee (MRC), the chairs of the existing technical committees, stakeholder volunteers, as well as NERC staff.

The SET considered multiple options for fulfilling the ERO Enterprise need for participatory technical input on matters of reliability and security of the North American bulk power system (BPS), including maintaining the existing committee structure. The SET recommended forming a new committee – the RSTC - to replace the three existing technical committees.

Article VII of the NERC Bylaws provides that the NERC Board may appoint committees, by resolution, as the NERC Board deems necessary to carry out its purposes. Such committees must be representative of members, other interested parties and the public. They must also provide for balanced decision-making as well as participation of persons with technical knowledge and experience.

All appointments of NERC committees shall provide the opportunity for an equitable number of members from the United States and Canada (and from Mexico after NERC receives recognition by appropriate governmental authorities in Mexico as its electric reliability organization) to be appointed to each committee in approximate proportion to each country's percentage of the total Net Energy for Load. All committees shall have such scope and duties, not inconsistent with law, as are specified in the NERC Bylaws, the NERC Rules of Procedure, or as otherwise determined by the NERC Board.

Appointment of the Chair and Vice-Chair of the RSTC

The NERC Board requested that the SET provide a recommendation for the initial Chair and Vice-Chair of the RSTC. To that end, NERC opened a nomination period from September 9-23,

2019 soliciting candidates for the two officer positions. The SET formed a Nominating Committee which nominated the proposed RSTC Chair and Vice-Chair. The SET reviewed the nominations and recommended two candidates to the NERC Board for appointment at the November 5, 2019 Board meeting.

The SET thereby recommends that the NERC Board appoint Greg Ford (President and Chief Executive Officer of Georgia System Operations Corporation) as the RSTC Chair and Dave Zwergel (Senior Director of Regional Operations at Midcontinent Independent System Operator) as the RSTC Vice Chair.

The selection of future Chairs and Vice Chairs of the RSTC will follow the process outlined in the proposed charter.

Transition to the RSTC

The SET proposes a gradual transition from the existing three, technical committee structure to the establishment of the RSTC. If the formation of the RSTC is approved by the NERC Board and the NERC Board appoints the proposed Chair and Vice-Chair, then the Chair and Vice-Chair will manage the transition.

The proposed chairs will open two separate nomination periods for selection of sector and at-large members. For purposes of the transition, the proposed officers will serve as the Nominating Subcommittee for selection of at-large members along with the NERC Board Vice-Chair, NERC Chief Executive Officer, and the MRC Vice-Chair. Selection of sector members and non-voting members will follow the processes outlined in the charter.

A full slate of proposed RSTC members will be presented to the NERC Board for appointment in February 2020. Upon NERC Board approval, the fully populated RSTC will then work to develop a transition plan and revise work plans for the subcommittees, working groups, and task forces of the OC, PC, and CIPC. This will be done in coordination with the current leadership of the technical committees to ensure a smooth transition between February 2020 and June 2020.

In June 2020, the OC, PC, and CIPC will host their final joint meeting to review work plans. The three technical committees will be disbanded after the June joint meeting. The first meeting of the RSTC will immediately follow the close of the final OC, PC, and CIPC joint meeting.

Charter of the RSTC

Section 1301 of the NERC Rules of Procedure provides that the NERC Board may from time to time create standing committees. In doing so, the NERC Board shall approve the charter of such a committee and assign specific authority to conduct business within that charter.

Below are the elements of the proposed RSTC Charter:¹

Functions

- Create a forum for industry stakeholders to support NERC programs in the development of key ERO Enterprise deliverables.

¹ This summary of the charter focuses on processes that will govern the RSTC post-transition in June 2020.

- Coordinate and oversee implementation of work plans for RSTC subcommittees, working groups, and task forces.
- Advise the NERC Board.

Hybrid Membership Model

- Three types of membership:
 - Sector members from 11 sectors;
 - At-large members; and,
 - Non-voting members.
- Sector members are selected through sector elections.
- At-large members are selected through a nominating subcommittee with the goal of creating balance in member representation as follows:
 - Regional Entity and Interconnection diversity (i.e., goal of having at least one representative from each Interconnection and Regional Entity footprint in the overall RSTC);
 - Subject matter expertise diversity (Planning, Operating, or Security);
 - Organizational type diversity (Cooperatives, Investor-Owned Utilities, Public Power, Power Marketing Agencies, etc.); and,
 - North American country diversity, consistent with the NERC bylaws, (Canada, Mexico, and U.S.).
- Non-voting members are identified by the RSTC Secretary in coordination with entities entitled to non-voting membership.

Member Selection

- It is expected that RSTC members will be from organizations who are NERC members, but it is not required.
- Members serve at the pleasure of the NERC Board.
- A company, including its affiliates, may not have more than one member on the RSTC.
- In the event that a sector has no nominations for one or both sector seats at the annual election, the RSTC must first attempt to fill those sector positions with at-large members. Otherwise, the sector seat(s) will remain vacant until the next annual election.

Nominating Subcommittee

- Composition:
 - RSTC Vice-Chair
 - Four members drawing from different sectors and at-large representatives.
- Members of this subcommittee are nominated by the RSTC Chair and approved by the full RSTC membership.

- Responsible for selecting at-large members and managing the process to select the chair and/or the vice-chair.

Terms

- Two-year terms with no limits with the exception of RSTC leadership.
- Unless an exception is approved by the NERC Board, no individual may serve more than one term as chair or vice-chair.

Vacancies and Proxies

- Members filling interim vacancies will only serve the remainder of the vacating member's term.
- A proxy may not be given to another RSTC member.
- A proxy must meet the RSTC's membership eligibility requirements.

Voting

- Affirmative action requires two-thirds action of the votes present at any meeting at which a quorum is present.
- Voting membership consists of the following:
 - Sectors 1-10 and Sector 12 – 22 voting members
 - At-Large – 10 voting members
 - Chair and Vice-Chair

Executive Committee

- Executive Committee consisting of the RSTC Chair, Vice-Chair, and four RSTC voting members selected by the RSTC Chair and Vice-Chair with a reasonable balance of subject matter expertise in Operations, Planning, and/or Security and with consideration for diversity in representation.
 - Authorized by the RSTC to act on its behalf between regular meetings on matters where urgent actions are crucial and full RSTC discussions are not practical.
 - Decisions can be ratified, modified, or annulled by the full RSTC membership.

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Reliability and Security Technical Committee Proposal

October 2019

RELIABILITY | RESILIENCE | SECURITY



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Table of Contents

Preface	iv
Overview	v
Background	vi
Chapter 1: Stakeholder Engagement Team Recommendation Development Process	1
Overview of Existing Committee Structures	1
Scope of SET Review	2
Stakeholder Engagement Team Review	2
Chapter 2: Vision for a Restructured Technical Committee Organization.....	4
Chapter 3: Options for Technical Committee Restructuring	5
Option 1: Create an Oversight Committee.....	5
Alternative 1a: Create a new Oversight Committee for NERC Technical Committees, Charter the SCCG and assign responsibilities	6
Oversight Committee Participation Model.....	6
Oversight Committee Implementation plan.....	7
Option 2: Replace Technical Committees with a Reliability and Security Technical Committee, and retain existing subcommittee structure.....	7
Reliability and Security Technical Committee Participation Model Options.....	7
Chapter 4: Compare and Contrast Options 1 and 2.....	8
Option 1: Establish an Oversight Committee	8
Option 2: Establish Reliability and Security Technical Committee.....	8
Potential Effectiveness and Efficiency Benefits	8
Recommended Participation Model:	11
Chapter 5: Membership	12
Membership Qualifications	12
Expectations	12
Membership Selection (Initial Seating)	13
Membership Selection (On-Going Seating).....	13
Board Appointment and Membership Terms (Initial Terms)	14
Board Appointment and Membership Terms (On-going Terms)	14
Officers	14
Chapter 6: Executive Committee	16
Authorization.....	16
Membership	16
Chapter 7: Industry Review and Comment Timeline	17

Table of Contents

Chapter 8: Elements of a Charter for the Reliability and Security Technical Committee 18

Appendix A: Stakeholder Engagement Team Roster 19

Appendix B: Existing Participation Models 20

Appendix C: Reliability and Security Technical Committee Member Definitions 22

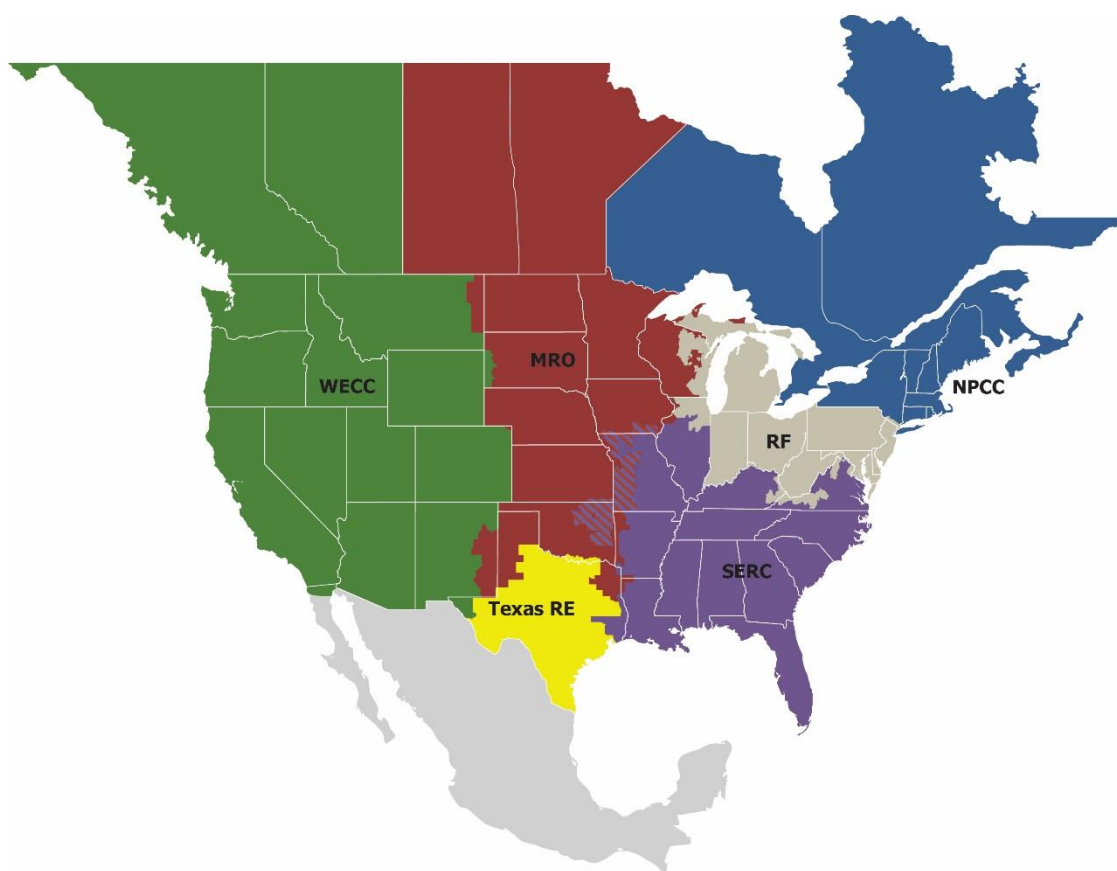
Appendix D: Reliability and Security Technical Committee Timeline 24

Preface

Electricity is a key component of the fabric of modern society and the Electric Reliability Organization (ERO) Enterprise serves to strengthen that fabric. The vision for the ERO Enterprise, which is comprised of the North American Electric Reliability Corporation (NERC) and the six Regional Entities (REs), is a highly reliable and secure North American bulk power system (BPS). Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.

Reliability | Resilience | Security
Because nearly 400 million citizens in North America are counting on us

The North American BPS is divided into six RE boundaries as shown in the map and corresponding table below. The multicolored area denotes overlap as some load-serving entities participate in one Region while associated Transmission Owners/Operators participate in another.



MRO	Midwest Reliability Organization
NPCC	Northeast Power Coordinating Council
RF	ReliabilityFirst
SERC	SERC Reliability Corporation
Texas RE	Texas Reliability Entity
WECC	Western Electricity Coordinating Council

Overview

NERC is presently undertaking a comprehensive assessment of its activities that is intended to improve the operational effectiveness of the ERO Enterprise while optimizing the value of industry stakeholder participation. The issue of improving the effectiveness and efficiency of stakeholder engagement across the ERO Enterprise was specifically raised by NERC Chair Roy Thilly in a January 4, 2018 Policy Input Letter to the Member Representatives Committee (MRC). In response to industry feedback that was received, the NERC Board of Trustees (Board) called for a comprehensive review of the existing technical committee structure and actions that could be taken to improve the effectiveness and efficiency of those committees.

As a result of that request, a stakeholder engagement team (SET) was formed to review the existing NERC technical committee structure and develop a recommendation. The SET was tasked by the Board and is comprised of members of the Board, leadership and representatives from the MRC, the chairs of the technical committees (Operating, Planning, and Critical Infrastructure Protection), other stakeholder volunteers, and NERC senior leadership, legal, and staff.

The SET considered multiple options for fulfilling the ERO Enterprise need for participatory technical input on matters of reliability and security of the North American BPS, including maintaining the existing committee structure. The SET determined that a new Reliability and Security Technical Committee (RSTC) to replace the three existing technical committees would best meet the vision for effective and efficient technical input. The sections below discuss the background, process, and vision that guided the SET's work and recommendation. The recommendation will be provided to the Board for possible approval at its November 2019 meeting.

Background

The [ERO Enterprise Long-Term Strategy](#) and [ERO Enterprise Operating Plan](#), approved by the Board on November 9, 2017, recognize the importance of achieving greater enterprise-wide effectiveness and efficiency. Over the course of 2018, NERC and the REs identified current and ongoing efforts related to effectiveness and efficiency and explored future initiatives. The following objectives guided NERC and the REs in this effort:

1. Enhance ERO effectiveness in executing its statutory functions, recognizing the value of industry expertise.
2. Improve the efficiency of ERO operations and the use of stakeholder resources.

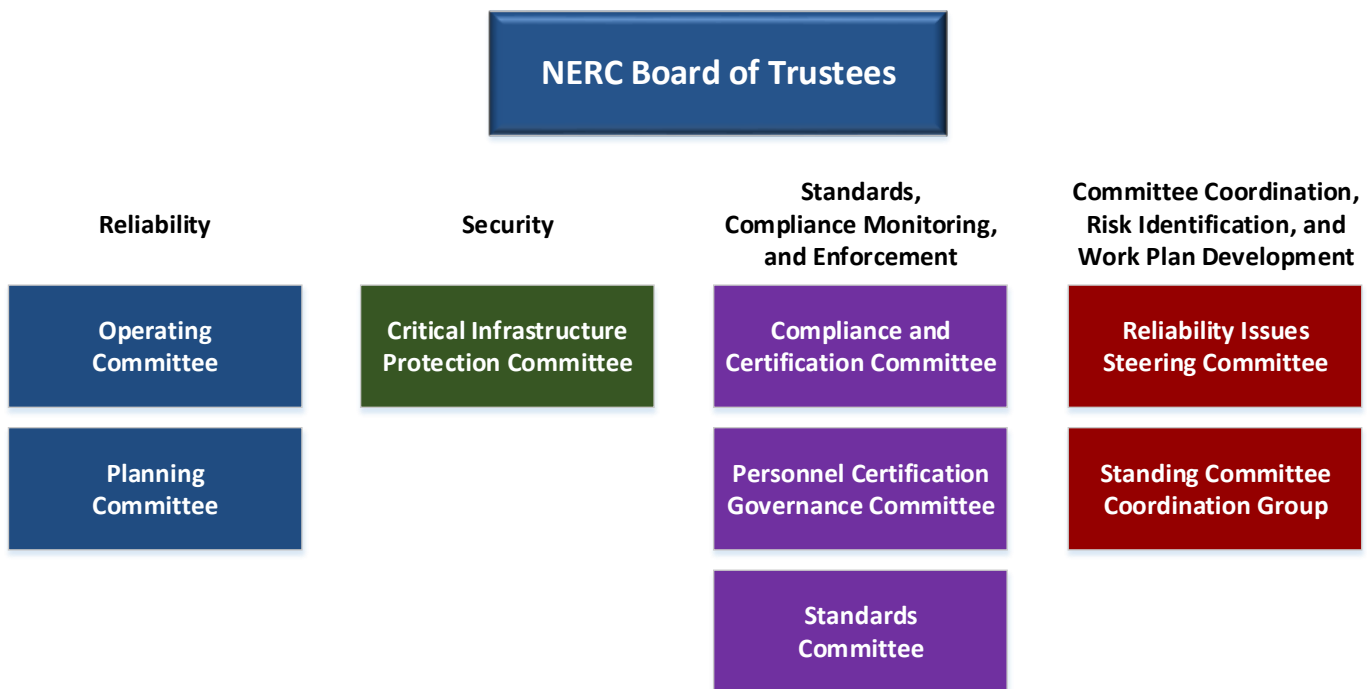
The SET was formed to carry out the objectives as related to stakeholder engagement through the technical committees. The SET was co-chaired by the vice chair of the MRC and NERC's Chief Engineer. A complete list of the SET membership and participants is in Appendix A.

Chapter 1: Stakeholder Engagement Team Recommendation Development Process

The SET performed four steps in its review and leveraged NERC’s Strategic Plan, Operating Plan, and RISC Report to facilitate the evaluation process: 1) examined all RE experiences with committee restructuring; 2) verified the parameters surrounding governance of the identified technical committees, as outlined in the NERC Rules of Procedure and Bylaws, Federal Power Act, and federal regulations; 3) reviewed common responsibilities, work flow, and current levels of coordination across the identified technical committees based on their work plans and deliverables; and 4) surveyed current committee members for their input about existing committee structures and potential replacement structures. The SET then reviewed potential options for organizational structure and developed recommendations for next steps.

Overview of Existing Committee Structures

The ERO Enterprise makes use of technical input, guidance, and reliability/security leadership provided by its standing committees: Planning (PC), Operating (OC), Compliance and Certification (CCC), Standards (SC), Critical Infrastructure Protection (CIPC), Reliability Issues Steering (RISC), and Personnel Certification Governance (PCGC) Committees. The diagram below shows the current structure of all the standing committees and their general area of focus:



Under the current NERC committee structure, the OC, PC, CIPC, CCC, SC, PCGC, and the RISC report to the Board. Except for the RISC, each has an executive committee that supports the committee between meetings, as well as guides and coordinates the subcommittee, working group, and task force workload and priorities. To further coordinate issues that may be cross-cutting, the chairs and vice-chairs (who sit on the executive committees) of all NERC standing committees meet on a quarterly basis, concurrent with the Board and MRC meetings. This group of chairs and vice chairs is called the Standing Committee Coordination Group (SCCG).¹ The SCCG itself does not have a

¹ The SCCG also includes leadership teams from the SC, CCC, RISC, and the PCGC. The SCCG members work to improve coordination between the technical committees and help develop work plan items to address reliability issues

charter or a mandate and, therefore, holds no authority to further direct the activities of the standing committees. NERC staff facilitate the meetings and discussions of the SCCG.

Separately, the RISC provides advice to the Board, triages risks, and provides front-end, high-level leadership for issues of strategic importance to the reliability and security of the BPS.

Scope of SET Review

To examine enhancements that could improve the use of scarce industry resources, the SET was tasked with reviewing the OC, PC, and CIPC structures and activities given their technical focus on reliability and security of the BPS. These technical committees identify and assess risk to the operation, planning, and security of the BPS. Most of the technical work of the committees is performed at the subcommittee, working group, or task force level. The technical committees provide direction and oversight of these groups. Some activities of the technical committees are ongoing and provide annual/biennial deliverables while other activities appear to be less focused and fragmented. Recently, more task force creation has occurred to address emerging, fast impacting issues.

The advisory committees (CCC, SC, and PCGC) are not part of this review as each advisory committee is quite distinct with no overlap of responsibilities as specifically noted in NERC's Rules of Procedure. These committees have been self-regulating over time to improve effectiveness and efficiency.

Further, the RISC was also not a part of this review as it has a unique charge and participation model. It produces a biennial report on key risk identification and mitigation. The RISC is chartered to triage risk mitigation approaches.

Stakeholder Engagement Team Review

Based on its review, the SET concluded the following regarding the existing OC/PC/CIPC structure:

- The current model has been in place with little change for over 10 years
 - Model requires significant expense and time commitment from NERC members, NERC staff, and industry stakeholders
 - The ERO Enterprise has matured
 - Several REs have had success enhancing their committee models
- The industry model is changing
 - Advances in new and unfamiliar technologies (e.g., inverters, batteries) are impacting the traditional power grid
 - Risk profiles are changing (e.g., fuel assurance, essential reliability services preservation with resource mix changes)
 - Recent experience within the committees is to stand up task forces for end-to-end solutions, bypassing existing subgroups
- The committee "silos" are blurring
 - Speed of change is accelerating
 - Committee activities increasingly overlap
 - New technology requires cross-cutting rethinking of many utility paradigms (e.g. – inverter-based resources including wind, solar and storage)

The technical committees must play a vital role in order for the ERO Enterprise to be successful in its mission of reducing risk to the BPS. Based on current operations, the technical committees provide oversight, work plan coordination, and technical review of the results and work products developed by working groups of subject matter experts. The SET recognizes the importance of the collaboration, training and education that occurs between participants and attendees of the technical committee meetings. Lessons learned, information sharing by the U.S. Department of Energy (DOE) National Labs, technical reports, security briefings, cyber reports, training, etc. will continue to be provided.

Enhancing stakeholder engagement through the three technical committees should:

- Strengthen alignment of stakeholder input with ERO Enterprise priorities
- Accommodate the changing industry model
- Focus on reliability and security risks from a strategic planning, operating and security perspective
- Effectively address the increasing overlap between the technical committees
- Leverage subject matter expertise more cost-effectively
- Effectively use NERC staff

Chapter 2: Vision for a Restructured Technical Committee Organization

The SET agreed on a vision for enhancing stakeholder engagement through technical committees as outlined below:

- We pivot quickly and refocus resources rapidly
 - We are in an ever-changing world and the pace of change is accelerating
 - Agile teams need to be readily deployed to address emerging issues
- We bring multi-disciplined teams together to develop “complete” solutions
 - Complex issues facing the industry that don’t fit into one basket
 - Ensure appropriate mix of knowledge/skills/abilities (participation model): Planning, Operations, Security, Compliance/Policy, and Legal
- We work collaboratively and efficiently to solve problems
 - Eliminate silos and redundancies
 - Committees need the ability to support standards and compliance
 - Ability to address projected and emerging risks that threaten the reliability of the bulk power system
 - Standards or guidelines may be needed
 - Additional tools (potentially new) may be needed
- We leverage scarce talent to solve problems and maximize our return

Chapter 3: Options for Technical Committee Restructuring

The SET reviewed all activities of the three technical committees. A few conclusions became apparent in this review:

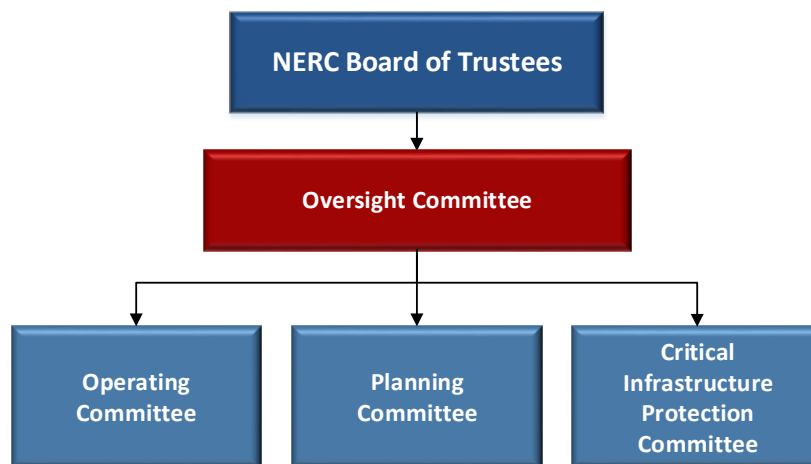
1. Technical committee participation is generally based on Sectors (OC/PC) or Regional nomination (CIPC). As more focused technical expertise is usually required to develop detailed solutions, most of the work is now performed at the subcommittee, working group, and task force level – not at the committee level.
2. By-and-large, technical committee activities focused on work plan development, evaluation and execution by the subgroups that report to them.
 - a. Subgroup report-outs are occurring on a quarterly basis.
 - b. The technical committee work plans are not formally coordinated.
3. Most problem solving is occurring at the subcommittee, working group, and task force level. Some subcommittees have ongoing recurring deliverables while others are more ad hoc task oriented.
4. Some reliability and security risk issues are being addressed by multiple subcommittees, leading to uncoordinated results, and less end-to-end solutions.

The SET also recognizes the importance of the collaboration, training and education that occurs during the technical committee meetings. Examples of such activities include presentations by National Laboratories, Lessons Learned, Security briefings, etc. These activities must continue in the future in some format.

Issue statement: The SET identified the need to ensure work plans are coordinated, and an opportunity for more end-to-end solution development to address reliability/security risks. Several options were reviewed.

Option 1: Create an Oversight Committee

Retain the current committee structure and create an Oversight Committee. The Oversight Committee could either be a newly created body or a redesign of the existing SCCG or RISC.



The following are the alternatives considered for the formation of the Oversight Committee to address the issue statement above:

Alternative 1a²: Create a new Oversight Committee for NERC Technical Committees, Charter the SCCG and assign responsibilities

Charter the SCCG to perform the assigned responsibilities with associated reporting and accountability for tasks. Institute SCCG reporting to the Board. Subcommittees can be attached (as in Option 2 of the Committee Structure below) for those groups that provide periodic reliability/security reports. For example, a Project Management Oversight Committee focused on project development, end-to-end solutions, and reduction of duplication. If selected, this option would be implemented by assigning to the SCCG the responsibility for developing a charter and organizational structure for approval.

Recommendation for Option 1: The SET believes that Alternative 1a provides the best baseline for comparison of alternatives considered in the effectiveness and efficiency review. The SCCG is currently an informal group that is designed to perform many of the tasks envisioned to be performed by the Oversight Committee and its membership contains the necessary technical and leadership skills to transition to a formal organization reporting to the Board. The SET also considered alternatives 1b and 1c (shown in footnote 2) but the SET does not believe them to be the best choices for creating an Oversight Committee because of the desire to have the Oversight Committee report to the Board. The SET recommends including RISC representation/leadership on the Oversight Committee.

Oversight Committee Participation Model

An oversight structure is needed to ensure the output of NERC RISC (risk reliability reports, risk parameters, data analysis, reliability assessments, etc.) is addressed as well as direct and coordinate potential mitigations and actions required of the NERC technical committees.

If Alternative 1a is the preferred proposed structure, the oversight committee should ensure that:

1. Risks are identified, prioritized and managed
2. Assignments are coordinated and not duplicated
3. The technical committees (OC, PC, and CIPC) are directed to successful execution of the duties
4. Tools (guidelines, guidance, standards, etc.) employed in response to risks are appropriate

There are a number of options for creating the Oversight Committee. Regardless of the selected organizational structure, assumptions have been made regarding the oversight committee:

- Decisions should consider the technical committee structure
- Coordinates all NERC technical committees
- Assumes participation by NERC technical committees (regardless of number)
- Eliminate or avoid duplication of effort or potential gaps in solutions
- RISC Reliability Report (priorities and profiles) used to easily identify and coordinate efforts in support of reliability and security
- Support moving quickly and refocusing resources rapidly
- Brings multi-disciplined teams together to develop “complete” solutions
- Leverage scarce talent to solve problems and maximize returns
- Work collaboratively to solve problems

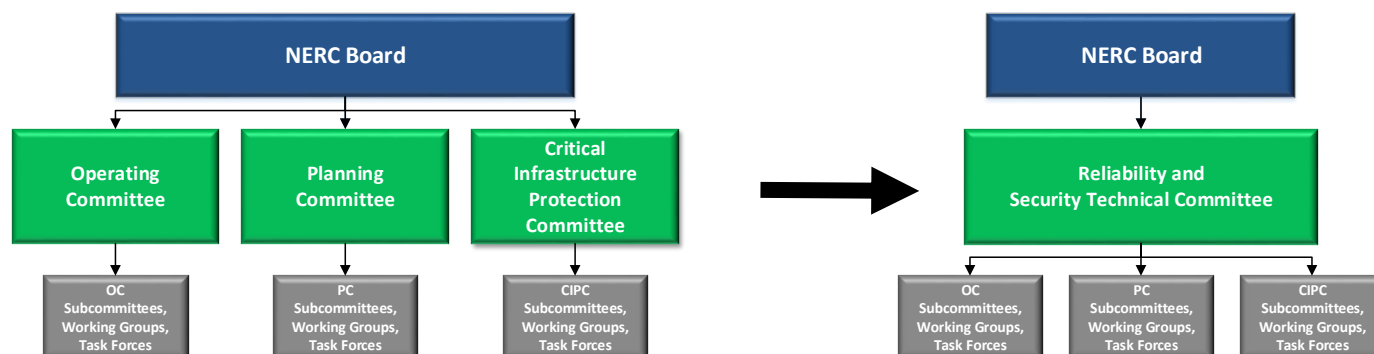
² The SET analyzed three alternatives for the creation of an Oversight Committee and recommends Alternative 1a. The other alternatives considered were Alternative 1b: Charter the SCCG with organizational reporting to RISC and Alternative 1c: Delegate functions to RISC. Alternative 1a was selected because it provided the best baseline to compare alternative structures, and is in-line with the current structure providing the lowest potential impact on the existing organization.

Oversight Committee Implementation plan

This option would be the simplest and quickest option to implement. It would require formalizing the SCCG charter and gaining Board approval. Participation models for the committees would not change. However, the option doesn't address all of the elements of the envisaged end-point. It does however provide a base-line to which a comparison can be made to other recommended approaches.

Option 2³: Replace Technical Committees with a Reliability and Security Technical Committee, and retain existing subcommittee structure

Replace the OC, PC, and CIPC with a single, new RSTC, which reports to the Board, overseeing the work of the subcommittees, working groups, and task forces. The existing subcommittees, working groups, and task forces reporting to the CIPC, OC, and PC will be evaluated for work scope and recurring deliverables. It is envisioned that those subcommittees and working groups with recurring deliverables will be retained, while those without recurring deliverables will be further evaluated for synergies and streamlining of stakeholder activities. Task forces will be deployed with clear deliverables and a timeline for completing those deliverables.



Reliability and Security Technical Committee Participation Model Options

The ERO has three general types of participation models in its committees, highlighted below (See Appendix B for more details):

- OC/PC – Sector-based model with 2 members from each of the 12 Sectors plus a chair and vice chair. Also have provisions for Canadian representation.
- CIPC – Regional-based model with three representatives from each Region with expertise in physical security, cyber security, and operations with provisions for Canadian representation as well as certain industry groups.
- RISC – Pool of experts selected based on skills and knowledge criteria
 - Geographic and International diversity
 - Sector, size, and asset (transmission, distribution, load, generation, etc.) diversity;
 - High-level understanding and perspective on reliability risks; and
 - Balanced consideration of these criteria, across the entire membership of the RISC.

³ The SET reviewed several options for restructuring the technical committees. The two most viable options include Alternative 1: creating a Reliability Committee with Operating and Planning expertise while CIPC remains as it exists; and Alternative 2 Transform CIPC, OC and PC into a Reliability and Security Technical Committee with subcommittees and a “roster” of technical experts that can be used to establish “problem specific” task forces. This second option was selected by the SET as it encourages the consideration of all aspects of risks to reliability when designing and operating the bulk power system, during normal and emergency conditions, either natural or man-made. This would result in coordinated management of resources for addressing the various aspects of threats to the reliable operation of the bulk power system.

Chapter 4: Compare and Contrast Options 1 and 2

Option 1: Establish an Oversight Committee

The existing NERC technical committee's structure remains unchanged with this option. Option 1 does create formal oversight of the activities of the OC, PC, and CIPC by the SCCG, chartered as the Oversight Committee. The Oversight Committee will be responsible for coordinating development and approving the work plans of the technical committees to assure that there is no redundancy in committee activities. The Oversight Committee, in consultation with NERC management team, will determine when there is a need to form task forces (project teams) to resolve a specific grid reliability issue. To implement Option 1, a charter must be developed for the Oversight Committee that will include membership, responsibilities, deliverables and reporting requirements to the Board.

Option 2: Establish Reliability and Security Technical Committee

This option creates a new formal oversight that combines the experience of all three committees into one. The newly created RSTC will oversee the output of the subcommittees, working groups, and task forces, and report to the Board. Depending on the participation model chosen for the RSTC, this model provides less "silo" impact for issues that overlap in the current model as well as increasing effectiveness by addressing duplication and/or gaps in the current subcommittee structure. During the transition to this new structure, the existing subcommittees, working groups, and task forces will remain until the RSTC has an opportunity to complete its analysis of all ongoing activities and priorities.

Potential Effectiveness and Efficiency Benefits

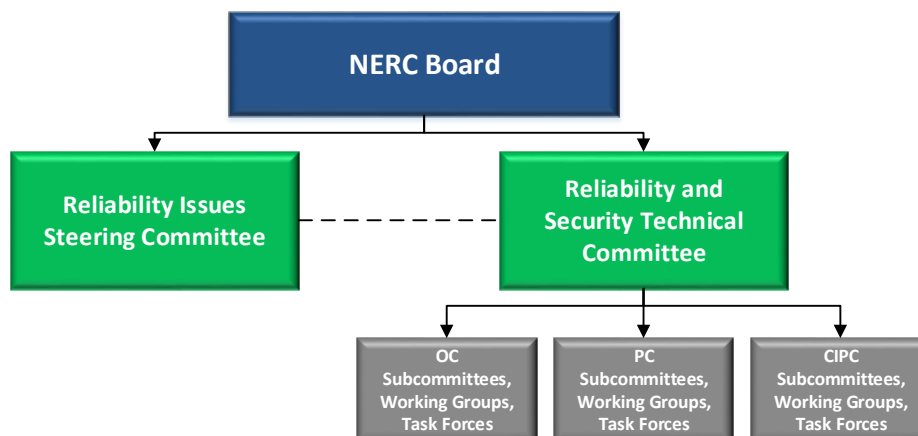
There are several potential effectiveness and efficiency benefits from Option 2, compared to both the status quo and Option 1. For example, Option 2 provides:

Better functional alignment with the RISC

The RISC is made up of industry advisors that provide leadership/advice on strategic forward-looking risks, prioritize the risks and provide recommendations for risk mitigation. The RISC provides its assessment in a report to the NERC Board every second year. The RISC report is used, among other things, to inform the ERO strategic plan and the annual Business Plan and Budget.

The main RISC-related function as it relates to the RSTC will be, in conjunction with NERC management, to initiate and oversee the development of technical analyses and products to better understand and mitigate the priority risks identified in the RISC report, monitor the effectiveness of mitigation activities, and identify emerging risks from measuring system performance.

The graphic below shows the relationship between the RISC, RSTC, and the Board:



The resulting model supports the ERO and Board with two leadership bodies:

1. RISC: Advising on emerging risks, prioritizing them and identifying impactful mitigation activities.
2. RSTC: Overseeing the implementation of those tactical prioritizations through work plans, similar to a project management office, as well as advising on the reliability and security of the BPS through reliability assessments and performance analysis to identify and address any unexpected new and emerging risks.

Below provides further granularity on the roles of RISC and the proposed RSTC.

Reliability Issues Steering Committee Charter

Purpose

The Reliability Issues Steering Committee (RISC or Committee) is a committee that triages and provides front-end, high-level leadership for issues of strategic importance to BPS reliability and security and offers high-level stakeholder leadership engagement and input on issues that impact BPS reliability.

RISC advises the Board, NERC standing committees, NERC staff, regulators, Regional Entities, and industry stakeholders to establish a common understanding of the scope, priority, and goals for the development of solutions to address these issues, including the use of solutions other than the development of new or revised Reliability Standards. In doing so, the RISC provides a framework for steering, developing, formalizing, and organizing recommendations to help NERC and the industry effectively focus their resources on the critical issues needed to best improve the reliability and security of the BPS.

Reporting

The RISC reports to the Board.

Functions

The RISC performs two primary functions for the Board.

1. The first function of the RISC is to evaluate emerging BPS reliability issues and risks. The RISC provides strategic leadership and advice to the Board and others to triage key reliability risks and propose solutions to manage those risks.
2. Second, the RISC provides a biennial analysis of risks to the BPS and produces a relative prioritization of the risks and mitigation activities. The prioritization is designed to advise:
 - a. Annual ERO action planning, resource allocation, budgeting and strategic planning processes; and
 - b. Standing committee planning, including the development of the Reliability Standards Development Plan.

In addition, the RISC performs such other functions that may, from time to time, be delegated or assigned by the Board.

Reliability and Security Technical Committee

Purpose

Similar to the RISC, RSTC will be an advisory committee that, in conjunction with NERC management, initiates and oversees the development of technical assessments and analysis that i) support the analytical assessment function of the ERO; and ii) develop and provide products that can be used by industry to mitigate risks to the BPS.

Reporting

The RSTC will report to the Board.

Functions

To provide technical advice, project management, and subject matter expertise support to each of the NERC program areas, and to serve as a forum to integrate the outputs of each ERO program area, including:

1. **Reliability Assessments** – Review reliability assessments, assure technical accuracy and completeness of results, and endorse approval of assessments to NERC’s Board.
2. **Cyber and Physical Security** – Review and assess the horizon for emerging cyber and physical risks. Develop mitigations, including guidelines, Alerts, webinars, whitepapers and standard enhancements.
3. **Emerging Issues and Reliability Concerns** – Identify emerging issues within the electric industry, address issues in reliability and security assessments, and address other issues as assigned by the Board.
4. **Operational Analyses** – Develop operational analyses, model validation, and key reliability areas, resulting in technically accurate and comprehensive reports addressing these areas (i.e., frequency response, intermittent generation, cyber and physical security, distributed energy resources (DER), etc.). Provide recommendations that facilitate addressing the reliability and security risks identified. Provide oversight, guidance, and direction to address key planning related issues.
5. **Standards Input** – Provide technical expertise and feedback to Standard Authorization Requests (SARs) that have reliability- or security-related impacts, provide foundational technical efforts that support the key reliability operational, planning and security related standards development, coordinate effectively with the Standards Committee to maintain alignment on priorities, develop and vet planning, operational and security guidelines that align with approved standards with industry stakeholders, and provide reliability risk information for prioritization of SARs and new or enhanced Reliability Standards.
6. **Metrics** – Provide direction, technical oversight, and feedback on the NERC Adequate Level of Reliability (ALR) metrics. Pioneer development of security metrics
7. **Event Analysis** – Review all event reports to determine lessons learned and good industry practices and promote the dissemination of information to the industry to enhance reliability.
8. **NERC Alerts** – Participate in the review and development of requests for industry actions and informational responses.
9. **Reliability and Security Guidelines, Technical Reports, White Papers, Implementation Guidance, and other reference documents** – Develop reliability guidelines, white papers, technical reports and reference documents to address emerging issues and industry concerns related to system operations.
10. **System Operator Training** – Provide necessary support and guidance to facilitate System Operator training.⁴
11. **Additional Activities and Outreach** – Opportunities to share lessons learned, information sharing by U.S. DOE National Labs, technical reports, security briefings, cyber reports and training, etc. will be broadened so more stakeholders can participate.

Increasing effectiveness and efficiency by providing end-to-end solutions

It is envisaged that the RSTC would provide direction to the existing subgroups of the current PC, OC, and CIPC that produce recurring deliverables that support ERO analytical work. As well, when emerging risks are identified, the RSTC would determine the best way to get a better understanding of the technical aspects of the issues and the potential mitigating strategies. It is envisaged that it would approach this task through the creation of issue-specific task forces that would have well-defined mandates and deliverables. A single issue-specific task force could be structured to examine and report on planning, operational and security aspects of a given issue. Examples of past

⁴ Currently the Personnel Subcommittee (PS), reports to the NERC Operating Committee and is the governing body of the NERC Continuing Education Program that oversees development and implementation of the Continuing Education (CE) Program requirements. The PS develops and updates, as necessary, the CE Program Manual. The RSTC should consider moving some functions from the PS to the NERC Personnel Certification Governance Committee. This transition would require a changes in NERC’s [Rules of Procedure](#).

issues that the RSTC might address in a more holistic way include essential reliability services (ERS), DER and inverter-based resources. Future issues may include, for example, storage.

Enhanced contact between the RSTC, the MRC, and the NERC Board

By replacing the three existing technical committees with one RSTC, enhanced contact will result between the new RSTC and the Board. More time at Board and MRC meetings is envisaged to hear a report from the RSTC and tee up specific items for discussion. As well, it is currently a challenge for Trustees to attend the OC, PC, and CIPC meetings as they occur concurrently.

General efficiencies

The integration of the existing OC, PC, and CIPC provides efficiencies in terms of both NERC and industry support, although these are difficult to quantify at this time. For example, rather than nearly 120 members participating in the three existing technical committees, approximately 40 members will participate in the RSTC. RSTC meetings will continue to be conducted as open meetings, similar to the existing technical committee meetings

Recommended Participation Model:

The SET is recommending a participation model for Option 2 which will be a hybrid of the existing models used in other committees. The number of RSTC members and qualifications are based on:

- Sector representation from Sectors 1 - 10 and 12 as discussed in Chapter 5
- Skills and knowledge criteria similar to the RISC
- Provisions for Canadian representation

Chapter 5: Membership

RSTC membership will be a hybrid model composed of Sector representatives, At Large representatives, and non-voting members. Sector representation will be two members each for Sectors 1 – 10 and 12.⁵ Overall selection of members will consider RE area and Interconnection diversity, subject matter expertise (Planning, Operating, or Security) organizational type (Cooperatives, Investor-Owned Utilities, Public Power, Power Marketing Agencies, etc.) and country (Canada, Mexico, and U.S.). At Large representation will be used to ensure a complete overall balanced representation and expertise in the RSTC.

Name	Voting Members
Sectors 1-10 and 12	22
At Large	10
Chair and Vice Chair	2
Total	34

Non-Voting Member	Number of Members
NERC Secretary	1
United States Federal Government	2
Canadian Federal Government	1
Provincial Government	1
Total	5

Membership Qualifications

The RSTC Charter will set forth that individuals qualified to serve on the RSTC will include senior management and technical level (e.g., Manager, Director, Vice President, Principal, Lead Engineer) industry experts who have familiarity, knowledge, and experience in Planning, Operating, and/or Security. In addition, the RSTC members are expected to have an understanding of Project Management culture and methods for delivering work products within scope, schedule, cost, and quality. The RSTC members will collaborate to provide oversight of multi-disciplinary and cross-organizational initiatives to ensure that the work products achieve the ERO’s and RISC’s strategic objectives, enhance NERC’s critical functions, and collectively address planning, operating and security objectives. The RSTC will primarily oversee development and implementation of risk mitigating technical solutions through the work of the subcommittees, working groups, and task forces.

Expectations

Members of the RSTC are expected to support NERC’s reliability mission;⁷ execute the policies, directives, and assignments of the Board; and advise the Board on the technical perspectives of risk mitigating solutions for: operating reliability matters; transmission planning matters; reliability and resource adequacy matters; physical and cyber security matters.⁸ Additionally, the RSTC will be responsible for ensuring the work of its subcommittees, working groups and task forces is completed in coordination with the efforts of the CCC, SC, PCGC, and the RISC.

⁵ With the ERO model maturing and Regional Entities an integral part of the ERO, Regional Entities (Sector 11) will not be directly represented on the stakeholder RSTC. Sector 11 representatives will participate as RSTC non-voting participants.

⁶ Mexican Government representation considered once they have joined NERC.

⁷ NERC’s mission is to “assure effective and efficient reduction of risks to the reliability and security of the bulk power system.”

⁸ Liaise with the Electricity Information Sharing and Analysis Center (E-ISAC).

Membership Selection (Initial Seating)

Nominations for initial terms for Sector representatives will be called for by NERC after Board approval in November 2019. The Sector nomination period will be November 6-December 6, 2019 and two members for each Sector will be sought. The Sector representation process will follow the current OC and PC election process. If no more than two nominations are received for a particular Sector, the two nominees will be deemed to have been elected for those positions. In the event that there are more than two nominees in any Sector, there will be a Sector election process to determine the two representatives for that Sector. Any unfilled Sector positions on the initial seating will convert to At Large seats to be filled through the Nominating Subcommittee (see below).

A nomination period for At Large nominees will occur after the Sector nomination period. This will be conducted December 9, 2019-January 3, 2020. Initial Seating of At Large representatives will be selected (for approval by the Board) by a Nominating Subcommittee consisting of the NERC Board Vice Chair, NERC Chief Executive Officer, MRC Vice Chair, and the RSTC's Chair and Vice Chair. Representatives will be selected based on the qualifications established in Membership and Membership Qualifications sections above. The qualifications and skills of the Sector representatives will be reviewed and At Large representatives will be selected to ensure broad skills, knowledge and geographic diversity within the RSTC. In addition to Sector seat diversity, membership on the RSTC will consider the following criteria in the selection of At Large representatives:

- Geographic and International (Canadian/Mexican) diversity, including a goal of having representatives based in each RE's area and each Interconnection.
- Sector, size, and asset (transmission, distribution, load, generation, etc.) diversity; and,
- Subject matter expertise in Operations, Planning, and/or Security including a reasonable balance of expertise among these three areas.

The SET did not include the existing Sector 11 (Regional Entity) representation in the proposed model which reflects the maturation of the ERO enterprise and coordination within and between REs.

To ensure adequate Canadian representation, the membership to the committee may be increased so that the number of Canadian voting members is equal to the percentage of the net energy for load (NEL) of Canada to the total NEL of the United States and Canada, times the total number of voting members on the committee, rounded to the next whole number.

Membership Selection (On-Going Seating)

The RSTC must present all new members for approval by the NERC Board at its annual February meeting.

Nominations for Sector members (Sectors 1-10 and 12) will be called for annually under a process that is open, inclusive, and fair, similar to the annual nomination process of the existing OC and PC. Sector and At Large nominees may not represent more than one Sector at any one time and no single organization, including its affiliates, may have more than one member on the RSTC. RE employees are not eligible to be At Large representatives.

The SET did not include the existing Sector 11 (Regional Entity) representation in the proposed model which reflects the maturation of the ERO enterprise and coordination within and between REs.

To ensure adequate Canadian representation, the membership to the committee may be increased so that the number of Canadian voting members is equal to the percentage of the net energy for load (NEL) of Canada to the total NEL of the United States and Canada, times the total number of voting members on the committee, rounded to the next whole number.

The Nominating Subcommittee (NS),⁹ which is appointed by the RSTC every two years, is responsible for the selection of At-Large representatives.

The NS will identify (using an open nomination period), qualify, and recommend individuals to fill At Large representative vacancies on the committee or to serve as the chair or vice chair of the committee. Individuals recommended by the NS for appointment to the committee must be approved by the Board. Representatives will be selected based on the qualifications established in Membership and Membership Qualifications sections above. In addition to Sector seat diversity, membership on the RSTC will consider the following criteria in the selection of At Large representatives:

- Geographic and International (Canadian/Mexican) diversity, including a goal of having representatives based in each RE's area and each Interconnection.
- Sector, size, and asset (transmission, distribution, load, generation, etc.) diversity; and,
- Subject matter expertise in Operations, Planning, and/or Security including a reasonable balance of expertise among these three areas.

See Appendix C for Sector and At Large definitions and descriptions.

Sectors will hold elections to fill expiring vacant Sector positions. Vacant At Large positions will be selected by the NS.

Interim Sector vacancies will be filled through a special election through an open nomination process and will remain vacant if not filled. Interim At-large vacancies will be filled by the NS through an open nomination process and will remain vacant if not filled.

Board Appointment and Membership Terms (Initial Terms)

Members will be appointed to the RSTC by the Board and serve on the RSTC at the pleasure of the Board. Member terms will initially consist of approximately half of the terms as three-year terms and the remaining half being two-year terms for both Sector and At Large representatives. This will promote continuity as the RSTC evolves. Sector and At Large nominees will nominate for either a three-year or two-year term. The NS will resolve any conflicts in terms to ensure staggered terms.

Board Appointment and Membership Terms (On-going Terms)

Members will be appointed to the RSTC by the Board and serve on the RSTC at the pleasure of the Board. Member terms are two years (with half of the terms ending in odd years and the remaining half ending in even years for both Sector and At Large representatives).

Officers

Officers will serve two-year terms and shall be selected as follows:

- The NS will develop a slate of candidates for the chair and vice chair and are elected by the full RSTC. The chair and vice chair will be confirmed by the Board.
- The Chair and Vice Chair may be a Sector or At Large member of the RSTC.
- The chair and vice chair shall not be from the same Sector.

⁹ The on-going RSTC Nominating Subcommittee will be appointed from the RSTC membership. The detailed information is contained in the proposed RSTC Charter.

- The chair and vice chair, upon assuming such positions, shall cease to act as representatives of the Sectors that elected them as representatives to the RSTC and shall thereafter be responsible for acting in the best interests of the members as a whole.
- Unless an exception is approved by the Board, no individual may serve more than one term as vice chair and one term as chair.

Chapter 6: Executive Committee

Authorization

The Executive Committee (EC) of the RSTC will be authorized by the RSTC to act on its behalf between regular meetings on matters where urgent actions are crucial and full RSTC discussions are not practical. Ultimate RSTC responsibility will reside with its full membership whose decisions cannot be overturned by the EC, and which retains the authority to ratify, modify, or annul EC actions.

Membership

The full RSTC will select an EC of six members, with consideration of Sectors, Regions, Interconnections, and other representation factors, as follows:

1. Chair
2. Vice-chair
3. Four RSTC voting members from different Sectors selected by the RSTC chair and vice-chair with subject matter expertise in Operations, Planning, and/or Security including a reasonable balance of expertise between the three areas.

Chapter 7: Industry Review and Comment Timeline

The SET presented the two options described in Chapter 3 to the MRC at its May 2019 meeting and requested feedback on these options. In light of that feedback and further consideration, the SET decided unanimously that Option 2 was preferable to Option 1 and has worked since that time to refine the details of the proposed RSTC for stakeholder feedback and further MRC and Board consideration.

The SET conducted an industry comment period from July 12-August 15, 2019 and conducted an industry webinar on August 8, 2019. There was an MRC Informational Session webinar on July 19, 2019 to inform industry of the SET's recommendations and to define the Policy Input questions regarding the proposal. There was also a Policy Input period July 11-31, 2019. The proposed recommendation was presented to the MRC for policy input at their August 14, 2019 meeting. The SET made revisions to the proposal based on MRC and Industry feedback. The revisions include:

- The SET Nominating Committee will recommend initial chair and vice chair for appointment by the Board (November meeting). Both are for two-year terms.
- The SET changed the Participation Model to two members per Sector. Sectors will elect or appoint their representatives. For the annual election, any unfilled seats will become At Large until the term expires.
- NERC will then hold Sector elections if needed followed by At Large nominating process with Nominating Subcommittee as shown in proposal document (above).
- Board to approve slate of RSTC members February 2020.
- Initial terms for Sector and At Large members will be approximately half of the members for two-year terms and half for a three-year term.
- After initial terms, all terms are two-year staggered terms with approximately half of Sector and At Large terms expiring annually.
- The EC will be elected by the RSTC membership at the first RSTC meeting.
- The SET clarified the goal of having representatives based in each RE's area and each Interconnection.
- The on-going RSTC Nominating Subcommittee will be appointed from the RSTC membership.
- The SET developed a transition plan (Appendix D) to extend the implementation period of the RSTC. The OC, PC, and CIPC will meet in March 2020 with the RSTC having an administrative meeting in March. The full RSTC will meet in June 2020.
- The SET also removed the requirement for executive level experience for RSTC members.

The final recommendation will be presented to the Board at its November 5, 2019 meeting.

Chapter 8: Elements of a Charter for the Reliability and Security Technical Committee

The SET reviewed existing technical committee charters and scope documents and recommends including the following in the Reliability and Security Technical Committee Charter:

1. Membership
 - a. Representation
 - b. Selection
 - c. Terms
 - d. Vacancies
 - e. Proxies
2. Meetings
 - a. Frequency
 - b. Quorum
 - c. Voting
 - d. Confidential sessions
3. Officers
 - a. Terms
 - b. Conditions
 - c. Selections
4. Voting
5. Subcommittees, Working Groups, Task Forces
 - a. Formation and Cessation
 - b. Work Plan Approval Process

Appendix A: Stakeholder Engagement Team Roster

Table A.1: Stakeholder Engagement Team Roster	
Name	Company
Leadership	
Jennifer Sterling (MRC Vice Chair)	Exelon
Mark Lauby	NERC
Team Members	
Ken DeFontes	NERC Trustee
Fred Gorbet	NERC Trustee
Greg Ford (MRC Chair)	Georgia System Operations Corporation
Lloyd Linke (OC Chair)	Western Area Power Administration
Dave Zwergel (OC Vice Chair)	MISO
Brian Evans-Mongeon (PC Chair)	Utility Services, Inc.
Marc Child (CIPC Chair)	Great River Energy
Jennifer Flandermeyer (CCC Chair)	Kansas City Power & Light
Jason Marshall	Wabash Valley Power Alliance
Patti Metro	NRECA
David Short	IESO
Martin Sidor	NRG Energy, Inc.
Scott Tomashefsky (CCC Vice Chair)	Northern California Power Agency
Jeffrey Cook	Bonneville Power Association
Michael Desselle	Southwest Power Pool
Additional Participants	
Edison Elizeh	Bonneville Power Association
Gaurav Karandikar	SERC
Phil Fedora	NPCC
David Zwergel	MISO
Jim Albright	TexasRE
Dave Godfrey	WECC
Tim Ponsetti	SERC
Melinda Montgomery	SERC
Maggie Peacock	SERC
John Odom	FRCC
Eric Senkowicz	FRCC
Jeff Craig	RF
Ray Palmieri	RF
NERC Staff	
Sam Chanoski	Tom Hofstetter
John Moura	Nina Jenkins-Johnston
Stephen Crutchfield	Sandy Shiflett
Mark Olson	

Appendix B: Existing Participation Models

Table B.1: Existing Participation Models			
	RISC	CIPC	OC/PC
	Pool of Experts	Regional Entity Representation	Balanced Sectors
Member Composition	<p>6 – Stakeholder based</p> <ul style="list-style-type: none"> • 4 – MRC • 2 – At-Large <p>5 – Committee based</p> <ul style="list-style-type: none"> • 1 – from each of the standing committees (OC/PC/CIPC/CCC/SC) 	<p>32 Voting Members</p> <ul style="list-style-type: none"> • 24 – registered entities (3 from each Regional Entity) • 2 – Canada • 2 – Policy Experts • 2 – APPA • 2 – NRECA 	<p>29 Voting Members</p> <ul style="list-style-type: none"> • 27 – Sectors 1-12¹⁰ • 2 – Chair and Vice Chair
Selecting Body	<p>Stakeholder Based Nominating Committee (chaired by the MRC Vice-Chair) presents a recommended slate of candidates to the Board.</p> <p>Committee Based Board appointed</p>	<p>Self-nomination from groups identified above</p> <p>Subject to removal by Executive Committee</p>	<p>Candidates are elected by the registered NERC Members in Sectors 1-10 and 12.</p> <p>Members in Sector 11 are appointed by the Regional Entity.</p>
Criteria	<p>Geographic and International diversity, such that Eastern, Western, and Texas Interconnections, along with Canada are represented on the RISC;</p> <p>Sector, size, and asset (transmission, distribution, load, generation, etc.) diversity;</p> <p>High-level understanding and perspective on reliability risks;</p> <p>Experience in a leadership role or background in an executive-level position is strongly preferred; and Balanced consideration of these criteria, across the entire membership of the RISC.</p>	<p>Each RE’s voting members must collectively have expertise in physical security, cyber security and operations</p>	<p>Investor-Owned Utility</p> <p>State/Municipality</p> <p>Cooperative Utility</p> <p>Federal or Provincial Utility / Federal Power Marketing Administration</p> <p>Transmission Dependent Utility</p> <p>Merchant Electricity Generator</p> <p>Electricity Marketer</p> <p>Large End-User Electricity Customer</p> <p>Small End-User Electricity Customer</p> <p>Independent System Operator / Regional Transmission Organization</p>

¹⁰ Sectors 1-3, 5-9, and 11-12 have two voting members each. Sector 4 has four voting members and Sector 10 has three voting members.

Table B.1: Existing Participation Models			
	RISC	CIPC	OC/PC
	Pool of Experts	Regional Entity Representation	Balanced Sectors
			Regional Entity State Government Officers
Non-Voting Members		Identified list of organizations	Government representatives (including Canada) Secretary Chair and Vice Chair of the subcommittees

Appendix C: Reliability and Security Technical Committee Member Definitions

Table C.1: RSTC Members		
Name	Definition	Members
Voting Members		
1. Investor-Owned Utility	This Sector includes any investor-owned entity with substantial business interest in ownership and/or operation in any of the asset categories of generation, transmission, or distribution. This Sector also includes organizations that represent the interests of such entities.	2
2. State/Municipal Utility	This Sector includes any entity owned by or subject to the governmental authority of a state or municipality, that is engaged in the generation, delivery, and/or sale of electric power to end-use customers primarily within the political boundaries of the state or municipality; and any entity, whose members are municipalities, formed under state law for the purpose of generating, transmitting, or purchasing electricity for sale at wholesale to their members. This Sector also includes organizations that represent the interests of such entities.	2
3. Cooperative Utility	This Sector includes any non-governmental entity that is incorporated under the laws of the state in which it operates, is owned by and provides electric service to end-use customers at cost, and is governed by a board of directors that is elected by the membership of the entity; and any non-governmental entity owned by and which provides generation and/or transmission service to such entities. This Sector also includes organizations that represent the interests of such entities.	2
4. Federal or Provincial Utility/Federal Power Marketing Administration	This Sector includes any U.S. federal, Canadian provincial, or Mexican entity that owns and/or operates electric facilities in any of the asset categories of generation, transmission, or distribution; or that functions as a power marketer or power marketing administrator. This Sector also includes organizations that represent the interests of such entities.	2
5. Transmission dependent Utility	This Sector includes any entity with a regulatory, contractual, or other legal obligation to serve wholesale aggregators or customers or end-use customers and that depends primarily on the transmission systems of third parties to provide this service. This Sector also includes organizations that represent the interests of such entities.	2
6. Merchant Electricity Generator	This Sector includes any entity that owns or operates an electricity generating facility that is not included in an investor-owned utility's rate base and that does not otherwise fall within any of Sectors (i) through (v). This Sector includes but is not limited to cogenerators, small power producers, and all other non-utility electricity producers such as exempt wholesale generators who sell electricity at wholesale. This Sector also includes organizations that represent the interests of such entities.	2
7. Electricity Marketer	This Sector includes any entity that is engaged in the activity of buying and selling of wholesale electric power in North America on a physical	2

Table C.1: RSTC Members		
Name	Definition	Members
	or financial basis. This Sector also includes organizations that represent the interests of such entities.	
8. Large End-User Electricity Customer	This Sector includes any entity in North America with at least one service delivery taken at 50 kV or higher (radial supply or facilities dedicated to serve customers) that is not purchased for resale; and any single end-use customer with an average aggregated service load (not purchased for resale) of at least 50,000 MWh annually, excluding cogeneration or other back feed to the serving utility. This Sector also includes organizations that represent the interests of such entities.	2
9. Small End User	This Sector includes any person or entity within North America that takes service below 50 kV; and any single end-use customer with an average aggregated service load (not purchased for resale) of less than 50,000 MWh annually, excluding cogeneration or other back feed to the serving utility. This Sector also includes organizations (including state consumer advocates) that represent the interests of such entities	2
10. Independent System Operator/Regional Transmission Organization	This Sector includes any entity authorized by the Commission to function as an independent transmission system operator, a Regional transmission organization, or a similar organization; comparable entities in Canada and Mexico; and the Electric Reliability Council of Texas or its successor. This Sector also includes organizations that represent the interests of such entities.	2
12. State Government	This Sector includes any state government department or agency in the United States having a regulatory and/or policy interest in the Bulk Electric System (BES).	2
Officers	Chair and Vice Chair	2
At Large	Entities that collectively meet the following general criteria for balanced representation: (i) geographic diversity from all U.S. interconnections and ERO Enterprise Regional Entities, (ii) high-level understanding and perspective on reliability risks based on experience at an organization in the electricity sector, (iii) operations, planning and/or cybersecurity experience and expertise from an organization in the electricity sector. Excludes Regional Entity staff.	10
Non-Voting Members		
Government Representatives	This Sector includes any federal, state, or provincial government department or agency in North America having a regulatory and/or policy interest in wholesale electricity. Entities with regulatory oversight over the Corporation or any Regional Entity, including U.S., Canadian, and Mexican federal agencies and any provincial entity in Canada having statutory oversight over the Corporation or a Regional Entity with respect to the approval and/or enforcement of Reliability Standards, may be non-voting members of this Sector.	
	United States Federal Government	2
	Canadian Federal Government	1
	Provincial Government	1
Secretary	The committee secretary is a NERC staff member appointed by NERC management and will be seated at the committee table	1

Appendix D: Reliability and Security Technical Committee Timeline

The SET developed a timeline to facilitate the transition from the existing committee structure to the RSTC. The NERC Board has requested that the SET provide a recommendation for the initial Chair and Vice Chair to serve two-year terms. To that end, NERC opened a nomination period from September 9-23, 2019 for the officer positions. The SET reviewed the nominations and selected a slate for recommendation to the Board for appointment at the November 5, 2019 Board meeting. The transition timeline is shown below:

- September 30, 2019 (8:00 – 5:00) – SET meeting in Chicago; recommended slate for Chair and Vice Chair and finalized charter.
- October 10, 2019 – MRC informational Session
- October 18, 2019 – Industry Webinar (11:00 am – 12:00 pm)
- November 5, 2019 – Board considers Proposal, Charter and Transition Plan; if approved, appoints Chair and Vice Chair.
- November 6, 2019 – Open Sector nomination period
- December 6, 2019 – Sector nomination period ends. NERC Staff will conduct Sector elections, if necessary, by December 20, 2019.
- December 9, 2019–January 3, 2020 – Open At Large nomination period. NERC Staff/SET analyzes Sector reps for gaps to be filled by At Large members.
- January 6-15, 2020 – Nominating Subcommittee to develop slate of At Large nominees for presentation to the Board.
- February 6, 2020 – Board appoints RSTC members (Sector and At Large). Terms will expire in June of alternating years following the initial terms with the initial term being two or three years, and thereafter 2 year terms. RSTC members will be notified of their appointment by the Board.
- February 7–May 29, 2020 – RSTC develops transition plan and work plans for RSTC and subcommittees. Coordinate with committee and subcommittee leadership to ensure work plans are in place and on schedule.
- March 3-4, 2020 – Hold OC, PC, and CIPC meetings as scheduled. RSTC members will be encouraged to attend one or more sessions and will meet on March 4, 2020 for the inaugural RSTC meeting to establish the Nominating Subcommittee, Executive Committee, and perform other administrative items. RSTC will be operational to ensure smooth transition.
- June 2020 – OC, PC, and CIPC will meet for final work plan approvals and to complete any other approvals. These committees will be disbanded after this session. RSTC will hold initial regular meeting with subcommittee reports and other agenda items.

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Reliability and Security Technical Committee Charter

November 2019

Approved by the NERC Board of Trustees: XX XX, 2019

RELIABILITY | RESILIENCE | SECURITY



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Table of Contents

Preface	iv
Section 1: Purpose	1
Section 2: RSTC Functions	2
Section 3: Membership	3
Representation Model.....	3
Member Selection	4
Member Expectations	5
Term	5
Vacancies and Proxies	6
Section 4: Meetings.....	7
Quorum	7
Voting	7
Open Meetings	7
Confidential Sessions.....	7
Majority and Minority Views.....	7
Action without a Meeting.....	7
Section 5: Officers and Executive Committee.....	8
Officers	8
Secretary.....	8
Chair	8
Vice-Chair	8
Executive Committee	9
Section 6: RSTC Subordinate Groups	10
Subcommittees.....	10
Working Groups.....	10
Task Forces	10
Section 7: Meeting Procedures	11
Voting Procedures for Motions	11
Minutes.....	11
Section 8: RSTC Deliverables and Approval Processes.....	12
Reliability Guidelines	12
Section 1600 Data or Information Requests	12
Other Types of Deliverables	13

Table of Contents

Review Process for other Deliverables..... 13

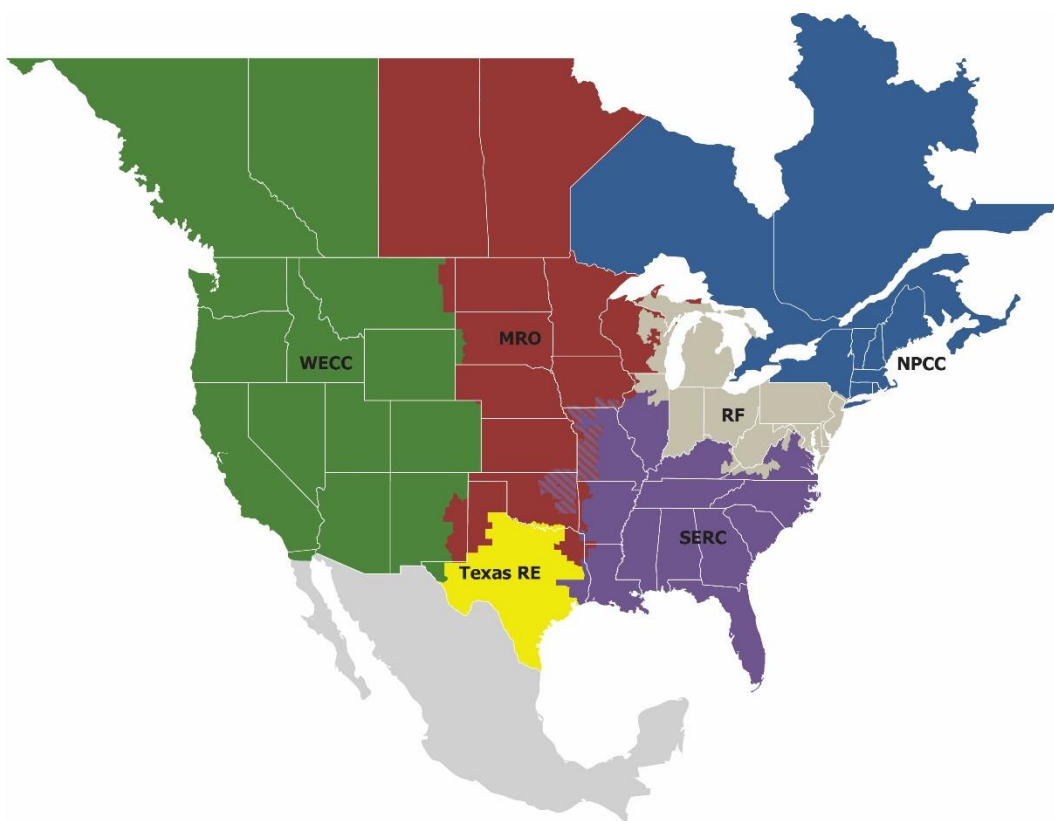
Possible Actions for other Deliverables..... 14

Preface

Electricity is a key component of the fabric of modern society and the Electric Reliability Organization (ERO) Enterprise serves to strengthen that fabric. The vision for the ERO Enterprise, which is comprised of the North American Electric Reliability Corporation (NERC) and the six Regional Entities (REs), is a highly reliable and secure North American bulk power system (BPS). Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.

Reliability | Resilience | Security
Because nearly 400 million citizens in North America are counting on us

The North American BPS is divided into six RE boundaries as shown in the map and corresponding table below. The multicolored area denotes overlap as some load-serving entities participate in one Region while associated Transmission Owners/Operators participate in another.



MRO	Midwest Reliability Organization
NPCC	Northeast Power Coordinating Council
RF	ReliabilityFirst
SERC	SERC Reliability Corporation
Texas RE	Texas Reliability Entity
WECC	Western Electricity Coordinating Council

Section 1: Purpose

The Reliability and Security Technical Committee (RSTC) is a standing committee that strives to advance the reliability and security of the interconnected BPS of North America by:

- Creating a forum for aggregating ideas and interests, drawing from diverse industry stakeholder expertise, to support the ERO Enterprise's mission; and,
- Leveraging such expertise to identify solutions to study, mitigate, and/or eliminate emerging risks to the BPS for the benefit of industry stakeholders, the NERC Board of Trustees (Board) and ERO Enterprise staff and leadership.

Section 2: RSTC Functions

Create a forum for industry stakeholders to support NERC programs in the development of key ERO Enterprise deliverables.

- Facilitate and advocate information sharing among relevant industry stakeholders;
- Review and provide guidance in developing deliverables critical to ERO functions, such as Reliability Standards, reliability assessments, requests for data (pursuant to Section 1600 of the NERC Rules of Procedure Section (ROP)), Implementation Guidance, and other analyses, guidelines, and reports;
- Solicit and coordinate technical direction, oversight activities, and feedback from industry stakeholders;
- Disseminate ERO deliverables to industry to enhance reliability;
- Develop internal and review external requests for industry actions and informational responses;
- Develop appropriate materials, as directed by ERO functions or the NERC Board, to support ERO Enterprise functions; and,
- Coordinate with ERO staff and liaise with government agencies and trade associations.

Coordinate and oversee implementation of RSTC subgroup work plans.

- Create and disband subcommittees, working groups and task forces to support ERO Enterprise functions;
- Harmonize and approve the work plans of subcommittees, working groups, and task forces to ensure alignment with strategic reports and analyses, such as the Business Plan and Budget, ERO Enterprise Long-Term Strategy, Operating Plan, biennial RISC report, State of Reliability report recommendations, Long-Term, Seasonal and Special Reliability Assessment recommendations and ongoing events analysis trends; and,
- Track the progress of the subcommittees, working groups, and task forces to complete assigned activities.

Advise the NERC Board of Trustees.

- Approve, accept, remand or endorse¹ ERO processes, analyses, reports, and other deliverables for the NERC Board; and,
- Provide technical input and analyses on operating and planned BPS reliability and security, emerging issues and risks, and other general industry concerns at the request of the NERC Board or NERC staff.

¹ See Section 8 for further details on these actions.

Section 3: Membership

Representation Model

The RSTC has a hybrid representation model consisting of the following types of memberships:

- Sector members;
- At-large members; and,
- Non-voting members.

Two members shall be elected to each of the following membership sectors:

- Sector 1 - Investor-owned Utility;
- Sector 2 - State/Municipal Utility;
- Sector 3 - Cooperative Utility;
- Sector 4 - Federal or Provincial Utility/Power Marketing Administration;
- Sector 5 - Transmission-dependent Utility;
- Sector 6 - Merchant Electricity Generator;
- Sector 7 - Electricity Marketer;
- Sector 8 - Large End Use Electricity Customer;
- Sector 9 - Small End Use Electricity Customer;
- Sector 10 - ISO/RTO; and,
- Sector 12 - Government Representatives.

Selection of at-large members will allow for better balancing of representation on the RSTC of the following:

- Regional Entity and Interconnection diversity (i.e., goal of having at least one representative from each Interconnection and Regional Entity footprint);
- Subject matter expertise (Planning, Operating, or Security);
- Organizational types (Cooperatives, Investor-Owned Utilities, Public Power, Power Marketing Agencies, etc.); and,
- North American countries, consistent with the NERC bylaws (Canada, Mexico, and U.S.).

Below is a breakdown of voting and non-voting membership on the RSTC:

Voting Membership	
Name	Voting Members
Sectors 1-10 and 12	22
At-Large	10
Chair and Vice-Chair	2
Total	34

Non-Voting Membership²	
Non-Voting Member	Number of Members
NERC Secretary	1
United States Federal Government	2
Canadian Federal Government	1
Provincial Government	1
Total	5

Member Selection

It is expected that RSTC members will be from organizations who are NERC members, but it is not required.

Members are appointed to the RSTC upon approval of the NERC Board and serve on the RSTC at the pleasure of the NERC Board.

1. Affiliates

A company, including its affiliates, may not have more than one member on the RSTC. Any RSTC member who is aware of a membership conflict of this nature is obligated to notify the RSTC secretary within 10 business days. The RSTC secretary will in turn report the conflict to the RSTC chair.

Members impacted by such a conflict, such as through a merger of organizations, may confer among themselves to determine which member should resign from the RSTC and notify the secretary and chair; however, if they are within the same industry sector and cannot reach an amicable solution to determine who will remain, the Nominating Subcommittee will review the qualifications of each member and make a recommendation to the full RSTC. The RSTC will determine which member shall continue to serve, subject to NERC Board approval.

If the conflict is not resolved in a timely manner by the impacted members, the chair shall notify all members of the affected industry sectors and recommend actions to resolve the conflict. If the membership conflict remains unresolved, the chair shall refer the conflict to the NERC Board for resolution.

2. Election of Sector Members

NERC members in each sector will annually elect members for expiring terms or open seats using a nomination and election process that is open, inclusive, and fair. In the event that a sector has no nominations for one or both sector seats at the annual election, the RSTC must first attempt to fill those sector positions with at-large members. Otherwise, the sector seat will remain vacant until the next annual election.

Sector elections will be completed in time for the Nominating Subcommittee to identify and nominate at-large representatives as well as for the secretary to send the full RSTC membership list to the NERC Board for its approval at the February meeting.

After the secretary announces the election results, newly elected members will serve on the RSTC pending approval by the Board.

If an interim vacancy is created in a sector, a special election will be held unless it would coincide with the annual election process. If a sector cannot fill an interim vacancy, then that sector seat will remain vacant until the next annual election. Interim sector vacancies will not be filled with an at-large representative.

² Upon recognition of NERC as the Electric Reliability Organization, Mexican government representation will be equitable and based approximately on proportionate Net Energy for Load.

3. Nominating Subcommittee

The Nominating Subcommittee will consist of five members (the RSTC Vice-Chair and four members drawing from different sectors and at-large representatives.)

The Nominating Subcommittee members are nominated by the RSTC Chair and approved by the full RSTC membership.

The term for members of the Nominating Subcommittee is two years.

In addition to recommending individuals for at-large representative seats, the Nominating Subcommittee manages the process to select the chair and/or vice-chair of the RSTC. The RSTC Vice-Chair shall recuse him or herself from this process.

4. Selection of At-Large Members

The Nominating Subcommittee recommends individuals to fill at-large representative seats on the RSTC, following consultation of the full RSTC.

5. Non-Voting Members

At the start of the annual RSTC nomination process, the RSTC Secretary will coordinate with entities entitled to non-voting membership to identify representatives for the non-voting seats.

6. International Representation

Canadian representation on the RSTC shall be consistent with Article VIII Section 4 of the NERC Bylaws.

Member Expectations

RSTC members are expected to act in accordance with this charter as well as to accomplish the following:

- Adhere to NERC Antitrust Compliance Guidelines and Participant Conduct Policy;
- Demonstrate and provide knowledge and expertise in support of RSTC activities;
- Where applicable, solicit comments and opinions from constituents and groups of constituents or trade organizations represented by the member and convey them to the RSTC;
- Respond promptly to all RSTC requests, including requests for reviews, comments, and votes on issues before the RSTC; and,
- Comply with the procedures in this Charter and Robert's Rules of Order during meetings.

Term

Upon the initial establishment of the RSTC, one half of members will serve for two year terms (with terms ending in even years) and the remaining half will serve for three year terms (with terms ending in odd years).

When the initial terms are complete, all terms will have a standard length of two years to ensure staggered membership.

Terms shorter than two years may be required for several reasons:

- If two members are simultaneously selected to a sector that did not have any existing members, in order to stagger their terms, one member will be assigned a one-year term and the second member will be assigned a two-year term.
- If a member is selected to fill a vacant member position between elections, the term will end when the term for that vacant position ends.

There are no limits on the number of terms that members can serve.

Vacancies and Proxies

Any membership vacancies may be filled between annual elections using the aforementioned selection process.

1. Vacancies Created by the Member

In the event a member can no longer serve on the RSTC, that member will submit a written resignation to the RSTC Chair or the Secretary.

2. Vacancies Requested by the Chair

The chair may request any RSTC member who ceases to participate in the RSTC consistent with member expectations (above) and to the satisfaction of the chair, to submit a resignation or to request continuation of membership with an explanation of extenuating circumstances. If a written response is not received within 30 days of the chair's request, the lack of response will be considered a resignation. If the chair is not satisfied with a written response, the RSTC Chair will refer the matter to the NERC Board.

3. Vacancies Requested by the Board

RSTC members serve at the pleasure of the NERC Board. The NERC Board may initiate a request for resignation, removal, or replacement a member from the RSTC, as it deems appropriate or at the request of the RSTC Chair.

4. Proxies

A voting member may select a proxy who attends and votes during all or a portion of a committee meeting in lieu of a voting member, provided that the absent voting representatives notifies the RSTC Chair, Vice-Chair, or Secretary of the proxy. A proxy may not be given to another RSTC member. A proxy must meet the RSTC's membership eligibility requirements.

To permit time to determine a proxy's eligibility, all proxies must be submitted to the secretary in writing at least one week prior to the meeting (electronic transmittal is acceptable) for approval by the chair. Any proxy submitted after that time will be accepted at the chair's discretion.

Section 4: Meetings

In the absence of specific provisions in this charter, all committee meetings will follow Roberts Rules of Order.

Quorum

The quorum necessary for transacting business at meetings of the RSTC is two-thirds of the voting members currently on the RSTC's roster.

If a quorum is not present at the time of the vote, the RSTC may not take any actions requiring a vote; however, the chair may, with the consent of the majority of voting members present, elect to allow discussion of the agenda items.

Voting

Actions by the RSTC will be approved upon receipt of the affirmative vote of two-thirds of the votes present at any meeting at which a quorum is present.

Voting may take place during regularly scheduled in-person meetings or may take place via electronic mail or conference call.

Open Meetings

RSTC meetings will be open to the public, except as noted below under Confidential Information.

Confidential Sessions

At the discretion of the chair, a meeting or portion of an RSTC meeting may have attendance limited based on confidentiality of the information to be disclosed at the meeting. Such limitations should be applied sparingly and on a non-discriminatory basis. Confidential Information will only be disclosed as provided by Section 1500 of the NERC ROP.

Majority and Minority Views

All members of a committee will be given the opportunity to provide alternative views on an issue. The results of committee actions, including recorded minutes, will reflect the majority as well as any minority views of the committee members. The chair will communicate both the majority and any minority views in presenting results to the NERC Board.

Action without a Meeting

Any action required or permitted at a meeting of the committee may be taken without a meeting at the request of the chair.

Such action without a meeting will be performed by mail or electronic ballot (e.g., telephone, email, or Internet) and will be recorded in the minutes as a roll call ballot. The secretary will announce the action required at least five business days before the date on which voting commences. As time permits, members should be allowed a window of 10 business days to vote. The secretary will document the results of such an action within 10 business days of the close of the voting period. Such action must meet the regular meeting quorum and voting requirements above.

Section 5: Officers and Executive Committee

Officers

The RSTC will have two officers – one chair and one vice-chair.

Officers shall be selected as follows:

- The Nominating Subcommittee solicits nominations for chair and vice-chair through an open nomination process. Self-nominations are permitted.
- The Nominating Subcommittee proposes chair and vice-chair candidates. The full RSTC will elect the chair and vice-chair.
- The chair and vice-chair shall not be from the same sector.
- The elected chair and vice-chair are approved by the NERC Board.
- Unless an exception is approved by the Board, no individual may serve more than one term as vice-chair and one term as chair.

Secretary

NERC will appoint the RSTC Secretary.

A member of the NERC staff will serve as the secretary of the RSTC. The secretary will do the following:

- Manage the day-to-day operations and business of the RSTC;
- Prepare and distribute notices of the RSTC meetings, prepare the meeting agenda, and prepare and distribute the minutes of the RSTC meetings;
- Facilitate the election/selection process for RSTC members; and,
- Act as the RSTC's parliamentarian.

Chair

The chair will direct and provide general supervision of RSTC activities, including the following:

- Coordinate the scheduling of all meetings, including approval of meeting duration and location;
- Develop agendas and rule on any deviation, addition, or deletion from a published agenda;
- Preside at and manage meetings, including the nature and length of discussion, recognition of speakers and proxies, motions, and voting;
- Act as spokesperson for the RSTC at forums inside and outside of NERC; and,
- Attend meetings of the NERC Board when necessary to report on RSTC activities.

Vice-Chair

The vice-chair will assume the responsibilities of the chair under the following conditions:

- At the discretion of the chair (for brief periods of time);
- When the chair is absent or temporarily unable to perform the chair's duties; or,
- When the chair is permanently unavailable or unable to perform the chair's duties. In the case of a permanent change, the vice-chair will continue to serve until a new chair is nominated and appointed by the NERC Board.

Executive Committee

The RSTC will select an Executive Committee of six members as follows:

- Chair;
- Vice-Chair;
- Four RSTC voting members selected by the RSTC Chair and Vice-Chair with a reasonable balance of subject matter expertise in Operations, Planning, and/or Security and with consideration for diversity in representation (i.e., sectors, Regional Entities, Interconnections, etc.).

The Executive Committee of the RSTC is authorized by the RSTC to act on its behalf between regular meetings on matters where urgent actions are crucial and full RSTC discussions are not practical.

Ultimate RSTC responsibility resides with its full membership whose decisions cannot be overturned by the Executive Committee, and which retains the authority to ratify, modify, or annul Executive Committee actions.

Section 6: RSTC Subordinate Groups

The RSTC organizational structure will be aligned as described by the NERC Bylaws to support a superior-subordinate hierarchy.

The RSTC may establish subcommittees, working groups, and task forces as necessary. The RSTC will be the responsible sponsor of all subordinate subcommittees, working groups, or task forces that it creates, or that its subordinate subcommittees and working groups may establish. The RSTC will keep the NERC Board informed of all groups subordinate to the RSTC.

Officers of subordinate groups will be appointed by the chair of the RSTC.

Subcommittees, working groups, and taskforces will conduct business in a manner consistent with all applicable sections of this manual and Robert's Rules of Order.

Subcommittees

The RSTC may establish subcommittees to which the RSTC may delegate some of RSTC's functions. The RSTC will approve the scope of each subcommittee it forms. The RSTC Chair will appoint the subcommittee officers (typically a chair and a vice-chair) for a specific term (generally two years). The subcommittee officers may be reappointed for up to two additional terms. The subcommittee will work within its assigned scope and be accountable for the responsibilities assigned to it by the committee. The formation of a subcommittee, due to the permanency of the subcommittee, will be approved by the NERC Board.

Working Groups

The RSTC may delegate specific continuing functions to a working group. The RSTC will approve the scope of each working group that it forms. The RSTC or subcommittee will appoint the working group officers (typically a chair and a vice-chair) for a specific term (generally two years). The working group officers may be reappointed for one additional term. The RSTC will conduct a "sunset" review of each working group every year. The working group will be accountable for the responsibilities assigned to it by the RSTC or subcommittee and will, at all times, work within its assigned scope. The RSTC should consider promoting to a subcommittee any working group that is required to work longer than one term.

Task Forces

The RSTC may assign specific work to a task force. The RSTC will approve the scope of each task force it forms. The chair of the RSTC will appoint the task force officers (typically a chair and a vice-chair). Each task force will have a finite duration, normally less than one year. The RSTC will review the task force scope at the end of the expected duration and at each subsequent meeting of the RSTC until the task force is retired. Action of the RSTC is required to continue the task force past its defined duration. The RSTC should consider promoting to a working group any task force that is required to work longer than one year.

Section 7: Meeting Procedures

Voting Procedures for Motions

- The default procedure is a voice vote.
- If the chair believes the voice vote is not conclusive, the chair may call for a show of hands.
- The chair will not specifically ask those who are abstaining to identify themselves when voting by voice or a show of hands.
- The committee may conduct a roll-call vote in those situations that need a record of each member's vote.
- The committee must approve conducting a roll call vote for the motion.
- The secretary will call each member's name.
- Members answer "yes," or "no," but may answer "present" if they wish to abstain from voting.

Minutes

- Meeting minutes are a record of what the committee did, not what its members said.
- Minutes should list discussion points where appropriate, but should usually not attribute comments to individuals. It is acceptable to cite the chair's directions, summaries, and assignments.
- Do not list the person who seconds a motion.
- Do not record (or even ask for) abstentions.
- All committee members are afforded the opportunity to provide alternative views on an issue. The meeting minutes will provide an exhibit to record minority positions. The chair shall report both the majority and any minority positions in presenting results to the NERC Board.

Section 8: RSTC Deliverables and Approval Processes

The RSTC will abide by the following parameters regarding approval, endorsement, or acceptance of committee deliverables.

Reliability Guidelines

Reliability Guidelines are documents that suggest approaches or behavior in a given technical area for the purpose of improving reliability. Reliability Guidelines are not binding norms or mandatory requirements. Reliability Guidelines may be adopted by a responsible entity in accordance with its own facts and circumstances.

1. New/updated draft guideline approved for industry posting.

The RSTC approves for posting for industry comment the release of a new or updated draft guideline developed by one of its subgroups or the committee as a whole.

The draft guideline is posted as “for industry-wide comment” for 45 days. If the draft guideline is an update, a redline version against the previous version must also be posted.

After the public comment period, the RSTC will post the comments received as well as its responses to the comments. The RSTC may delegate the preparation of responses to a committee subgroup.

A new or updated guideline which considers the comments received, is approved by the RSTC and posted as “Approved” on the NERC website. Updates must include a revision history and a redline version against the previous version.

After posting a new or updated guideline, the RSTC will continue to accept comments from the industry via a web-based forum where commenters may post their comments.

- a. Each quarter, the RSTC will review the comments received.
- b. At any time, the RSTC may decide to update the guideline based on the comments received or on changes in the industry that necessitate an update.
- c. Updating an existing guideline will require that a draft updated guideline be approved by the RSTC in the above steps.

2. Review of Approved Reliability Guidelines, Security Guidelines, and Reference Documents

Approved Reliability Guidelines or Reference Documents shall be reviewed for continued applicability by the RSTC at a minimum of every third year since the last revision.

3. Communication of New/Revised Reliability Guidelines, Security Guidelines, and Reference Documents

In an effort to ensure that industry remains informed of revisions to a Reliability Guideline or Reference Document or the creation of a new Reliability Guideline or Reference Document, the RSTC subcommittee responsible for the Reliability Guideline will follow an agreed upon process.

4. Coordination with Standards Committee

Standards Committee authorization is required for a Reliability Guideline to become a supporting document that is posted with or referenced from a NERC Reliability Standard. See Appendix 3A in the NERC’s ROP under “Supporting Document.”

Section 1600 Data or Information Requests

A report requested by the RSTC that accompanies or recommends a ROP Section 1600 - Data or Information Request will follow the process outlined below:

1. This Section 1600 request, with draft supporting documentation, will be provided to the RSTC at a regular meeting.
2. The draft Section 1600 data request and supporting documentation will be considered for authorization to post for comments at the RSTC regular meeting.
3. A committee subgroup will review and develop responses to comments on the draft Section 1600 data request and will provide a final draft report, including all required documentation for the final data request, to the RSTC at a regular meeting for endorsement.
4. The final draft of the 1600 data request – with responses to all comments and any modifications made to the request based on these comments – will be provided to the NERC Board.

Other Types of Deliverables

1. Policy Outreach

On an ongoing basis, the RSTC will coordinate with the forums, policymakers, and other entities to encourage those organizations to share reliability guidelines, reference documents and lessons learned to benefit the industry.

Reports required under the NERC ROP or as directed by an Applicable Governmental Authority or the NERC Board: documents include NERC’s long-term reliability assessment, special assessments, and probabilistic assessments. These reports may also be used as the technical basis for standards actions and can be part of informational filings to FERC or other government agencies.

2. White Papers

Documents that explore technical facets of topics, often making recommendations for further action. They may be written by subcommittees, working groups, or task forces of their own volition, or at the request of the RSTC.

3. Reference Documents and Technical Reports

Documents that serve as a reference for the electric utility industry and/or NERC stakeholders regarding a specific topic of interest. These deliverables are intended to document industry practices or technical concepts at the time of publication and may be updated as deemed necessary, per a recommendation by the RSTC or its subgroups to reflect current industry practices.

4. Implementation Guidance

Documents providing examples or approaches for registered entities to comply with standard requirements. The RSTC is designated by the ERO Enterprise as a pre-qualified organization for vetting Implementation Guidance in accordance with NERC Board -approved Compliance Guidance Policy. Implementation Guidance that is endorsed by the RSTC can be submitted to the ERO Enterprise for endorsement, allowing for its use in Compliance Monitoring and Enforcement Program (CMEP) activities.

Review Process for other Deliverables

Deliverables with a deadline established by NERC management or the NERC Board will be developed based on a timeline reviewed by the RSTC to allow for an adequate review period, without compromising the desired report release dates. Due to the need for flexibility in the review and approval process, timelines are provided as guidelines to be followed by the committee and its subgroups.

A default review period of no less than 10 business days will be provided for all committee deliverables. Requests for exceptions may be brought to the RSTC at its regular meetings or to the Executive Committee if the exception cannot wait for an RSTC meeting.

In all cases, a final report may be considered for approval, endorsement, or acceptance if the RSTC, as outlined above, decides to act sooner.

Possible Actions for other Deliverables

1. Approve:

The RSTC has reviewed the deliverable and supports the content and development process, including any recommendations.

2. Accept:

The RSTC has reviewed the deliverable and supports the development process used to complete the deliverable.

3. Remand:

The RSTC remands the deliverable to the originating subcommittee, refer it to another group, or direct other action by the RSTC or one of its subcommittees or groups.

4. Endorse:

The RSTC agrees with the content of the document or action, and recommends the deliverable for the approving authority to act on. This includes deliverables that are provided to the RSTC by other NERC committees. RSTC endorsements will be made with recognition that the deliverable is subject to further modifications by NERC Executive Management and/or the NERC Board. Changes made to the deliverable subsequent to RSTC endorsement will be presented to the RSTC in a timely manner. If the RSTC does not agree with the deliverable or its recommendations, it may decline endorsement. It is recognized that this does not prevent an approval authority from further action.

SERC Bylaws Amendments

Action

Approve proposed amendments to the Bylaws of SERC (“Bylaws”) and file with the Applicable Governmental Authority for approval. The proposed amendments to the SERC Bylaws do not affect SERC’s qualifications or ability to function as a Regional Entity under its Regional Delegation Agreement with the North American Electric Reliability Corporation (“NERC”).

Background

The SERC management team has been working closely with the SERC Board of Directors on proposed Bylaw amendments that will transform SERC’s governance structure. Pending necessary approvals, the proposed amendments are anticipated to take effect January 1, 2021.¹

The proposed Bylaw amendments accomplish the following primary objectives:

First, SERC is transitioning its existing Board Executive Committee into the full Board that will be a hybrid Board made up of Stakeholder and Independent Directors.

Second, SERC is adding at least three Independent Directors to the SERC Board.

Third, SERC is formalizing its Membership body, which will include a representative from each Member company, by transitioning the existing full Board into a Members group that will meet at least annually to advise the Board on the Business Plan and Budget, elect Independent Directors, and approve Bylaw changes, as needed.

Finally, SERC is revamping its Board Committees, which will include transitioning the SERC Board Compliance Committee into a SERC Board Risk Committee. SERC Board Committees shall also include a Human Resources and Compensation Committee; a Nominating and Governance Committee; and a Finance and Audit Committee.

In June 2018, the SERC Board formed a task force of the Board to work with SERC staff on developing the proposed Bylaw amendments. For the past year and a half, the task force and SERC staff have reported out regularly on the status of this project to the SERC Board as well as conducted informational webinars that were open to all SERC members. The task force and SERC staff also worked closely with the Florida entities in developing the proposed amendments, even before the July 1, 2019 Florida integration into SERC, to involve them in helping shape the future SERC Board. Additionally, SERC staff engaged with NERC on the proposed changes throughout the development of the project.

In developing the proposed Bylaw amendments, SERC used as guiding principles the *Independence Principles for Regional Entities (Independence Principles)* that were developed by

¹ With NERC Board approval, SERC and NERC will jointly file a petition with the Federal Energy Regulatory Commission with a request for approval by mid-2020 so that transition activities can take place in 2020 and the new governance structure can take effect January 1, 2021.

the NERC Board of Trustees. While NERC's *Independence Principles* provided direction throughout this project, SERC also reviewed governance best practices to shape its direction.

The SERC Board Executive Committee endorsed the proposed Bylaw modifications during its September 11, 2019 meeting. The SERC Board approved the Bylaw modifications during its October 23, 2019 Board meeting.

Summary of SERC Bylaw Amendments

Below is a summary of specific changes proposed to align with NERC's *Independence Principles*:

Governance

- The proposed SERC Bylaws call for at least three (3) but not more than five (5) Independent Directors.
- With input from the Independent Directors, the Nominating and Governance Committee shall present Independent Directors to the Members for election to the SERC Board.
- Consistent with provisions in NERC's Bylaws, a SERC Independent Director shall be a person (i) who is not an officer or employee of the Corporation; not an officer, director, or employee of a Member; and not an officer, director or employee of any entity that would reasonably be perceived as having a direct financial interest in the outcome the Board of Director's decisions; and (ii) who does not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director. The SERC Board of Directors may adopt additional criteria for Independent Directors.
- The Nominating and Governance Committee will ensure that annual fiduciary duty training is provided to the Board of Directors.
- The Board Chair may be a Sector Director or an Independent Director. If the Board Chair is a Sector Director, a Lead Independent Director shall be designated to consult regularly with the Chair on agendas and other important matters.
- SERC's current *Conflict of Interest Policy* requires employees and Directors to complete conflict of interest questionnaires annually and be recused from any activity that creates a conflict, including when a Director's employer is in a dispute with SERC. SERC's current practice is to provide annual training to staff and Directors on the *Conflict of Interest Policy*.

Compensation

- Regarding setting compensation for Independent Directors and the CEO, including directing a compensation study, there "must be a majority approval vote from the Human Resources and Compensation Committee with the majority of Independent Directors voting in favor."
- The Human Resources and Compensation Committee shall (i) Assist the Board in fulfilling its fiduciary duties as they pertain to determining appropriate compensation levels and ensuring that compensation methods are consistent with the Corporation's mission, vision, and values; (ii) assist the Board in developing compensation strategies, policies and plans that will enhance the Corporation's ability to attract and retain skilled

leadership; and (iii) assist the Board in developing and implementing compensation policies for Independent Directors.

Compliance and Enforcement

- Compliance and enforcement activities will continue to be overseen by SERC staff that are fully independent from stakeholders. Consistent with SERC's practice for many years, no entity-specific compliance and enforcement determinations are approved by the SERC Board or any of its Committees.
- SERC is retiring its Board Compliance Committee and replacing it with a new Board Risk Committee that will be responsible for overseeing the Corporation's risk management framework; providing oversight over management and the SERC Technical Committee's assessments of external risks to the SERC region; and periodically reporting these risk oversight findings to the SERC Board of Directors.

NERC Independence Principles not directly addressed by the proposed changes to SERC's Bylaws will be addressed in the SERC Board Committee charters or other SERC policies and procedures.

AMENDED AND RESTATED

BYLAWS

OF

SERC RELIABILITY CORPORATION

A North Carolina Nonprofit Corporation

Approved by the SERC Board of Directors on October 23, 2019

[PROPOSED BYLAW CHANGES (remove before filing)]

TABLE OF CONTENTS

ARTICLE I - OFFICES	1
1.1 Principal Office.....	1
1.2 Other Offices	1
ARTICLE II - PURPOSES	1
2.1 General Purposes	1
2.2 Geographic Area.....	2
ARTICLE III - POWERS	2
3.1 Powers.....	2
ARTICLE IV - MEMBERSHIP	2
4.1 General.....	2
4.2 Eligibility	2
4.3 Admission of Members.....	3
4.4 Termination.....	3
4.5 Sectors.....	3
4.6 Transfer of Membership	4
4.7 Member Powers	5
4.8 Annual Meeting of Members.....	5
4.9 Special Meetings of Members	5
4.10 Location of Meetings of Members	6
4.11 Conduct of Meetings of Members	6
4.12 Notice of Meetings	6
4.13 Right to Vote; Act of Members	7
4.15 Quorum	7
4.16 Action by Electronic Communication	7
4.17 Voting Member; Proxies.....	8
4.18 Public Notice of Member Meetings.....	8
4.19 Posting of Minutes.....	8
4.20 Reimbursement of Member Expenses	8
ARTICLE V - BOARD OF DIRECTORS	9
5.1 General Powers	9
5.2 Duties	9
5.3 Composition and Eligibility.....	10

5.4	Meetings of the Board of Directors, Notice, Waiver.....	11
5.5	Election of Board Officers.....	12
5.6	Terms of Sector Directors.....	12
5.7	Terms of Independent Directors.....	12
5.8	Vacancies and Removal.....	13
5.9	Agenda.....	13
5.10	Compensation and Reimbursement.....	13
5.11	Quorum.....	13
5.12	Voting.....	13
5.13	Action Without a Meeting.....	14
5.14	Action by Electronic Communication.....	14
ARTICLE VI - CORPORATE OFFICERS		14
6.1	Corporate Officers.....	14
6.2	President/Chief Executive Officer.....	14
6.3	Vice President.....	15
6.4	Secretary.....	15
6.5	Treasurer.....	15
ARTICLE VII - BOARD COMMITTEES		16
7.1	Designation by Board.....	16
7.2	Authority.....	16
7.3	Board Risk Committee.....	16
7.4	Human Resources and Compensation Committee.....	16
7.5	Finance and Audit Committee.....	17
7.6	Nominating and Governance Committee.....	17
7.7	Rules for Governance.....	18
7.8	Ad-Hoc Committees.....	18
7.9	Support Committees of the Corporation.....	18
ARTICLE VIII - MISCELLANEOUS		18
8.1	Conflicts of Interest.....	18
8.2	Contracts.....	18
8.3	Checks, Drafts, or Orders.....	19
8.4	Deposits.....	19
8.5	Books and Records.....	19
8.6	Seal.....	19
8.7	Fiscal Year.....	19
8.8	Notice.....	19
8.9	Waiver of Notice.....	19

Approved by the SERC Board of Directors on October 23, 2019
Approved the NERC Board of Trustees on _____
Approved by the Federal Energy Regulatory Commission on _____

8.10	Policies and Procedures	19
ARTICLE IX - EXPENSES		20
9.1	Allocation of Specific Expenses	20
9.2	Statutory Functions	20
9.3	Non-Statutory Functions.....	20
ARTICLE X - DISPUTE RESOLUTION PROCESS		20
10.1	Dispute Resolution.....	20
ARTICLE XI - DISSOLUTION		21
11.1	Dissolution	21
11.2	Distribution of Assets	21
ARTICLE XII - INDEMNIFICATION		21
12.1	Indemnification of Directors, Committee Members, Officers, Employees and Agents.....	21
ARTICLE XIII - AMENDMENT OF THE BYLAWS AND ARTICLES OF INCORPORATION		21
13.1	Amendment Process	21
13.2	Board Amendment of Bylaws	22

AMENDED AND RESTATED
BYLAWS
OF
SERC RELIABILITY CORPORATION
[Hereinafter referred to as the “Corporation”]
A North Carolina Nonprofit Corporation

ARTICLE I - OFFICES

1.1 **Principal Office**. The principal office of the Corporation shall be located in the City of Charlotte, Mecklenburg County, North Carolina. The Board of Directors (or “the Board”) may by resolution change the location of this office from time to time.

1.2 **Other Offices**. The Corporation may have other offices at such place or places as the Board of Directors may from time to time appoint or the business of the Corporation may require.

ARTICLE II - PURPOSES

2.1 **General Purposes**. The purpose of the Corporation is to reduce risks to the reliability and security of the electric grid in the SERC Region, as defined in Section 2.2. In pursuit of this goal, the Corporation shall:

- (a) enter into a Delegation Agreement to serve as a Regional Entity pursuant to 16 U.S.C. § 824o or the corresponding provisions of any subsequent U.S. Code revisions;
- (b) promote the development of reliability and adequacy arrangements among the systems in the SERC Region;
- (c) participate in the establishment of Reliability Standards;
- (d) participate in the measurement of performance relative to these Reliability Standards;
- (e) promote conformance to and compliance with these Reliability Standards;

- (f) develop and exchange information with respect to planning and operating matters relating to the reliability and adequacy of the Bulk Power System;
- (g) review as necessary activities in the SERC Region on reliability and adequacy in order to meet Reliability Standards;
- (h) provide a mechanism to resolve disputes on reliability issues in a manner that meets the needs of the parties and the SERC Region; and
- (i) provide information with respect to matters considered by the Corporation, where appropriate, to the Federal Energy Regulatory Commission ("FERC") and to other federal and state agencies concerned with reliability and adequacy.

2.2 **Geographic Area.** The Corporation accomplishes its purposes in a geographic area (the "SERC Region") that is defined in Exhibit A of the Amended and Restated Delegation Agreement Between the North American Electric Reliability Corporation and SERC Reliability Corporation, as amended from time to time.

ARTICLE III - POWERS

3.1 **Powers.** The Corporation shall have the power to engage in any lawful act or activity for which corporations may be organized under the general nonprofit corporation law of the State of North Carolina, subject to any limitations provided in applicable federal or state law or in the Certificate of Incorporation or these Bylaws.

ARTICLE IV - MEMBERSHIP

4.1 **General.** The Corporation shall be a membership corporation. Entities that meet the eligibility requirements, apply for membership in the Corporation, and whose applications have been duly approved by the Board of Directors for admission as a member shall hereinafter be referred to individually as a "Member" or "Member Company" and collectively as "Members" or "Member Companies".

4.2 **Eligibility.** Membership in the Corporation is voluntary and is open to any entity in the SERC Region that is a user, owner or operator of the Bulk Power System, has a material interest in the Bulk Power System in the SERC Region, satisfies the criteria for membership specified in this Section 4.2, qualifies for one or more of the Sectors

defined in Section 4.5, and is subject to the jurisdiction of the Federal Energy Regulatory Commission. Membership in the Corporation is predicated on mandatory acceptance of the responsibility to promote, support, and comply with Reliability Standards of the Corporation and the North American Electric Reliability Corporation ("NERC"), and to assist the Corporation in its compliance with the terms and provisions of a Delegation Agreement (a "Delegation Agreement") with NERC, by which NERC delegates authority to propose and enforce Reliability Standards, pursuant to 16 U.S.C. § 824o or the corresponding provisions of any subsequent U.S. Code revisions. For purposes of these Bylaws, the terms "Bulk Power System", "Reliability Standards" and "Regional Entity" shall be as defined in 16 U.S.C. § 824o or the corresponding provisions of any subsequent U.S. Code revisions.

4.3 **Admission of Members.** New Members may join the Corporation upon the approval of a submitted application as provided in this Section 4.3. The application shall designate the Sector the prospective Member wishes to join. The Secretary of the Corporation shall review the membership application and may request additional demonstration by the applicant that it qualifies for membership in a particular Sector. The Board of Directors shall have the sole authority to approve applications for membership upon such criteria as it deems appropriate.

4.4 **Termination.** A Member Company may terminate its membership in the Corporation by giving the Board of Directors at least thirty (30) calendar days prior written notice of its intent to terminate such membership. Such Member Companies shall hereinafter be referred to as "Terminated Member Companies". Terminated Member Companies shall nevertheless continue to be liable for any and all obligations incurred prior to the end of the calendar year in which such notice is effective, including, but not limited to, the obligation to pay a pro rata share of any Corporation expense. In addition, the Board of Directors may terminate the membership of a Member Company if, in the judgment of the Board of Directors, the Member Company has failed to meet its obligations and responsibilities to the Corporation. The termination of the membership, as well as the effective date and terms and conditions of such termination, of a Member Company by the Board of Directors shall require an affirmative vote of at least two-thirds (2/3) of the voting members of the Board of Directors.

4.5 **Sectors.** Each Member Company shall be classified by the Board of Directors in not more than one of the following seven (7) Sectors (each a "Sector", and collectively, the "Sectors"):

- (a) Investor-Owned Utility Sector – This Sector includes any investor-owned entity with substantial business interest in ownership and/or operation in any of the asset categories of generation, transmission or distribution.
- (b) Federal/State Sector – This Sector includes any U.S. federal entity that owns and/or operates electric facilities and/or provides

electricity for sale at wholesale to their members; balancing authority services, in any of the asset categories of generation, transmission, or distribution; or any entity that is owned by or subject to the governmental authority of a state and that is engaged in the generation, delivery, and/or sale of electric power to end-use customers primarily within the political boundaries of the state.

- (c) Cooperative Sector – This Sector includes any non-governmental entity that is incorporated under the laws of the state in which it operates, is owned by and provides electric service to end-use customers at cost, and is governed by a board of directors that is elected by the membership of the entity; and any non-governmental entity owned by and which provides generation and/or transmission service to such entities.
- (d) Municipal Sector – This Sector includes any entity owned by or subject to the governmental authority of a municipality, that is engaged in the generation, delivery, and/or sale of electric power to end-use customers primarily within the political boundaries of the municipality; and any entity, whose members are municipalities, formed under state law for the purpose of generating or purchasing.
- (e) Marketer Sector– This Sector includes any entity that is engaged in the activity of buying and selling of wholesale electric power in the SERC Region on a physical or financial basis.
- (f) Merchant Electricity Generator Sector – This Sector includes any entity that owns or operates an electricity generating facility or provides balancing authority services for such entities. This includes, but is not limited to, small power producers and all other non-utility producers such as exempt wholesale generators who sell electricity at wholesale.
- (g) ISO-RTO/Reliability Coordinator Sector – This Sector includes any entity that operates a FERC approved ISO or RTO or is an organization that is registered as a Reliability Coordinator on the NERC Compliance Registry.

The classification of a Member Company in a particular Sector may only be changed by the Board of Directors.

4.6 **Transfer of Membership.** A Member Company may not give or otherwise transfer its membership, except to a successor that becomes a Member Company in accordance with Section 4.3 of these Amended and Restated Bylaws, and provided that the successor continues to meet the predecessor's obligations.

4.7 **Member Powers.** The Members shall have the following rights and obligations:

- (a) To elect the Independent Directors;
- (b) To elect the Sector Directors;
- (c) To approve amendments to the Bylaws as recommended by the Board of Directors in accordance with the provisions in Section 13.1 of these Bylaws;
- (d) To approve dissolution, merger or the sale, pledge or transfer of substantially all of the Corporation's assets as recommended by the Board of Directors; and
- (e) To provide advice and recommendations to the Board of Directors with respect to the development of annual budgets, business plans, and other matters pertinent to the purpose and operations of the Corporation.

Except as expressly set forth in these Amended and Restated Bylaws, the Members shall have no other authority, rights, privileges, or preferences.

4.8 **Annual Meeting of Members.** The Members shall hold at least one Annual Meeting of the Members each year to elect the Independent Directors, elect Sector Directors, and to conduct other such business as may come before the meeting. By resolution adopted at any Annual Meeting of the Members, the Members may provide for additional regular meetings that may be held without further notice to the Members.

At the Annual Meeting of Members: (i) Independent Directors and Sector Directors shall be elected; (ii) the President and Corporate Treasurer shall report on the activities and financial condition of the Corporation; and (iii) the Members shall consider and act upon such other matters as are consistent with the notice of the Annual Meeting of the Members. The failure to hold an annual meeting in accordance with these Bylaws shall not affect the validity of a corporate action.

4.9 **Special Meetings of Members.** Special Meetings of the Members may be called by:

- (a) The Chair of the Board of Directors;
- (b) Any six (6) Directors on the Board of Directors;
- (c) The President/Chief Executive Officer; or

- (d) Members if at least ten percent (10%) of the Members request such a meeting in written form to the Chair of the Board of Directors or the President of the Corporation describing the purpose for which the Special Meeting is to be held.

Not less than seven (7) days prior to the date of the meeting, the Secretary of the Corporation shall provide notice to all Members of the Special Meeting. Notice of the meeting and the costs of the meeting shall be at the expense of the Corporation. The business transacted at a Special Meeting is limited to the purposes stated within the notice of the meeting. Business transacted at a Special Meeting that is not included in those stated purposes is voidable by or on behalf of the Corporation, unless a majority of the Members entitled to vote were present at such meeting or have waived notice of the meeting under Section 4.12.

4.10 **Location of Meetings of Members.** Meetings of Members shall be held at the principal office of the Corporation, or such other place within the Region as determined by the Board Chair or the President/Chief Executive Officer.

4.11 **Conduct of Meetings of Members.** The Board Chair shall conduct and preside at all Meetings of the Members, be responsible for the preparation of the agenda, and carry out all other duties assigned by the Board of Directors. In the Chair's absence, the Board Vice Chair shall serve as acting Chair and shall preside at all Meetings of the Members, be responsible for the preparation of the agenda, and carry out all other duties assigned by the Board of Directors.

4.12 **Notice of Meetings.**

- (a) **Notice Requirements.** Notice of all Meetings of the Members must be given at least seven (7) days before the date of a meeting and not more than sixty (60) days before the date of a meeting. The notice must contain the date, time and place of the meeting, instructions for electronic attendance or voting, if applicable, and an agenda of the matters upon which action may be taken at the meeting. A matter may be added to the agenda of a meeting at the meeting upon the affirmative vote of a majority of the votes cast on a motion to amend the agenda. If the meeting is an adjourned meeting and the date, time and place of the meeting were announced at the time of the adjournment, notice is not required unless a new record date for the adjourned meeting is or must be fixed. Notice shall be deemed given by the Corporation to the Members when (a) posted on the Corporation's public website in a reasonably prominent location, and (b) sent by mail, facsimile or reputable overnight delivery service or by electronic transmission pursuant to Section 8.8.

- (b) **Waiver of Notice; Objections.** A Member may waive notice of a meeting of Members. A waiver of notice by a Member entitled to notice is effective whether given before, at, or after the meeting, and whether given in writing, or by attendance. Attendance by a Member at a meeting is a waiver of notice of that meeting, unless the Member objects at the beginning of the meeting to the transaction of business because the meeting is not lawfully called or convened, or objects before a vote on an item of business because the item may not lawfully be considered at that meeting and does not participate in the consideration of the item at that meeting.

4.13 **Right to Vote; Act of Members.** Each Member shall be entitled to one vote on all matters submitted to a vote of the Members. If a quorum for a meeting of the Members is present, a majority of the votes cast on the matter shall be the act of the Members, except with respect to any matter described in Section 4.14, and is subject to the following additional requirements:

- (a) An affirmative vote from a Member from at least three Sectors is required for any action to pass.
- (b) A negative vote from a Member from at least two Sectors is required for any action to fail.

Abstentions shall not count negatively or positively in tallying the vote; however, the abstaining members' attendance at a meeting shall still count toward the establishment of quorum.

4.14 **Special Voting Requirements.** Notwithstanding any other provision of these Bylaws, and except as set forth in the Articles of Incorporation, two-thirds (2/3) of the votes cast shall be required to amend the Bylaws or the Articles of Incorporation, as provided in Section 13.1 of these Bylaws. The substance of the proposed amendment(s) must be posted in accordance with the provisions of Section 13.1.

4.15 **Quorum.** A quorum for a meeting of Members is necessary for the transaction of business at a meeting of Members. A quorum is established by a majority of the Members. If a quorum for a meeting of the Members is not present, a meeting may be adjourned for that reason by the Members then represented or present.

4.16 **Action by Electronic Communication.** Unless otherwise restricted by the Articles of Incorporation, these Amended and Restated Bylaws, or by applicable law, the Members may participate in a meeting of the Members by means of a conference telephone or similar communication equipment whereby all persons participating in the meeting can hear each other and participate in such manner and shall constitute presence in person at such meeting. Meetings held by electronic communication are subject to the Notice requirements in Section 4.12, as well as Quorum requirements in Section 4.15.

4.17 **Voting Member; Proxies.**

- (a) **Designation of Voting Member; Proxies.** Each year prior to the annual meeting of Members, each Member shall designate the individual authorized to vote on Corporation matters on behalf of the Member to the Secretary in writing. A Member may change such designation at any time by providing at least twenty-four (24) hour written notice to the Secretary of the Corporation. Such notice may be provided by electronic transmission. Each Member may only give a proxy to a person who is a member, officer, executive-level employee, or agent of the Member. Alternatively, a Member may give a proxy to a representative of a Member registered in the same Sector.
- (b) **Effective Period.** An appointment of a proxy is effective when received by the Secretary or other officer or agent authorized to tabulate votes. An appointment is valid for the next regular or specially scheduled meeting or ballot by electronic transmission. However, a proxy is not valid for more than sixty (60) days from its date of execution.
- (c) **Revocation.** An appointment of a proxy is revocable by a Member. Appointment of a proxy is revoked by the person appointing the proxy either by expiration of the sixty (60) day period, by open declaration at a meeting, or by signing and delivering a revocation in writing or by electronic transmission to the Secretary or other officer or agent authorized to tabulate proxy votes. This may be done either in a statement that the appointment of the proxy is revoked or by a subsequent appointment that shall serve to cancel all prior proxies.

4.18 **Public Notice of Member Meetings.** Notice to the public of the dates, times and places of meetings of the Members, and all nonconfidential material provided to the Members, shall be posted on the Corporation's website at approximately the same time that notice is given to the Members.

4.19 **Posting of Minutes.** Minutes of meetings of Members shall be posted on the Corporation's website once approved.

4.20 **Reimbursement of Member Expenses.** The Corporation will be under no obligation to reimburse Members for expenses associated with their attendance at Annual, regular or Special Meetings of the Members.

ARTICLE V - BOARD OF DIRECTORS

5.1 **General Powers.** The business and affairs of the Corporation shall be managed under the direction of the Board of Directors except as otherwise provided by the Articles of Incorporation or these Amended and Restated Bylaws.

5.2 **Duties.** The Board of Directors shall have all powers accorded to it under law not expressly reserved in whole or in part to the Members under the Articles of Incorporation or these Amended and Restated Bylaws, which shall include by way of example and not by way of limitation of powers, the responsibility to:

- (a) Govern the corporation and oversee its activities;
- (b) Approve Reliability Standards and their modifications utilizing a fair, open, balanced and inclusive process;
- (c) Ensure that the Compliance Monitoring and Enforcement Process is applied consistently;
- (d) Establish and approve an annual budget for submission to NERC;
- (e) Hire the Corporation's president and, upon the recommendation of a majority of the Independent Directors, approve his or her salary;
- (f) Recommend to Members to approve the dissolution, merger or the sale, pledge or transfer of substantially all of the Corporation's assets;
- (g) Form or dissolve Board committees as appropriate;
- (h) Fill vacancies on any of the Board's committees;
- (i) Recommend amendments to the Articles of Incorporation to the Members;
- (j) Recommend amendments to the Bylaws to the Members or approve such amendments as allowed under Section 13.2; and
- (k) Resolve any disputes regarding the Member Companies and the Corporation, if those issues cannot be resolved by the standing committees or subcommittees of the Corporation and are not otherwise subject to NERC's dispute provisions for non-compliance with Reliability Standards.

5.3 **Composition and Eligibility.**

- (a) The Board of Directors shall be comprised of at least eighteen (18) Directors in addition to the President/Chief Executive Officer who shall serve as ex-officio non-voting member of the Board in accordance with Section 6.2(d).
- (b) Fifteen (15) of the Directors, which shall be referred to as Sector Directors, shall be allocated as follows:
 - (i) The Investor-Owned Utility Sector shall have four (4) representatives;
 - (ii) The Federal/State Sector shall have two (2) representatives;
 - (iii) The Cooperative Sector shall have three (3) representatives;
 - (iv) The Municipal Sector shall have three (3) representatives;
 - (v) The Marketer Sector shall have one (1) representative;
 - (vi) The Merchant Electricity Generator Sector shall have one (1) representative; and
 - (vii) The ISO-RTO/Reliability Coordinator Sector shall have one (1) representative.
- (c) Sectors shall recommend their respective Sector Director(s) to the Nominating and Governance Committee from among individuals holding senior management positions in Member organizations, which shall be presented by the Nominating and Governance Committee to the Members for election to the Board of Directors. No two Directors may be employees of a single Member or any affiliate or related party of a Member or any affiliate. In the event of a vacancy, the replacement Director shall be nominated as provided in this Section 5.3(c) and elected by the Members at the next Annual, regular or Special Meeting of the Members.
- (d) At least three (3) but no more than five (5) Directors shall be Independent Directors elected by the Members. An Independent Director is a person (i) who is not an officer or employee of the Corporation; an officer, director, or employee of a Member; or an officer, director or employee of any entity that would reasonably be perceived as having a direct financial interest in the outcome the Board of Director's decisions; and (ii) who does not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director. The Board of Directors may adopt additional standards for director independence not inconsistent herewith.

- (e) The Independent Directors shall be nominated by the Nominating and Governance Committee, and approved by the Members at the Annual Meeting of the Members, or at such other time as specified by the Board of Directors.
- (f) Any Director which the Board of Directors has determined has a conflict of interest on any matter brought before the Board shall not vote on such matter and shall recuse himself or herself from all Board deliberations concerning such matter.
- (g) There will be no alternates or proxies for Directors.

5.4 **Meetings of the Board of Directors, Notice, Waiver**

- (a) **Meetings**. An annual meeting of the Board of Directors shall be held without notice immediately following the Annual Meeting of the Members. In addition, regular meetings may be held at such time or times as fixed by the Board of Directors. Special meetings of the Board of Directors may be called by the Chair of the Board, the President/Chief Executive Officer, or by any three Directors and shall be held at the principal office of the Corporation, or such other place within the Region as determined by the Chair or the President/Chief Executive Officer.
- (b) **Notice**. Notice of the dates, times, and places of all regular and special meetings of the Board of Directors shall be published by the Secretary and provided to all Directors and Members not less than three (3) days prior to the date of the meeting. Notice shall be deemed given by the Corporation to Directors and Members when: 1) posted on the Corporation's public website in a reasonably prominent location, and 2) sent by mail or electronic transmission to each Director and Member included on the rosters maintained by the Secretary of the Corporation.
- (c) **Waiver**. Any person entitled to notice of a regular or special meeting of the Board of Directors may waive notice thereof. A waiver of notice by a person entitled to notice is effective whether given before, at, or after the meeting, and whether given in writing or by attendance. Attendance by a director at a meeting of the Board is a waiver of notice of that meeting, unless the director objects at the beginning of the meeting to the transaction of business because the meeting is not lawfully called or convened, or objects before a vote on an item of business because the item may not lawfully be considered at that meeting and does not participate in the consideration of the item at that meeting.

5.5 **Election of Board Officers.**

- (a) Biennially, the Board of Directors, upon recommendation of the Nominating and Governance Committee shall elect Board Officers from among the Directors for the positions of Chair and Vice Chair, each for a term of two (2) years beginning on July 1st after the election. No Director may serve in more than one (1) Board Officer position at the same time.
- (b) The Chair may be a Sector Director or an Independent Director. If the Chair is a Sector Director, the Independent Directors shall designate a lead Independent Director that the Chair shall consult regularly on agendas and other matters of importance. If the Chair and the Vice Chair are Independent Directors, the Sector Directors shall designate a lead Sector Director that the Chair shall consult regularly on agendas and other matters of importance.
- (c) The Chair shall conduct and preside at all meetings, be responsible for the preparation of the agenda, and carry out all other duties assigned by the Board of Directors. In the Chair's absence, the Vice Chair shall serve as acting Chair and shall preside at all meetings, be responsible for the preparation of the agenda, and carry out all other duties assigned by the Board of Directors. In the event that a Board Officer cannot complete his or her term, the Board of Directors may hold a special election to elect a replacement Board Officer for the remainder of the unexpired term.

5.6 **Terms of Sector Directors.** The Sector Directors shall be divided into two groups, Group 1 and Group 2, with the number of Sector Directors in each group divided as nearly equal as possible. Each group shall serve for two (2) year terms beginning on July 1, with the start of the term for Group 1 beginning in alternating years from the start of the term for Group 2. Terms of Sector Directors may be extended beyond a two (2) year term or be less than a two (2) year term as deemed necessary by the Members.

5.7 **Terms of Independent Directors.** The Independent Directors shall be divided into two groups, Group 1 and Group 2, with the number of Independent Directors in each group divided as nearly equal as possible. Each group shall serve for two (2) year terms beginning on July 1, with the start of the term for Group 1 beginning in alternating years from the start of the term for Group 2. Terms of Independent Directors may be extended beyond a two (2) year term or be less than a two (2) year term as deemed necessary by the Members. No Independent Director shall serve more than four (4) terms.

5.8 **Vacancies and Removal.** If a Director resigns, dies, changes corporate affiliation or is removed during the term of office for which elected, the position shall thereupon be vacant and shall be filled as soon as practicable and in accordance with the same procedures that the position had previously been filled. The successor Director shall hold office for the unexpired portion of the term of the director replaced. An Independent Director or Sector Director may be removed by the affirmative vote of two-thirds (2/3) of the remaining Directors. Any Director may be removed by the Board of Directors for non-attendance at three or more consecutive Board meetings. Any Independent or Sector Director removed by the Board of Directors under this Section 5.8 may not be reelected to the Board.

5.9 **Agenda.** As far in advance of each regular and special meeting as practical, an agenda shall be distributed to Directors and other participants.

5.10 **Compensation and Reimbursement.** Sector Directors shall not receive any compensation from the Corporation for their services to the Corporation as Directors on the Board. Independent Directors shall be entitled to such compensation as indicated by a Board policy, if any. Independent Directors shall have the right to reimbursement by the Corporation of their actual reasonable travel expenses to Board of Directors meetings or when specifically selected to represent the Corporation at a business meeting, subject to Board policy as adopted from time to time, if any. Sector Directors shall not be reimbursed by the Corporation for any expenses, unless specifically approved in advance by resolution of the Board of Directors.

5.11 **Quorum.** A quorum is necessary for the transaction of business at a meeting of the Board of Directors. A quorum is established by the presence of a majority of the Directors entitled to vote at a meeting, provided that a majority of the Independent Directors must also be present to constitute a quorum. Electronic participation is acceptable if authorized by the Board Chair at that meeting. If a quorum for a meeting of the Board of Directors is not established, a meeting may be adjourned for that reason by the Directors then represented or present.

5.12 **Voting.** Each voting Director on the Board of Directors shall have one vote with respect to decisions of the Board of Directors. The President of the Corporation shall be an ex-officio member of the Board without vote and shall not be counted for quorum purposes. The positive vote of a majority of the voting directors is necessary to pass a particular action, except with respect to any matter described in Sections 4.4, 4.13, 11.1, and 13.1, and is subject to the following additional requirements:

- (a) An affirmative vote from a Director from at least three Sectors is required for any action to pass.
- (b) A negative vote from a Director from at least two Sectors is required for any action to fail.

For voting purposes, the Independent Directors shall constitute its own Sector.

5.13 **Action Without a Meeting.** Any action required by law to be taken at a meeting of Directors, or any action which may be taken at a meeting of Directors or by a Board Committee, may be taken without a meeting if all members of the Board or Board Committee consent thereto in writing or by electronic transmission, and the writing(s) or electronic transmission(s) are included in the minutes or filed with the corporate records reflecting the action taken. Action taken under this section is effective when the last Director consents unless the consent specifies a different effective date. A consent signed under this section has the effect of a meeting vote.

5.14 **Action by Electronic Communication.** Unless otherwise restricted by the Articles of Incorporation, these Amended and Restated Bylaws, or by applicable law, the Members may participate in a meeting of Directors by means of a conference telephone or similar communication equipment whereby all persons participating in the meeting can hear each other and participate in such manner and shall constitute presence in person at such meeting. Meetings held by electronic communication are subject to the Notice requirements in Section 5.4, as well as Quorum requirements in Section 5.11.

ARTICLE VI - CORPORATE OFFICERS

6.1 **Corporate Officers.** The Board of Directors shall appoint a President/Chief Executive Officer, one or more Vice Presidents, a Secretary, and a Treasurer of the Corporation. Two (2) or more of such offices may be held by the same person, except for the offices of President/Chief Executive Officer and Secretary. The Board of Directors may appoint such other officers and assistant officers as it deems necessary.

6.2 **President/Chief Executive Officer.** The President shall be the Chief Executive Officer of the Corporation and shall manage the operations of the Corporation to the end that its purposes shall be accomplished. The President shall:

- (a) Promote the mission of the Corporation and implement the goals and objectives of the Corporation;
- (b) Report to the Board of Directors and carry out the policies and procedures set by the Board of Directors;
- (c) Represent SERC at all NERC Stakeholder and Board of Trustees, meetings, as appropriate;
- (d) Attend all Board of Directors meetings and serve as ex-officio non-voting member of (i) the Board of Directors, and (ii) all Board committees;

- (e) Coordinate subregional activities and interregional affairs, to include data collection;
- (f) Oversee the business affairs of the Corporation, including the Corporation staff, and enact such policies and procedures for staff as are needed to implement the goals and objectives of the Corporation; and
- (g) Provide other assistance to the Corporation and NERC, as appropriate.

6.3 **Vice President.** The Corporation may have one or more Vice Presidents. A Vice President of the Corporation shall perform such duties and exercise such powers as may be assigned to him or her from time to time by the Board of Directors or the President/Chief Executive Officer. In the absence of the President/Chief Executive Officer, or in the case of the President/Chief Executive Officer's inability to act (because of death, resignation, removal, disqualification, or otherwise), a Vice President of the Corporation may be appointed to perform the duties and exercise the powers of the President/Chief Executive Officer, subject to the control of the Board of Directors.

6.4 **Secretary.** The Secretary of the Corporation shall be custodian of and shall maintain the corporate books, records and the minutes of the meetings of the Board of Directors and other Corporation-related meetings and shall assure that all required notices are duly given in accordance with these Bylaws, the Articles of Incorporation or as otherwise may be required by law. The Secretary of the Corporation shall also be the custodian of the seal of the Corporation. The Secretary of the Corporation shall, in general, perform all duties incident to the office of Secretary of the Corporation and such other duties as may, from time to time, be assigned to him or her by the Board of Directors or the President/Chief Executive Officer.

6.5 **Treasurer.** The Treasurer of the Corporation shall have charge and custody of, and be responsible for, all funds and securities of the Corporation and deposit all such funds in the name of the Corporation in such banks, trust companies, or other depositories as shall be selected in accordance with the provisions of these Bylaws. The Treasurer of the Corporation shall, in general, perform all of the duties incident to the office of Treasurer of the Corporation and such other duties as from time to time may be assigned to him or her by the Board of Directors or the President/Chief Executive Officer.

ARTICLE VII - BOARD COMMITTEES

7.1 **Designation by Board.** The Board of Directors may designate Board Committees as shall be necessary to address the purposes of the Corporation.

7.2 **Authority.** The powers and duties of Board Committees shall be subject to general policies and procedures established by the Board and shall be at all times subject to the control and direction of the Board. Board Committees shall include a Board Risk Committee, a Human Resources and Compensation Committee, a Finance and Audit Committee, a Nominating and Governance Committee, and such other Board Committees as the Board may authorize from time to time. All Board Committees and the chairs thereof, unless the appointment of the chair is otherwise designated by these Bylaws or the Board committee's charters, shall be nominated by the Nominating and Governance Committee and approved by the Board. The Board may act by and through the Board Committees as may be specified in resolutions adopted by the Board. With the exception of the Finance and Audit Committee as specified in Section 7.5 and in that committee's charter, Committee members must be Directors of the Board.

7.3 **Board Risk Committee.** The Board Risk Committee shall consist of up to five (5) members of the Board, at least one (1) of which shall be an Independent Director. The Board Chair shall be ineligible to serve as Chair of the Board Risk Committee. The Board Risk Committee shall be responsible for overseeing the Corporation's risk management framework; providing oversight over management and the Technical Committee's assessments of external risks to the SERC Region; and periodically reporting these risks oversight findings to the Board of Directors.

7.4 **Human Resources and Compensation Committee.** The Human Resources and Compensation Committee shall consist of up to seven (7) members of the Board, at least two (2) of which shall be Independent Directors. The purpose of the Human Resources and Compensation Committee is to assist the Board in fulfilling its fiduciary duties as they pertain to determining appropriate compensation levels and ensuring that compensation methods are consistent with the Corporation's mission, vision, and values. The Human Resources and Compensation Committee shall assist the Board in developing and implementing compensation strategies, policies and plans that will enhance the Corporation's ability to attract and retain skilled top-level leadership. The Human Resources and Compensation Committee shall assist the Board in developing and implementing compensation policies for Independent Directors.

In achieving these objectives, it shall be the responsibility of the Human Resources and Compensation Committee to establish a rebuttable presumption of reasonableness under the Intermediate Sanctions rules for the compensation of all employees who are deemed to be Disqualified Persons as defined under the Internal Revenue Code and any implementing regulations.

7.5 **Finance and Audit Committee.** The Finance and Audit Committee shall be composed of not less than three (3) and no more than five (5) members of the Board, at least one (1) of which shall be an Independent Director. The Finance and Audit Committee may include a non-Director as a member if the Committee so determines that financial expertise is needed that is not available among the Directors of the Board. The Finance and Audit Committee must be chaired by a Director of the Board. The Finance and Audit Committee's purpose is to assist the Board in its oversight of the financial affairs of the Corporation, including the financial condition, operating and capital budgeting, external audits, debt structure, debt financing and refinancing, investments, and other significant financial matters. The Finance and Audit Committee shall review all issues involving significant financial transactions prior to final consideration by the Board.

7.6 **Nominating and Governance Committee.** The Nominating and Governance Committee shall consist of up to five (5) members of the Board, at least one (1) of which shall be an Independent Director. The purpose of the Nominating and Governance Committee is to identify and recommend qualified individuals for appointment as Directors as well as assist the Board by reviewing governance documents and recommending modifications as needed.

- (a) Independent Director Nominations. The Nominating and Governance Committee shall seek out for nomination Independent Directors from diverse backgrounds, who will contribute to the effective functioning of the Board of Directors and the Corporation by bringing a broad range of industry expertise, viewpoints, experiences, skill sets, and knowledge. If an incumbent Independent Director is not re-nominated, the Nominating and Governance Committee will use reasonable efforts to ensure that diverse candidates are in the pool of potential nominees for the open Independent Director position and may retain an independent consultant to identify individuals qualified and willing to serve as an Independent Director. Independent Director nominations will be recommended to the Members for approval
- (b) Sector Director Nominations. The Nominating and Governance Committee shall coordinate with the Sector Members to collect appropriate candidates for the Sector Directors to be recommended to the Members for approval.
- (c) Officer and Committee Nominations. The Nominating and Governance Committee shall assist the Board by identifying and recommending appointments for Officers of the Board and for appointments of Board Committees and Board Committee chairs.
- (d) Governance Document Review. The Nominating and Governance Committee shall assist the Board in fulfilling its fiduciary duties as they pertain to reviewing the organization's Bylaws and governing policies and procedures and recommending changes as needed.

(e) **Fiduciary Duty Training.** The Nominating and Governance Committee shall ensure that annual fiduciary duty training is provided to the Board of Directors.

7.7 **Rules for Governance.** Each Board Committee shall adopt rules for its own governance that are not inconsistent with these Bylaws, rules adopted by the Board, applicable NERC or FERC rules or regulations, or applicable state or federal laws. Each Board Committee shall maintain its rules for governance in a written charter that is approved by the Board.

7.8 **Ad-Hoc Committees.** The Board or its Board Committees may, from time to time, appoint ad-hoc committees to research and/or advise it on compliance or technical issues or matters, among other things. Such ad-hoc committees may be formed on an as-needed basis and may vary in makeup depending on the needs of the Board or Board Committees. Committee members of ad-hoc committees need not be Directors unless otherwise stated in the Board resolution creating such committee.

7.9 **Support Committees of the Corporation.** In addition to Board Committees and ad-hoc committees of the Board, the Board may by resolution create Technical Committees of the Corporation as the Board deems necessary to carry out the purposes of the Corporation. Such Technical Committees shall be representative of members of the Corporation. They shall provide for balanced decision making, and include persons with outstanding technical knowledge and experience. The membership of the Technical Committees shall be determined based upon experience, expertise and the needs of the Board, the Board Committees, or the Corporation. All Technical Committees formed under this Section 7.9 shall be subject to the direction and control of the Board. Each Technical Committee shall adopt rules for its own governance that are not inconsistent with these Bylaws, rules adopted by the Board, applicable NERC or FERC rules or regulations, or applicable state or federal laws. Each Technical Committee shall maintain its rules for governance in a written charter that is approved by the Board.

The Board shall conduct a review of all Committees of the Corporation on an annual basis to ensure that the business of the Corporation is conducted in an efficient, cost-effective manner.

ARTICLE VIII - MISCELLANEOUS

8.1 **Conflicts of Interest.** All Directors and Board committee representatives shall comply with the Corporation's policies that prohibit conflicts of interest, as such conflicts could cast doubt on the ability of such persons to act with total objectivity with regard to the overall interests of the Corporation.

8.2 **Contracts.** The Board of Directors may authorize any officer or agent of the Corporation, in addition to the officers so authorized by these Bylaws, to enter into

any contract or execute and deliver any instrument in the name of and on behalf of the Corporation, and such authority may be general or confined to specific instances.

8.3 **Checks, Drafts, or Orders.** All checks, drafts, or orders for the payment of money, notes or other evidences of indebtedness issued in the name of the Corporation, shall be signed by an authorized officer or agent of the Corporation and in such manner as shall from time to time be determined by resolution of the Board of Directors.

8.4 **Deposits.** All funds of the Corporation shall be deposited from time to time to the credit of the Corporation in such banks, trust companies, or other depositories as the Corporation's President/Chief Executive Officer may select.

8.5 **Books and Records.** The Corporation shall keep correct and complete books and records of account and shall also keep minutes of the proceedings of the Members, the Board of Directors, and committees having any of the authority of the Board of Directors, and shall keep at its registered or principal office a record giving the names and addresses of the Directors and Members. All books and records of the Corporation may be inspected by any Director, or agent or attorney representing any Director, for any proper purpose at any reasonable time.

8.6 **Seal.** The corporate seal shall be in circular form and shall have inscribed thereon the name of the Corporation, the words "Corporate Seal", and such other word or words, if any, as may be determined by the Board of Directors to be inscribed thereon.

8.7 **Fiscal Year.** The fiscal year of the Corporation shall begin on the first day of January and end on the last day of December in each year.

8.8 **Notice.** With respect to any notice requirements contained in these Bylaws, notice shall be delivered or given either personally, by mail (including U.S. postal service, electronic mail, and any nationally recognized delivery service), or by facsimile. Any notice sent by United States mail shall be deemed to be delivered when deposited in the United States mail with postage thereon prepaid addressed to the notice recipient at the recipient's address as it appears on the records of the Corporation. If notice is provided in person, by electronic mail, or by facsimile, such notice shall be deemed to be delivered when transmitted for delivery to the recipient.

8.9 **Waiver of Notice.** Whenever any notice is required to be given under the provisions of the North Carolina Nonprofit Corporation Act or under the provisions of the articles of incorporation or the Bylaws of the Corporation, a waiver thereof in writing signed by the person or persons entitled to such notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice.

8.10 **Policies and Procedures.** The Directors shall execute and abide by the conflicts of interest policy as may be adopted and amended from time to time by the Board

of Directors. The officers of the Corporation and Directors shall abide by such other policies and procedures as may be adopted from time to time by the Board of Directors.

ARTICLE IX - EXPENSES

9.1 **Allocation of Specific Expenses.** The expenses of Directors and Board Officers shall be borne by that person's regular employer except for expenses of Independent Directors related to their duties associated with the Board of Directors. Expenses of Independent Directors shall be reimbursable subject to these Amended and Restated Bylaws and the Board's policy as may be amended from time to time, if any.

9.2 **Statutory Functions.** The Corporation anticipates that as a general rule all of its expenses shall be incurred in the furtherance of statutory activities pursuant to Section 215 of the Federal Power Act, and that all such expenses shall be funded by NERC, subject to FERC approval.

9.3 **Non-Statutory Functions.** Notwithstanding Section 9.2, the Board of Directors may from time to time authorize the Corporation to participate in non-statutory activities (i.e., activities not described in Section 215 of the Federal Power Act). In the event that the Corporation proposes to engage in non-statutory activities, such activities shall be identified in the Corporation's annual business plan that is submitted to NERC and, if approved by NERC, shall be submitted to FERC for approval in advance of engaging in such non-statutory activities. The expenses incurred by the Corporation for any such approved non-statutory activities shall be allocated by the Board of Directors to the beneficiaries of such activities on a basis proposed in the business plan submitted for NERC and FERC approval.

ARTICLE X - DISPUTE RESOLUTION PROCESS

10.1 **Dispute Resolution.** All disputes regarding non-compliance with Reliability Standards shall be handled in accordance with the NERC Rules of Procedure. The organizational units of the Corporation shall deal with all other disputes within the framework of their respective organizations. For such other disputes, Member Companies of the Corporation are encouraged to utilize the appropriate Dispute Resolution Process within the Corporation prior to seeking resolution at NERC, FERC, or with legal counsel.

ARTICLE XI - DISSOLUTION

11.1 **Dissolution**. The Corporation may be voluntarily dissolved upon unanimous consent of the Board of Directors to recommend dissolution followed by approval by the Members of the Board's recommendation, and in accordance with Section 55A-14-02 of the North Carolina Nonprofit Corporation Act, as amended from time to time.

11.2 **Distribution of Assets**. Upon dissolution of the Corporation as provided in Section 11.1, the residual assets, after payment of all just obligations, shall be distributed exclusively to organizations which are exempt from federal income tax under Section 501(c)(6) of the Internal Revenue Code of 1986, or corresponding provisions of any subsequent federal tax laws, as the Board of Directors shall determine.

ARTICLE XII - INDEMNIFICATION

12.1 **Indemnification of Directors, Committee Members, Officers, Employees and Agents**. Every person who is, or has served as, a Director, committee member, Officer, employee, or agent of the Corporation shall be indemnified by the Corporation in the manner and to the extent authorized by the North Carolina Nonprofit Corporation Act. The foregoing rights of indemnification shall be without prejudice to any other rights to which any such Director, committee member, Officer, employee, or agent may be entitled as a matter of law.

ARTICLE XIII - AMENDMENT OF THE BYLAWS AND ARTICLES OF INCORPORATION

13.1 **Amendment Process**. Any proposal to amend the Articles of Incorporation or Bylaws (an "Amendment") shall first be put before the Board of Directors at any regular or special meeting for a vote to recommend such Amendment to the Members. Copies of the proposed Amendment shall be distributed to the Board of Directors at least thirty (30) calendar days before the meeting at which they are to be considered. A recommendation that the Members approve the Amendment shall be approved by at least two-thirds (2/3) of the Board of Directors, provided that a quorum is present. Upon approval of the recommendation by the Board, the Members may approve the recommended Amendment at any regular or special meeting. Copies of the proposed Amendment shall be distributed to the Members at least thirty (30) calendar days before the Meeting of the Members at which they are to be considered. An Amendment

recommended by the Board of Directors shall be adopted and proposed to the NERC Board of Trustees for approval after being approved by at least two-thirds (2/3) of the Members, provided that a quorum of the Members is present.

13.2 **Board Amendment of Bylaws.** Notwithstanding the Members reserved power in Section 4.7 or the amendment process outlined in Section 13.1, upon the passage of any federal electric reliability legislation, and/or the adoption of any rules or regulations of FERC, NERC or other governmental entity with jurisdiction, the Board shall have authority to amend these Bylaws as necessary and appropriate to comply with such law, legislation, rules and regulations.

AMENDED AND RESTATED

BYLAWS

OF

SERC RELIABILITY CORPORATION

A North Carolina Nonprofit Corporation

Approved by the SERC Board of Directors on October ~~24, 2018~~23, 2019

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————— **[PROPOSED BYLAW CHANGES (remove before filing)]**

TABLE OF CONTENTS

ARTICLE I - OFFICES	1
1.1 Principal Office.....	1
1.2 Other Offices	1
ARTICLE II - PURPOSES.....	1
2.1 General Purposes	1
2.2 Geographic Area.....	2
ARTICLE III - POWERS.....	2
3.1 Powers.....	2
ARTICLE IV - MEMBERSHIP	2
4.1 General.....	2
4.2 Eligibility	2
4.3 Admission of Members.....	3
4.4 Termination.....	3
4.5 Sectors.....	3
4.6 Transfer of Membership	4
4.7 Member Powers	5
4.8 Annual Meeting of Members.....	5
4.9 Special Meetings of Members	5
4.10 Location of Meetings of Members	6
4.11 Conduct of Meetings of Members	6
4.12 Notice of Meetings	6
4.13 Right to Vote; Act of Members	7
4.15 Quorum	7
4.16 Action by Electronic Communication	9
4.17 Voting Member; Proxies.....	9
4.18 Public Notice of Member Meetings.....	9
4.19 Posting of Minutes.....	9
4.20 Reimbursement of Member Expenses.....	10
ARTICLE V - BOARD OF DIRECTORS	10
5.1 General Powers.....	10
5.2 Duties.....	10
5.3 Composition and Eligibility.....	11
5.4 Meetings of the Board of Directors, Notice, Waiver.....	13

Approved by the SERC Board of Directors on October 24, 2018

Approved the NERC Board of Trustees on February 7, 2019

Approved by the Federal Energy Regulatory Commission on April 30, 2019

5.5	Election of Board Officers.....	13
5.6	Terms of Sector Directors.....	15
5.7	Terms of Independent Directors.....	15
5.8	Vacancies and Removal.....	16
5.9	Agenda.....	16
5.10	Compensation and Reimbursement.....	16
5.11	Quorum.....	19
5.12	Voting.....	19
5.13	Action Without a Meeting.....	19
5.14	Action by Electronic Communication.....	20
ARTICLE VI - CORPORATE OFFICERS		20
6.1	Corporate Officers.....	20
6.2	President/Chief Executive Officer.....	20
6.3	Vice President.....	21
6.4	Secretary.....	21
6.5	Treasurer.....	21
ARTICLE VII - BOARD COMMITTEES		22
7.1	Designation by Board.....	22
7.2	Authority.....	23
7.3	Board Risk Committee.....	23
7.4	Human Resources and Compensation Committee.....	23
7.5	Finance and Audit Committee.....	23
7.6	Nominating and Governance Committee.....	24
7.7	Rules for Governance.....	24
7.8	Ad-Hoc Committees.....	25
7.9	Support Committees of the Corporation.....	25
ARTICLE VIII - MISCELLANEOUS		25
8.1	Conflicts of Interest.....	25
8.2	Contracts.....	25
8.3	Checks, Drafts, or Orders.....	26
8.4	Deposits.....	26
8.5	Books and Records.....	26
8.6	Seal.....	26
8.7	Fiscal Year.....	26
8.8	Notice.....	26
8.9	Waiver of Notice.....	26
8.10	Policies and Procedures.....	27

Approved by the SERC Board of Directors on October 24, 2018

Approved the NERC Board of Trustees on February 7, 2019

Approved by the Federal Energy Regulatory Commission on April 30, 2019

ARTICLE IX - EXPENSES	27
9.1 Allocation of Specific Expenses.....	27
9.2 Statutory Functions.....	27
9.3 Non-Statutory Functions.....	27
ARTICLE X - DISPUTE RESOLUTION PROCESS	27
10.1 Dispute Resolution.....	27
ARTICLE XI - DISSOLUTION	28
11.1 Dissolution.....	28
11.2 Distribution of Assets.....	28
ARTICLE XII - INDEMNIFICATION	28
12.1 Indemnification of Directors, Committee Members, Officers, Employees and Agents.....	28
ARTICLE XIII - AMENDMENT OF THE BYLAWS AND ARTICLES OF INCORPORATION	29
13.1 Amendment Process.....	29
13.2 Board Amendment of Bylaws.....	29
ARTICLE I - OFFICES	1
4.1 Principal Office.....	1
4.2 Other Offices.....	1
ARTICLE II - MEMBERSHIP	1
2.1 General.....	1
2.2 Eligibility.....	1
2.3 Termination.....	2
2.4 Sectors.....	2
2.5 Transfer of Membership.....	3
2.6 Powers.....	3
ARTICLE III - PURPOSES	3
3.1 General Purposes.....	3
3.2 Geographic Area.....	4
3.3 Other Statutory Functions.....	4

Approved by the SERC Board of Directors on October 24, 2018

Approved the NERC Board of Trustees on February 7, 2019

Approved by the Federal Energy Regulatory Commission on April 30, 2019

ARTICLE IV – BOARD OF DIRECTORS	4
4.1 General Powers	4
4.2 Composition and Eligibility	5
4.3 Customer Advisors, Board Advisors, and Other Participants	5
4.4 Regular Meetings of the Board	6
4.5 Special Meetings of the Board	6
4.6 Notice of Special Meetings	6
4.7 Election of Board Officers and Executive Committee	6
4.8 Agenda	7
4.9 Compensation	7
4.10 Duties	7
4.11 Voting	7
4.12 Voting Definitions	8
4.13 Determination of Adjusted Weighted Vote	8
4.14 Voting; Manner of Acting; Voting Rights; Quorum	9
4.15 Action without a meeting	10
ARTICLE V – CORPORATE OFFICERS	10
5.1 Corporate Officers	10
5.2 President/Chief Executive Officer	10
5.3 Vice President	11
5.4 Secretary	11
5.5 Treasurer	11
ARTICLE VI – EXECUTIVE COMMITTEE	11
6.1 Executive Committee Representatives	11
6.2 Ex Officio Representatives	12
6.3 Authority of Executive Committee	12
6.4 Action	12
ARTICLE VII – OTHER COMMITTEES	13
7.1 Designation by Board	13
7.2 Rules for Governance	13
7.3 Ad-Hoc Support Committees	13
ARTICLE VIII – MISCELLANEOUS	13
8.1 Conflicts of Interest	13
8.2 Contracts	13
8.3 Checks, Drafts, etc.	13
8.4 Deposits	14
8.5 Books and Records	14
8.6 Seal	14
8.7 Fiscal Year	14

Approved by the SERC Board of Directors on October 24, 2018

Approved the NERC Board of Trustees on February 7, 2019

Approved by the Federal Energy Regulatory Commission on April 30, 2019

ARTICLE IX – EXPENSES	14
9.1 Allocation of Specific Expenses	14
9.2 Statutory Functions	14
9.3 Non-Statutory Functions	14
ARTICLE X – DISPUTE RESOLUTION PROCESS	15
10.1 Dispute Resolution	15
ARTICLE XI – DISSOLUTION	15
11.1 Dissolution	15
11.2 Distribution of Assets	15
ARTICLE XII – WAIVER OF NOTICE	15
12.1 Waiver	15
ARTICLE XIII – INDEMNIFICATION	15
13.1 Indemnification of Directors, Committee Members, Officers, Employees and Agents	15
ARTICLE XIV – AMENDMENT OF THE BYLAWS AND ARTICLES OF INCORPORATION	16
14.1 Amendment of the Bylaws and Articles of Incorporation	16

Approved by the SERC Board of Directors on October 24, 2018

Approved the NERC Board of Trustees on February 7, 2019

Approved by the Federal Energy Regulatory Commission on April 30, 2019 _____ 12

AMENDED AND RESTATED
BYLAWS
OF
SERC RELIABILITY CORPORATION
[Hereinafter referred to as the “Corporation”]
A North Carolina Nonprofit Corporation

ARTICLE I - OFFICES

1.1 **Principal Office.** The principal office of the Corporation shall be located in the City of Charlotte, Mecklenburg County, North Carolina. The Board of Directors (or “the Board”) may by resolution change the location of this office from time to time.

1.2 **Other Offices.** The Corporation may have other offices at such place or places as the Board of Directors may from time to time appoint or the business of the Corporation may require.

ARTICLE II - PURPOSES

2.1 **General Purposes.** The purpose of the Corporation is to reduce risks to the reliability and security of the electric grid in the SERC Region, as defined in Section 2.2. In pursuit of this goal, the Corporation shall:

(a) enter into a Delegation Agreement to serve as a Regional Entity pursuant to 16 U.S.C. § 824o or the corresponding provisions of any subsequent U.S. Code revisions;

(b) promote the development of reliability and adequacy arrangements among the systems in the SERC Region;

(c) participate in the establishment of Reliability Standards;

(d) participate in the measurement of performance relative to these Reliability Standards;

(e) promote conformance to and compliance with these Reliability Standards;

- (f) develop and exchange information with respect to planning and operating matters relating to the reliability and adequacy of the Bulk Power System;
- (g) review as necessary activities in the SERC Region on reliability and adequacy in order to meet Reliability Standards;
- (h) provide a mechanism to resolve disputes on reliability issues in a manner that meets the needs of the parties and the SERC Region; and
- (i) provide information with respect to matters considered by the Corporation, where appropriate, to the Federal Energy Regulatory Commission ("FERC") and to other federal and state agencies concerned with reliability and adequacy.

2.2 **Geographic Area.** The Corporation accomplishes its purposes in a geographic area (the "SERC Region") that is defined in Exhibit A of the Amended and Restated Delegation Agreement Between the North American Electric Reliability Corporation and SERC Reliability Corporation, as amended from time to time.

ARTICLE III - POWERS

3.1 **Powers.** The Corporation shall have the power to engage in any lawful act or activity for which corporations may be organized under the general nonprofit corporation law of the State of North Carolina, subject to any limitations provided in applicable federal or state law or in the Certificate of Incorporation or these Bylaws.

ARTICLE ~~III~~IV - MEMBERSHIP

24.1 **General.** The Corporation shall be a membership corporation. Entities that meet the eligibility requirements ~~and~~, apply for membership in the Corporation, ~~and whose applications have been duly approved by the Board of Directors for admission as a member~~ shall hereinafter be referred to individually as a "Member" ~~or "Member Company"~~ and collectively as "Members" or "Member Companies".

24.2 **Eligibility.** Membership in the Corporation is voluntary and is open to any entity in the SERC Region (~~defined in Section 3.2 below~~) that is a user, owner or operator of the Bulk Power System, has a material interest in the Bulk Power System in the SERC Region, satisfies the criteria for membership specified in this Section ~~24.2~~, qualifies for one or more of the Sectors ~~identified~~defined in Section ~~2.4.5~~, and is subject to the

jurisdiction of the Federal Energy Regulatory Commission. Membership in the Corporation is predicated on mandatory acceptance of the responsibility to promote, support, and comply with Reliability Standards of the Corporation and the North American Electric Reliability Corporation ("NERC"), and to assist the Corporation in its compliance with the terms and provisions of a Delegation Agreement (a "Delegation Agreement") with NERC, by which NERC delegates authority to propose and enforce Reliability Standards, pursuant to 16 U.S.C. § 824o or the corresponding provisions of any subsequent U.S. Code revisions. For purposes of these Bylaws, the terms "Bulk Power System", "Reliability Standards" and "Regional Entity" shall be as defined in 16 U.S.C. § 824o or the corresponding provisions of any subsequent U.S. Code revisions.

2.4.3 Admission of Members. New Members may join the Corporation upon the approval of a submitted application as provided in this Section 4.3. The application shall designate the Sector the prospective Member wishes to join. The Secretary of the Corporation shall review the membership application and may request additional demonstration by the applicant that it qualifies for membership in a particular Sector. The Board of Directors shall have the sole authority to approve applications for membership upon such criteria as it deems appropriate.

4.4 Termination. A Member Company may terminate its membership in the Corporation by giving the Board of Directors at least thirty (30) calendar days prior written notice of its intent to terminate such membership ~~(such. Such~~ Member Companies shall hereinafter be referred to as "Terminated Member Companies"). ~~Terminated Member Companies shall nevertheless continue to be liable for any and all obligations incurred prior to the end of the calendar year in which such notice is given effective, including, but not limited to, the obligation to pay a pro rata share of any Corporation expense. In addition to termination of membership by the Member Company, the Board of Directors, following notice to the Member Company, may terminate the membership of a Member Company if, in the judgment of the Board of Directors that, the Member Company has violated failed to meet its obligations and responsibilities to the Corporation. The The termination of the membership, as well as the effective date and terms and conditions of such termination of the membership, of a Member Company by the Board of Directors shall require a Supermajority an affirmative vote, as defined in these Bylaws, of at least two-thirds (2/3) of the voting members of the Board of Directors.~~

2.4.5 Sectors. Each Member Company shall be classified by the Executive Committee in Board of Directors in not more than one of the following seven (7) Sectors (each a "Sector", and collectively, the "Sectors"):

- (a) Investor-Owned Utility Sector – This Sector includes any investor-owned entity with substantial business interest in ownership and/or operation in any of the asset categories of generation, transmission or distribution.
- (b) Federal/State Sector – This Sector includes any U.S. federal entity that owns and/or operates electric facilities and/or provides

~~(b)~~ electricity for sale at wholesale to their members; balancing authority services, in any of the asset categories of generation, transmission, or distribution; or any entity that is owned by or subject to the governmental authority of a state and that is engaged in the generation, delivery, and/or sale of electric power to end-use customers primarily within the political boundaries of the state.

- (c) Cooperative Sector – This Sector includes any non-governmental entity that is incorporated under the laws of the state in which it operates, is owned by and provides electric service to end-use customers at cost, and is governed by a board of directors that is elected by the membership of the entity; and any non-governmental entity owned by and which provides generation and/or transmission service to such entities.
- (d) Municipal Sector – This Sector includes any entity owned by or subject to the governmental authority of a municipality, that is engaged in the generation, delivery, and/or sale of electric power to end-use customers primarily within the political boundaries of the municipality; and any entity, whose members are municipalities, formed under state law for the purpose of generating or purchasing ~~electricity for sale at wholesale to their members.~~
- (e) Marketer Sector– This Sector includes any entity that is engaged in the activity of buying and selling of wholesale electric power in the SERC Region on a physical or financial basis.
- (f) Merchant Electricity Generator Sector – This Sector includes any entity that owns or operates an electricity generating facility or provides balancing authority services for such entities. This includes, but is not limited to, small power producers and all other non-utility producers such as exempt wholesale generators who sell electricity at wholesale.

~~(f)~~ ~~(g)~~ ISO-RTO/Reliability Coordinator Sector – This Sector includes any entity that operates a FERC approved ISO or RTO ~~– or is an organization that is registered as a Reliability Coordinator on the NERC Compliance Registry.~~

The ~~Executive Committee's~~ classification of a Member Company in a particular Sector may only be changed by the ~~Executive Committee~~ Board of Directors.

2-54.6 Transfer of Membership. A Member Company may not give or otherwise transfer its membership, except to a successor that becomes a Member Company in accordance with ~~the terms and conditions~~ Section 4.3 of these Amended and Restated

Bylaws, and provided that the successor continues to meet ~~its~~the predecessor's obligations.

~~2.6~~ 4.7 **Member Powers.** The Members shall have the following rights and obligations:

- (a) To elect the Independent Directors;
- (b) To elect the Sector Directors;
- (c) To approve amendments to the Bylaws as recommended by the Board of Directors in accordance with the provisions in Section 13.1 of these Bylaws;
- (d) To approve dissolution, merger or the sale, pledge or transfer of substantially all of the Corporation's assets as recommended by the Board of Directors; and
- (e) To provide advice and recommendations to the Board of Directors with respect to the development of annual budgets, business plans, and other matters pertinent to the purpose and operations of the Corporation.

Except as expressly set forth in these Amended and Restated Bylaws, the Members shall have no other authority, rights, privileges, or preferences.

4.8 **Annual Meeting of Members.** The Members shall hold at least one Annual Meeting of the Members each year to elect the Independent Directors, elect Sector Directors, and to conduct other such business as may come before the meeting. By resolution adopted at any Annual Meeting of the Members, the Members may provide for additional regular meetings that may be held without further notice to the Members.

At the Annual Meeting of Members: (i) Independent Directors and Sector Directors shall be elected; (ii) the President and Corporate Treasurer shall report on the activities and financial condition of the Corporation; and (iii) the Members shall consider and act upon such other matters as are consistent with the notice of the Annual Meeting of the Members. The failure to hold an annual meeting in accordance with these Bylaws shall not affect the validity of a corporate action.

4.9 **Special Meetings of Members.** Special Meetings of the Members may be called by:

- (a) ~~The Chair of~~ the Board of Directors;
- (b) Any six (6) Directors on the Board of Directors;
- (c) The President/Chief Executive Officer; or

Approved by the SERC Board of Directors on October 24, 2018

Approved by the NERC Board of Trustees on February 7, 2019

Approved by the Federal Energy Regulatory Commission on April 30, 2019

- (d) Members if at least ten percent (10%) of the Members request such a meeting in written form to the Chair of the Board of Directors or the President of the Corporation describing the purpose for which the Special Meeting is to be held.

Not less than seven (7) days prior to the date of the meeting, the Secretary of the Corporation shall provide notice to all Members of the Special Meeting. Notice of the meeting and the costs of the meeting shall be at the expense of the Corporation. The business transacted at a Special Meeting is limited to the purposes stated within the notice of the meeting. Business transacted at a Special Meeting that is not included in those stated purposes is voidable by or on behalf of the Corporation, unless a majority of the Members entitled to vote were present at such meeting or have waived notice of the meeting under Section 4.12.

4.10 **Location of Meetings of Members.** Meetings of Members shall be held at the principal office of the Corporation, or such other place within the Region as determined by the Board Chair or the President/Chief Executive Officer.

4.11 **Conduct of Meetings of Members.** The Board Chair shall conduct and preside at all Meetings of the Members, be responsible for the preparation of the agenda, and carry out all other duties assigned by the Board of Directors. In the Chair's absence, the Board Vice Chair shall serve as acting Chair and shall preside at all Meetings of the Members, be responsible for the preparation of the agenda, and carry out all other duties assigned by the Board of Directors.

4.12 **Notice of Meetings.**

- (a) **Notice Requirements.** Notice of all Meetings of the Members must be given at least seven (7) days before the date of a meeting and not more than sixty (60) days before the date of a meeting. The notice must contain the date, time and place of the meeting, instructions for electronic attendance or voting, if applicable, and an agenda of the matters upon which action may be taken at the meeting. A matter may be added to the agenda of a meeting at the meeting upon the affirmative vote of a majority of the votes cast on a motion to amend the agenda. If the meeting is an adjourned meeting and the date, time and place of the meeting were announced at the time of the adjournment, notice is not required unless a new record date for the adjourned meeting is or must be fixed. Notice shall be deemed given by the Corporation to the Members when (a) posted on the Corporation's public website in a reasonably prominent location, and (b) sent by mail, facsimile or reputable overnight delivery service or by electronic transmission pursuant to Section 8.8.

- (b) **Waiver of Notice; Objections.** A Member may waive notice of a meeting of Members. A waiver of notice by a Member entitled to

notice is effective whether given before, at, or after the meeting, and whether given in writing, or by attendance. Attendance by a Member at a meeting is a waiver of notice of that meeting, unless the Member objects at the beginning of the meeting to the transaction of business because the meeting is not lawfully called or convened, or objects before a vote on an item of business because the item may not lawfully be considered at that meeting and does not participate in the consideration of the item at that meeting.

4.13 **Right to Vote; Act of Members.** Each Member shall be entitled to one vote on all matters submitted to a vote of the Members. If a quorum for a meeting of the Members is present, a majority of the votes cast on the matter shall be the act of the Members, except with respect to any matter described in Section 4.14, and is subject to the following additional requirements:

- (a) An affirmative vote from a Member from at least three Sectors is required for any action to pass.
- (b) A negative vote from a Member from at least two Sectors is required for any action to fail.

Abstentions shall not count negatively or positively in tallying the vote; however, the abstaining members' attendance at a meeting shall still count toward the establishment of quorum.

4.14 **Special Voting Requirements.** Notwithstanding any other provisions provision of these Bylaws, and except for as set forth in the appointment Articles of Directors Incorporation, two-thirds (2/3) of the votes cast shall be required to amend the Bylaws or the Articles of Incorporation, as provided in Section 4.2 below, Member Companies shall be non-voting members and shall have no power or authority or right to vote with respect to the actions of the Corporation, specifically including, but not limited to, the dissolution or merger of the Corporation 13.1 of these Bylaws. The substance of the proposed amendment(s) must be posted in accordance with the provisions of Section 13.1.

~~ARTICLE III – PURPOSES~~

~~3.1 **General Purposes.** The purpose of the Corporation is to promote effective and efficient administration of Bulk Power System reliability in the SERC Region, as defined in Section 3.2. In pursuit of this goal, the Corporation shall:~~

- ~~(a) enter into a Delegation Agreement to serve as a Regional Entity pursuant to 16 U.S.C. § 824o or the corresponding provisions of any subsequent U.S. Code revisions;~~

- ~~_____ (b) promote the development of reliability and adequacy arrangements among the systems in the SERC Region;~~
- ~~_____ (c) participate in the establishment of Reliability Standards;~~
- ~~_____ (d) participate in the measurement of performance relative to these Reliability Standards;~~
- ~~_____ (e) promote conformance to and compliance with these Reliability Standards;~~
- ~~_____ (f) develop and exchange information with respect to planning and operating matters relating to the reliability and adequacy of the Bulk Power System;~~
- ~~_____ (g) review as necessary activities in the SERC Region on reliability and adequacy in order to meet Reliability Standards;~~
- ~~_____ (h) provide a mechanism to resolve disputes on reliability issues in a manner that meets the needs of the parties and the SERC Region; and~~
- ~~_____ (i) provide information with respect to matters considered by the Corporation, where appropriate, to the Federal Energy Regulatory Commission ("FERC") and to other federal and state agencies concerned with reliability and adequacy.~~

~~_____ **3.2 Geographic Area.** The Corporation accomplishes its purposes in a geographic area (the "SERC Region") that is defined in Exhibit A of the Amended and Restated Delegation Agreement Between North American Electric Reliability Corporation and SERC Reliability Corporation.~~

~~_____ **3.3 Other Statutory Functions.** The Corporation may also perform statutory functions outside of the SERC Region, on behalf of NERC or other Regional Entities. The Corporation may undertake such activities pursuant to a contract that is approved by the Executive Committee.~~

~~_____ **4.15 Quorum.** A quorum for a meeting of Members is necessary for the transaction of business at a meeting of Members. A quorum is established by a majority of the Members. If a quorum for a meeting of the Members is not present, a meeting may be adjourned for that reason by the Members then represented or present.~~

4.16 **Action by Electronic Communication.** Unless otherwise restricted by the Articles of Incorporation, these Amended and Restated Bylaws, or by applicable law, the Members may participate in a meeting of the Members by means of a conference telephone or similar communication equipment whereby all persons participating in the meeting can hear each other and participate in such manner and shall constitute presence in person at such meeting. Meetings held by electronic communication are subject to the Notice requirements in Section 4.12, as well as Quorum requirements in Section 4.15.

4.17 **Voting Member; Proxies.**

- (a) **Designation of Voting Member; Proxies.** Each year prior to the annual meeting of Members, each Member shall designate the individual authorized to vote on Corporation matters on behalf of the Member to the Secretary in writing. A Member may change such designation at any time by providing at least twenty-four (24) hour written notice to the Secretary of the Corporation. Such notice may be provided by electronic transmission. Each Member may only give a proxy to a person who is a member, officer, executive-level employee, or agent of the Member. Alternatively, a Member may give a proxy to a representative of a Member registered in the same Sector.
- (b) **Effective Period.** An appointment of a proxy is effective when received by the Secretary or other officer or agent authorized to tabulate votes. An appointment is valid for the next regular or specially scheduled meeting or ballot by electronic transmission. However, a proxy is not valid for more than sixty (60) days from its date of execution.
- (c) **Revocation.** An appointment of a proxy is revocable by a Member. Appointment of a proxy is revoked by the person appointing the proxy either by expiration of the sixty (60) day period, by open declaration at a meeting, or by signing and delivering a revocation in writing or by electronic transmission to the Secretary or other officer or agent authorized to tabulate proxy votes. This may be done either in a statement that the appointment of the proxy is revoked or by a subsequent appointment that shall serve to cancel all prior proxies.

4.18 **Public Notice of Member Meetings.** Notice to the public of the dates, times and places of meetings of the Members, and all nonconfidential material provided to the Members, shall be posted on the Corporation's website at approximately the same time that notice is given to the Members.

4.19 **Posting of Minutes.** Minutes of meetings of Members shall be posted on the Corporation's website once approved.

4.20 Reimbursement of Member Expenses. The Corporation will be under no obligation to reimburse Members for expenses associated with their attendance at Annual, regular or Special Meetings of the Members.

ARTICLE ~~IV~~V - BOARD OF DIRECTORS

45.1 General Powers. The business and affairs of the Corporation shall be managed ~~by its~~under the direction of the Board of Directors except as otherwise provided ~~in~~by the Articles of Incorporation or these Amended and Restated Bylaws.

5.2 Duties. The Board of Directors shall have all powers accorded to it under law not expressly reserved in whole or in part to the Members under the Articles of Incorporation or these Amended and Restated Bylaws, which shall include by way of example and not by way of limitation of powers, the responsibility to:

- (a) Govern the corporation and oversee its activities;
- (b) Approve Reliability Standards and their modifications utilizing a fair, open, balanced and inclusive process;
- (c) Ensure that the Compliance Monitoring and Enforcement Process is applied consistently;
- (d) Establish and approve an annual budget for submission to NERC;
- (e) Hire the Corporation's president and, upon the recommendation of a majority of the Independent Directors, approve his or her salary;
- (f) Recommend to Members to approve the dissolution, merger or the sale, pledge or transfer of substantially all of the Corporation's assets;
- (g) Form or dissolve Board committees as appropriate;
- (h) Fill vacancies on any of the Board's committees;
- (i) Recommend amendments to the Articles of Incorporation to the Members;
- (j) Recommend amendments to the Bylaws to the Members or approve such amendments as allowed under Section 13.2; and

(k) Resolve any disputes regarding the Member Companies and the Corporation, if those issues cannot be resolved by the standing committees or subcommittees of the Corporation and are not otherwise subject to NERC's dispute provisions for non-compliance with Reliability Standards.

4.25.3 Composition and Eligibility.

(a) The Board of Directors shall be comprised of at least eighteen (18) Directors in addition to the President/Chief Executive Officer who shall serve as ex-officio non-voting member of the Board in accordance with Section 6.2(d).

(b) Fifteen (15) of the Directors, which shall be referred to as Sector Directors, shall be allocated as follows:

(i) The Investor-Owned Utility Sector shall have four (4) representatives;

(ii) The Federal/State Sector shall have two (2) representatives;

(iii) The Cooperative Sector shall have three (3) representatives;

(iv) The Municipal Sector shall have three (3) representatives;

(v) The Marketer Sector shall have one (1) representative;

(vi) The Merchant Electricity Generator Sector shall have one (1) representative; and no fewer than

(vii) The ISO-RTO/Reliability Coordinator Sector shall have one (1) representative.

(c) Sectors shall recommend their respective Sector Director(s) to the Nominating and Governance Committee from among individuals holding senior management positions in Member organizations, which shall be presented by the Nominating and Governance Committee to the Members for election to the Board of Directors. No two Directors may be employees of a single Member or any affiliate or related party of a Member or any affiliate. In the event of a vacancy, the replacement Director shall be nominated as provided in this Section 5.3(c) and elected by the Members at the next Annual, regular or Special Meeting of the Members.

(d) At least three (3) Directors but no more than five (5) Directors shall be Independent Directors elected by the Members. An Independent Director is a person (i) who is not an officer or employee of the Corporation; an officer, director, or employee of a Member; or an officer, director or employee of any entity that would reasonably be perceived as having a direct financial interest in the outcome the Board of Director's decisions; and (ii) who does not have a

relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director. The Board of Directors may adopt additional standards for director independence not inconsistent herewith.

~~Each Director shall be the principal officer or other authorized employee from a Member Company or a company that controls, is controlled by, or is under common control with such Member Company (an “affiliated entity”). Each Member Company, together with any affiliated entities, may appoint one (1) Director to the Board of Directors. For clarification purposes only, each Member Company and all of such Member Company’s affiliated entities (including any affiliated entities which may be a separate Member Company) shall have the right to appoint only one (1) Director to serve on behalf of such Member Company and all of such Member Company’s affiliated entities. Each Director shall serve until otherwise replaced by the applicable Member Company, together with any affiliated entities. Each Member Company, together with any affiliated entities, may designate one (1) alternate Director, who shall be a principal officer or other authorized employee from the Director’s Member Company or an affiliated entity, to serve in the place of the Member Company’s Director at any meeting of the Board of Directors (an “Alternate Director”). Directors may not otherwise use proxy votes. Any vacancy occurring among the Directors or Alternate Directors shall be filled by the applicable Member Company, together with any affiliated entities.~~

~~4.3 **Customer Advisors; Board Advisors; and Other Participants.** The Board of Directors may, but shall not be required to, appoint one or more Customer Advisors to serve the Corporation. Each Customer Advisor shall be a person in the SERC Region who is (i) employed by an entity that receives service at retail and does not otherwise sell, purchase, or transmit power over the Bulk Power System or own, operate or maintain, control or operate facilities or systems that are part of the Bulk Power System; (ii) a state public utility commission representative; or (iii) any other customer advocate. The term of the Customer Advisor(s) shall be for a two (2) year period. The role of the Customer Advisor(s) is purely advisory and the Customer Advisor(s) shall have no authority whatsoever to bind the Corporation in any way.~~

~~The Board of Directors may, but shall not be required to, appoint one but no more than five Board Advisor(s) to serve the Corporation, the Board of Directors, the Executive Committee and the Officers of the Corporation. The Board Advisor(s) shall be either former Directors of the Corporation or former NERC Trustees. Appointments shall be made by the Board of Directors and those appointed shall serve for a term of one (1) year with no limits on eligibility for reappointment. The purpose of the Board Advisor(s) shall be to advise the Board of Directors, Executive Committee and Officers of the Corporation, as directed from time to time by the Board of Directors or the Executive Committee. The role of the Board Advisor(s) is purely advisory and the Board Advisor(s) shall have no authority whatsoever to bind the Corporation in any way.~~

(e) The Independent Directors shall be nominated by the Nominating and Governance Committee, and approved by the Members at the

Annual Meeting of the Members, or at such other time as specified by the Board of Directors.

(f) Any Director which the Board of Directors has determined has a conflict of interest on any matter brought before the Board shall not vote on such matter and shall recuse himself or herself from all Board deliberations concerning such matter.

(g) There will be no alternates or proxies for Directors.

5.4 Meetings of the Board of Directors, Notice, Waiver

(a) **Meetings.** An annual meeting of the Board of Directors shall be held without notice immediately following the Annual Meeting of the Members. In addition, regular meetings may be held at such time or times as fixed by the Board of Directors. Special meetings of the Board of Directors may be called by the Chair of the Board, the President/Chief Executive Officer, or by any three Directors and shall be held at the principal office of the Corporation, or such other place within the Region as determined by the Chair or the President/Chief Executive Officer.

(b) **Notice.** Notice of the dates, times, and places of all regular and special meetings of the Board of Directors shall be published by the Secretary and provided to all Directors and Members not less than three (3) days prior to the date of the meeting. Notice shall be deemed given by the Corporation to Directors and Members when: 1) posted on the Corporation's public website in a reasonably prominent location, and 2) sent by mail or electronic transmission to each Director and Member included on the rosters maintained by the Secretary of the Corporation.

(c) **Waiver.** Any person entitled to notice of a regular or special meeting of the Board of Directors may waive notice thereof. A waiver of notice by a person entitled to notice is effective whether given before, at, or after the meeting, and whether given in writing or by attendance. Attendance by a director at a meeting of the Board is a waiver of notice of that meeting, unless the director objects at the beginning of the meeting to the transaction of business because the meeting is not lawfully called or convened, or objects before a vote on an item of business because the item may not lawfully be considered at that meeting and does not participate in the consideration of the item at that meeting.

5.5

~~The Chair of FERC and the chair or president of any State Utility Commission in a state in which electric service is provided by a Member Company of the Corporation shall be invited to designate an observer to attend meetings of the Board.~~

~~4.4 **Regular Meetings of the Board.** Unless otherwise determined by the Chair, a regular meeting of the Board of Directors shall be held without other notice than these Bylaws on the fourth Wednesday in the months of April and October in each year. Notwithstanding the foregoing, the Chair may elect to hold a regular semi-annual meeting of the Board of Directors on another date provided that the Board receives at least ten (10) days advance notice. If the day fixed for the meeting shall be a legal holiday in the State of North Carolina, the meeting shall be held on the next succeeding business day. The Board of Directors may designate any place as the place of meeting for any meeting. The Board of Directors may provide by resolution the time and place for the holding of additional regular meetings of the Board without other notice than the resolution. Directors or any committee designated by the Board of Directors may participate in such Board or committee meetings by means of a telephone conference, webcast or any other communication by means of which all persons participating in the meeting can hear each other at the same time, and participation by such means shall constitute presence in person at such meeting.~~

~~4.5 **Special Meetings of the Board.** Special meetings of the Board of Directors may be called at the request of the Chair, or by Directors holding twenty percent (20%) or more of the Individual Votes. The Chair may fix any place as the place for holding any special meeting of the Board.~~

~~4.6 **Notice of Special Meetings.** Notice of any special meeting of the Board of Directors shall be given at least two (2) days prior to the special meeting by written notice delivered personally, or sent by mail or electronic mail to each Director at the address as shown by the records of the Corporation. If mailed, such notice shall be deemed to be delivered when deposited in the United States mail in a sealed envelope so addressed, with postage prepaid. If sent by electronic mail, such notice shall be deemed to be delivered when sent via electronic mail. Any Director may waive notice of any meeting. The attendance of a Director at any meeting shall constitute a waiver of notice of such meeting, except where a Director attends a meeting for the express purpose of objecting to the transaction of any business because the meeting is not lawfully called or convened. Neither the business to be transacted at, nor the purpose of, any special meeting of the Board need be specified in the notice or waiver of notice of such meeting, unless specifically required by law or by these Bylaws.~~

~~4.7 **Election of Board Officers and Executive Committee.**~~

~~(a) Biennially, at the April meeting, the Board of Directors, upon recommendation of the Nominating and Governance Committee shall elect Board Officers from among the Directors for the positions of Chair, and Vice Chair, and Secretary-Treasurer, each for a term of two (2) years beginning on July 1st after the election. No Director~~

may serve in more than one (1) Board Officer position at the same time.

(b) The Chair may be a Sector Director or an Independent Director. If the Chair is a Sector Director, the Independent Directors shall designate a lead Independent Director that the Chair shall consult regularly on agendas and other matters of importance. If the Chair and the Vice Chair are Independent Directors, the Sector Directors shall designate a lead Sector Director that the Chair shall consult regularly on agendas and other matters of importance.

(c) The Chair shall conduct and preside at all meetings, be responsible for the preparation of the agenda, and carry out all other duties assigned by the Board of Directors. In the Chair's absence, the Vice Chair shall serve as acting Chair and shall preside at all meetings, be responsible for the preparation of the agenda, and carry out all other duties assigned by the Board of Directors. In the event that a Board Officer cannot complete his or her term, the Board of Directors may hold a special election to elect a replacement Board Officer for the remainder of the unexpired term.

~~Initially, at the first April Board meeting following the integration of FRCC into SERC, the Board shall approve two groups (Group 1 and Group 2) of representatives to the Executive Committee which shall be nominated by the Sectors. Group 1 shall serve an initial three (3) year term and then for two (2) year terms thereafter, with terms beginning on July 1 after the approval; Group 2 shall serve an initial two (2) year term and then for two (2) year terms thereafter, with terms beginning on July 1 after the approval in alternating years from Group 1 terms. The initial allocation of Executive Committee representatives to Group 1 and Group 2 shall be recommended by the Nominating Committee and approved by the Chair, or in the absence of the Chair, by the Vice Chair. Each Sector may also elect alternates to the Executive Committee, which shall be elected on the same schedule as their representatives and, if a Sector has more than one (1) representative on the Executive Committee, such Sector shall designate the priority of succession by such alternates.~~

~~4.8—5.6 **Terms of Sector Directors.** The Sector Directors shall be divided into two groups, Group 1 and Group 2, with the number of Sector Directors in each group divided as nearly equal as possible. Each group shall serve for two (2) year terms beginning on July 1, with the start of the term for Group 1 beginning in alternating years from the start of the term for Group 2. Terms of Sector Directors may be extended beyond a two (2) year term or be less than a two (2) year term as deemed necessary by the Members.~~

~~5.7 **Terms of Independent Directors.** The Independent Directors shall be divided into two groups, Group 1 and Group 2, with the number of Independent Directors~~

in each group divided as nearly equal as possible. Each group shall serve for two (2) year terms beginning on July 1, with the start of the term for Group 1 beginning in alternating years from the start of the term for Group 2. Terms of Independent Directors may be extended beyond a two (2) year term or be less than a two (2) year term as deemed necessary by the Members. No Independent Director shall serve more than four (4) terms.

5.8 **Vacancies and Removal.** If a Director resigns, dies, changes corporate affiliation or is removed during the term of office for which elected, the position shall thereupon be vacant and shall be filled as soon as practicable and in accordance with the same procedures that the position had previously been filled. The successor Director shall hold office for the unexpired portion of the term of the director replaced. An Independent Director or Sector Director may be removed by the affirmative vote of two-thirds (2/3) of the remaining Directors. Any Director may be removed by the Board of Directors for non-attendance at three or more consecutive Board meetings. Any Independent or Sector Director removed by the Board of Directors under this Section 5.8 may not be reelected to the Board.

5.9 **Agenda.** As far in advance of each regular and special meeting as practical, an agenda shall be distributed to Directors and other participants.

4.95.10 **Compensation and Reimbursement.** Sector Directors shall not receive any compensation from the Corporation for their services to the Corporation-

~~4.10 **Duties.** The as Directors on the Board of Independent Directors shall be entitled to such compensation as indicated by a Board policy, if any. Independent Directors shall have the exclusive responsibility to:~~

- right
- ~~(a) Authorize distributions;~~
 - ~~(b) Recommend to members reimbursement by the Corporation of their actual reasonable travel expenses to Board of Directors meetings or approve dissolution, merger or the sale, pledge or transfer of substantially all of the Corporation's assets;~~
 - ~~(c)(a) Fill vacancies on any of the Board's committees;~~
 - ~~(d) Adopt, amend, or repeal the Articles of Incorporation or Bylaws;~~
 - (e) Form or dissolve committees when specifically selected to represent the Corporation at a business meeting, subject to Board policy as adopted from time to time, if any. Sector Directors shall not be reimbursed by the Corporation for any expenses, unless specifically approved in advance by resolution of the Board as it deems necessary to carry out the business of the Corporation; and of Directors.

~~(f)(a) Resolve any disputes regarding the Member Companies and the Corporation, if those issues cannot be resolved by the standing committees or subcommittees of the Corporation and are not otherwise subject to NERC's dispute provisions for non-compliance with Reliability Standards.~~

~~4.11 **Voting.** The intent of Sections 4.12 and 4.14 is to ensure that no two Sectors should be able to control any decision and that a single Sector should not be able to veto any matter, respectively. In the event that either of the foregoing shall nevertheless occur, the Board shall promptly revise the provisions of these Bylaws so that no two Sectors shall be able to control any decision and no single Sector shall be able to veto any matter.~~

~~4.12 **Voting Definitions.**~~

~~(a) "Adjusted Weighted Vote" shall mean the number of votes of each Director determined in the manner set forth in Section 4.13 hereof.~~

~~(b) "Simple Majority" shall require the presence of a quorum and the (i) concurrence of Directors whose combined Individual Votes are greater than fifty percent (50%) of the total Individual Votes of all Directors present at the meeting and entitled to vote on the issue, (ii) concurrence of Directors whose combined Adjusted Weighted Votes are greater than fifty percent (50%) of the total Adjusted Weighted Vote of all Directors at the meeting and entitled to vote on the issue, and (iii) for at least one of the Individual Vote test or the Adjusted Weighted Vote test, on an individual Sector basis, the positive vote shall outweigh the negative vote for at least three Sectors.~~

~~(c) "Supermajority" shall require the presence of a quorum and the (i) concurrence of Directors whose combined Individual Votes equal or exceed two-thirds (2/3) of the total Individual Votes of all Directors present at the meeting and entitled to vote on the issue, (ii) concurrence of Directors whose combined Adjusted Weighted Votes are greater than two-thirds (2/3) of the total Adjusted Weighted Vote of all Directors present at the meeting and entitled to vote on the issue, and (iii) for at least one of the Individual Vote test or the Adjusted Weighted Vote test, on an individual Sector basis, the positive vote shall outweigh the negative vote for at least three Sectors.~~

~~(d) "Individual Vote" shall mean a single vote accorded to each Director.~~

~~(e) "Given Year" shall mean the applicable fiscal year for which the Adjusted Weighted Votes are calculated.~~

~~(f) "Reporting Year" shall mean the fiscal year immediately preceding the Given Year.~~

~~(g) "Previous Year" shall mean the fiscal year immediately preceding the Reporting Year.~~

~~4.13 **Determination of Adjusted Weighted Vote.** The Directors' Adjusted Weighted Votes for a Given Year shall be determined by the following formula:~~

$$~~V = 10(1/N) + 30(B/C) + 30(D/E) + 30(F/G)~~$$

~~V = % of Adjusted Weighted Vote~~

~~N = total number of Member Companies~~

~~B = Member Company's Previous Year internal peak demand~~

~~C = total of factor B for all Member Companies~~

~~D = Member Company's owned generating capacity as of January 1 of the Reporting Year~~

~~E = total of factor D for all Member Companies~~

~~F = Member Company's sum of circuit miles of transmission times the respective operating voltage for facilities of 69 kV and above as of December 31 of the Previous Year~~

~~G = total of factor F for all Member Companies~~

~~4.14 **Voting; Manner of Acting; Voting Rights; Quorum.**~~

~~(a) Except as otherwise provided in these Bylaws, all actions by the Board of Directors require approval by a Simple Majority vote.~~

~~(b) A motion which requires a vote shall be deemed to have passed by the requisite vote if it passes either:~~

~~(i) the Individual Vote test; or~~

~~(ii) the Adjusted Weighted Vote test;~~

~~and, for purposes of the failed test (any test that is not satisfied), on an individual Sector basis, the positive votes outweigh the negative votes in every Sector but one.~~

~~(c) Directors holding two thirds (2/3) of the Individual Votes shall constitute a quorum for action by the Board. If Directors holding less than two thirds (2/3) of the Individual Votes are present at the meeting, a majority of the Directors present may adjourn the meeting from time to time without further notice.~~

~~4.15~~

5.11 Quorum. A quorum is necessary for the transaction of business at a meeting of the Board of Directors. A quorum is established by the presence of a majority of the Directors entitled to vote at a meeting, provided that a majority of the Independent Directors must also be present to constitute a quorum. Electronic participation is acceptable if authorized by the Board Chair at that meeting. If a quorum for a meeting of the Board of Directors is not established, a meeting may be adjourned for that reason by the Directors then represented or present.

5.12 Voting. Each voting Director on the Board of Directors shall have one vote with respect to decisions of the Board of Directors. The President of the Corporation shall be an ex-officio member of the Board without vote and shall not be counted for quorum purposes. The positive vote of a majority of the voting directors is necessary to pass a particular action, except with respect to any matter described in Sections 4.4, 4.13, 11.1, and 13.1, and is subject to the following additional requirements:

- (a) An affirmative vote from a Director from at least three Sectors is required for any action to pass.
- (b) A negative vote from a Director from at least two Sectors is required for any action to fail.

For voting purposes, the Independent Directors shall constitute its own Sector.

5.13 Action without a meeting. Any action required by law to be taken at a meeting of Directors, or any action which may be taken at a meeting of Directors or by a Board Committee, may be taken without a meeting if all members of the Directors Board or Board Committee consent thereto in writing to the action so taken. The action shall be evidenced by one or more written consents describing the action taken, signed or by each Director electronic transmission, and the writing(s) or electronic transmission(s) are included in the minutes or filed with the corporate records reflecting the action taken. Action taken under this section is effective when the last Director signs the consent unless the consent specifies a different effective date. A consent signed under this section has the effect of a meeting vote. A Director's consent to action taken without a meeting may be in electronic form and delivered by electronic means.

5.14 Action by Electronic Communication. Unless otherwise restricted by the Articles of Incorporation, these Amended and Restated Bylaws, or by applicable law, the Members may participate in a meeting of Directors by means of a conference telephone or similar communication equipment whereby all persons participating in the meeting can hear each other and participate in such manner and shall constitute presence in person at such meeting. Meetings held by electronic communication are subject to the Notice requirements in Section 5.4, as well as Quorum requirements in Section 5.11.

ARTICLE ~~VVI~~ - CORPORATE OFFICERS

56.1 Corporate Officers. The Board of Directors shall appoint a President/Chief Executive Officer, one or more Vice Presidents, a Secretary, and a Treasurer of the Corporation. -Two (2) or more of such offices may be held by the same person, except for the offices of President/Chief Executive Officer and Secretary. -The Board of Directors may appoint such other officers and assistant officers as it deems necessary. ~~The Board Officers shall determine the compensation and benefits for all Corporate Officers.~~

56.2 President/Chief Executive Officer. The President shall be the Chief Executive Officer of the Corporation and shall manage the operations of the Corporation to the end that its purposes shall be accomplished. -The President shall:

- (a) Promote the mission of the Corporation and implement the goals and objectives of the Corporation;
- ~~(b)(a)~~ Report to the Board of Directors and carry out the policies and procedures set by the Board of Directors;
- ~~(c)(a)~~ Represent SERC at all NERC Stakeholder and Board of Trustees, meetings, as appropriate;
- ~~(d)(a)~~ Attend all Board of Directors meetings and serve as ex-officio non-voting member of (i) the Board of Directors, ~~(ii) the Executive Committee,~~ and ~~(iii)~~ all ~~other~~ Board committees;
- ~~(e)(a)~~ Coordinate subregional activities and interregional affairs, to include data collection;
- ~~(f)(a)~~ Oversee the business affairs of the Corporation, including the Corporation staff, and enact such policies and procedures for staff as are needed to implement the goals and objectives of the Corporation; and

~~(g)(a)~~ Provide other assistance to the Corporation and NERC, as appropriate.

56.3 Vice President. The Corporation may have one or more Vice Presidents. A Vice President of the Corporation shall perform such duties and exercise such powers as may be assigned to him or her from time to time by the Board of Directors, ~~the Executive Committee,~~ or the President/Chief Executive Officer. In the absence of the President/Chief Executive Officer, or in the case of the ~~President's~~President/Chief Executive Officer's inability to act (because of death, resignation, removal, disqualification, or otherwise), a Vice President of the Corporation may be appointed to perform the duties and exercise the powers of the President/Chief Executive Officer, subject to the control of the Board of Directors ~~and the Executive Committee~~.

56.4 Secretary. The Secretary of the Corporation shall be custodian of and shall maintain the corporate books, records and the minutes of the meetings of the Board of Directors and other Corporation-related meetings and shall assure that all required notices are duly given in accordance with these Bylaws, the Articles of Incorporation or as otherwise may be required by law. ~~The Secretary of the Corporation shall also be the custodian of the seal of the Corporation.~~ The Secretary of the Corporation shall, in general, perform all duties incident to the office of Secretary of the Corporation and such other duties as may, from time to time, be assigned to him or her by the Board of Directors, ~~the Executive Committee,~~ or the President/Chief Executive Officer.

56.5 Treasurer. The Treasurer of the Corporation shall have charge and custody of, and be responsible for, all funds and securities of the Corporation and deposit all such funds in the name of the Corporation in such banks, trust companies, or other depositories as shall be selected in accordance with the provisions of these Bylaws. ~~The Treasurer of the Corporation shall, in general, perform all of the duties incident to the office of Treasurer of the Corporation and such other duties as from time to time may be assigned to him or her by the Board of Directors,~~ ~~the Executive Committee,~~ or the President/Chief Executive Officer.

ARTICLE VI - EXECUTIVE COMMITTEE

~~6.1 **Executive Committee Representatives.** The Executive Committee shall be comprised of fifteen (15) Sector representatives from the Board of Directors, consisting of:~~

~~(a) The Investor Owned Utility Sector shall have four (4) representatives;~~

~~(ii) (b) The Federal/State Sector shall have two (2) representatives;~~

~~(ii) (c) The Cooperative Sector shall have three (3) representatives;~~

~~(ii) (d) The Municipal Sector shall have three (3) representatives;~~

~~(e) The Marketer Sector shall have one (1) representative;~~

~~(f) The Merchant Electricity Generator Sector shall have one (1) representative; and~~

~~(g) The ISO-RTO Sector shall have one (1) representative.~~

~~It is the desire of the Board of Directors that the Cooperative and Municipal sectors have representation from both transmission dependent and transmission owning Members.~~

~~Each Sector shall be responsible for nominating their representative(s) and alternates from among the Directors. The Chair of the Board shall serve as Chair of the Executive Committee and shall conduct all meetings and shall be responsible for the preparation of the agenda. In the event that a representative on the Executive Committee is unable to complete a term, the Sector's alternate shall replace such representative.~~

~~6.2 **Ex Officio Representatives.** The Chair, Vice Chair, and Secretary-Treasurer of the Board of Directors shall also be ex officio representatives on the Executive Committee, but shall not have voting rights unless such Board Officer is also elected by a Sector to the Executive Committee pursuant to Section 6.1 above.~~

~~6.3 **Authority of Executive Committee.** Except as limited by Section 55A-8-25 of the North Carolina Nonprofit Corporation Act and Section 4.10 of these Bylaws, the Executive Committee is empowered to make all such decisions and take such actions as are deemed to be necessary for the operation of the Corporation.~~

~~6.4 **Action.** Each voting representative on the Executive Committee shall have one vote. The presence of three quarters (3/4) of the voting representatives on the Executive Committee shall constitute a quorum. The positive vote of two-thirds (2/3) of Executive Committee voting representatives present and voting is necessary to pass a particular action.~~

ARTICLE VII - OTHERBOARD COMMITTEES

~~7.7.1 **Designation by Board.** The Board of Directors, by resolution adopted by a Simple Majority vote, may designate Board committees and standing~~

~~committees, Committees~~ as shall be necessary to address the purposes of the Corporation. ~~Each~~

7.2 Authority. The powers and duties of Board Committees shall be subject to general policies and procedures established by the Board and shall be at all times subject to the control and direction of the Board. Board Committees shall include a Board Risk Committee, a Human Resources and Compensation Committee, a Finance and Audit Committee, a Nominating and Governance Committee, and such other Board committee shall have Committees as the Board may authorize from time to time. All Board Committees and the chairs thereof, unless the appointment of the chair is otherwise designated by these Bylaws or the Board committee's charters, shall be nominated by the Nominating and Governance Committee and approved by the Board. The Board may act by and through the Board Committees as may be specified in resolutions adopted by the Board. With the exception of the Finance and Audit Committee as specified in Section 7.5 and in that committee's charter, Committee members must be Directors of the Board.

7.3 Board Risk Committee. The Board Risk Committee shall consist of up to five (5) members of the Board, at least two Directors among one (1) of which shall be an Independent Director. The Board Chair shall be ineligible to serve as Chair of the Board Risk Committee. The Board Risk Committee shall be responsible for overseeing the Corporation's risk management framework; providing oversight over management and the Technical Committee's assessments of external risks to the SERC Region; and periodically reporting these risks oversight findings to the Board of Directors.

7.4 Human Resources and Compensation Committee. The Human Resources and Compensation Committee shall consist of up to seven (7) members of the Board, at least two (2) of which shall be Independent Directors. The purpose of the Human Resources and Compensation Committee is to assist the Board in fulfilling its members-fiduciary duties as they pertain to determining appropriate compensation levels and ensuring that compensation methods are consistent with the Corporation's mission, vision, and values. The Human Resources and Compensation Committee shall assist the Board in developing and implementing compensation strategies, policies and plans that will enhance the Corporation's ability to attract and retain skilled top-level leadership. The Human Resources and Compensation Committee shall assist the Board in developing and implementing compensation policies for Independent Directors.

~~7.2~~—In achieving these objectives, it shall be the responsibility of the Human Resources and Compensation Committee to establish a rebuttable presumption of reasonableness under the Intermediate Sanctions rules for the compensation of all employees who are deemed to be Disqualified Persons as defined under the Internal Revenue Code and any implementing regulations.

7.5 Finance and Audit Committee. The Finance and Audit Committee shall be composed of not less than three (3) and no more than five (5) members of the Board, at least one (1) of which shall be an Independent Director. The Finance and Audit Committee may include a non-Director as a member if the Committee so determines that

financial expertise is needed that is not available among the Directors of the Board. The Finance and Audit Committee must be chaired by a Director of the Board. The Finance and Audit Committee's purpose is to assist the Board in its oversight of the financial affairs of the Corporation, including the financial condition, operating and capital budgeting, external audits, debt structure, debt financing and refinancing, investments, and other significant financial matters. The Finance and Audit Committee shall review all issues involving significant financial transactions prior to final consideration by the Board.

7.6 **Nominating and Governance Committee.** The Nominating and Governance Committee shall consist of up to five (5) members of the Board, at least one (1) of which shall be an Independent Director. The purpose of the Nominating and Governance Committee is to identify and recommend qualified individuals for appointment as Directors as well as assist the Board by reviewing governance documents and recommending modifications as needed.

(a) Independent Director Nominations. The Nominating and Governance Committee shall seek out for nomination Independent Directors from diverse backgrounds, who will contribute to the effective functioning of the Board of Directors and the Corporation by bringing a broad range of industry expertise, viewpoints, experiences, skill sets, and knowledge. If an incumbent Independent Director is not re-nominated, the Nominating and Governance Committee will use reasonable efforts to ensure that diverse candidates are in the pool of potential nominees for the open Independent Director position and may retain an independent consultant to identify individuals qualified and willing to serve as an Independent Director. Independent Director nominations will be recommended to the Members for approval

(b) Sector Director Nominations. The Nominating and Governance Committee shall coordinate with the Sector Members to collect appropriate candidates for the Sector Directors to be recommended to the Members for approval.

(c) Officer and Committee Nominations. The Nominating and Governance Committee shall assist the Board by identifying and recommending appointments for Officers of the Board and for appointments of Board Committees and Board Committee chairs.

(d) Governance Document Review. The Nominating and Governance Committee shall assist the Board in fulfilling its fiduciary duties as they pertain to reviewing the organization's Bylaws and governing policies and procedures and recommending changes as needed.

(e) Fiduciary Duty Training. The Nominating and Governance Committee shall ensure that annual fiduciary duty training is provided to the Board of Directors.

7.7 **Rules for Governance.** Each ~~committee~~Board Committee shall adopt rules for its own governance that are not inconsistent with these Bylaws, rules adopted

by the Board ~~of Directors~~, applicable NERC or FERC rules or regulations, or applicable state or federal laws. Each ~~committee~~Board Committee shall maintain its rules for governance in a written ~~scope document~~charter that is approved by the Board ~~of Directors~~.

7.38 Ad-Hoc ~~Support~~ Committees. The Board or its ~~committees~~Board Committees may, from time to time, appoint ad-hoc committees to research and/or advise it on compliance or technical issues or matters, among other things. Such ad-hoc committees may be formed on an as-needed basis and may vary in makeup depending on the needs of the Board or ~~its committees.~~Board Committees. Committee members of ad-hoc committees need not be Directors unless otherwise stated in the Board resolution creating such committee.

7.9 Support Committees of the Corporation. In addition to Board Committees and ad-hoc committees of the Board, the Board may by resolution create Technical Committees of the Corporation as the Board deems necessary to carry out the purposes of the Corporation. Such Technical Committees shall be representative of members of the Corporation. They shall provide for balanced decision making, and include persons with outstanding technical knowledge and experience. The membership of the Technical Committees shall be determined based upon experience, expertise and the needs of the Board, the Board Committees, or the Corporation. All Technical Committees formed under this Section 7.9 shall be subject to the direction and control of the Board. Each Technical Committee shall adopt rules for its own governance that are not inconsistent with these Bylaws, rules adopted by the Board, applicable NERC or FERC rules or regulations, or applicable state or federal laws. Each Technical Committee shall maintain its rules for governance in a written charter that is approved by the Board.

The Board shall conduct a review of all Committees of the Corporation on an annual basis to ensure that the business of the Corporation is conducted in an efficient, cost-effective manner.

ARTICLE VIII - MISCELLANEOUS

8.1 Conflicts of Interest. All Directors, ~~Alternate Directors, Customer Advisers, Board Advisers,~~ and Board committee representatives shall comply with the Corporation's ~~Standards of Conduct policy~~policies that ~~prohibits~~prohibit conflicts of interest, as such conflicts could cast doubt on the ability of such persons to act with total objectivity with regard to the overall interests of the Corporation.

8.2 Contracts. The Board of Directors may authorize any officer or agent of the Corporation, in addition to the officers so authorized by these Bylaws, to enter into any contract or execute and deliver any instrument in the name of and on behalf of the Corporation, and such authority may be general or confined to specific instances.

~~Approved by the SERC Board of Directors on October 24, 2018~~

~~Approved the NERC Board of Trustees on February 7, 2019~~

~~Approved by the Federal Energy Regulatory Commission on April 30, 2019~~

8.3 **Checks, Drafts, eteor Orders**. All checks, drafts, or orders for the payment of money, notes or other evidences of indebtedness issued in the name of the Corporation, shall be signed by an authorized officer or agent of the Corporation and in such manner as shall from time to time be determined by resolution of the ~~Executive Committee. In the absence of such determination by the Executive Committee, such instruments shall be signed by the Board's Secretary-Treasurer, the Corporation's President, or the Corporation's Finance Director, as stipulated by the Executive Committee. The Corporation's Finance Director may arrange audits of financial records, sign appropriate documents, and perform such duties normally performed by the Board's Secretary-Treasurer, except duties assigned to the Corporation's President.~~Board of Directors.

8.4 **Deposits**. All funds of the Corporation shall be deposited from time to time to the credit of the Corporation in such banks, trust companies, or other depositories as the Corporation's President/Chief Executive Officer may select.

8.5 **Books and Records**. The Corporation shall keep correct and complete books and records of account and shall also keep minutes of the proceedings of the ~~Members, the~~ Board of Directors, and committees having any of the authority of the Board of Directors, and shall keep at its registered or principal office a record giving the names and addresses of the Directors- and Members. All books and records of the Corporation may be inspected by any Director, or agent or attorney representing any Director, for any proper purpose at any reasonable time.

8.6 **Seal**. The corporate seal shall be in circular form and shall have inscribed thereon the name of the Corporation, the words "Corporate Seal", and such other word or words, if any, as may be determined by the Board of Directors to be inscribed thereon.

8.7 **Fiscal Year**. The fiscal year of the Corporation shall begin on the first day of January and end on the last day of December in each year.

~~8.8 **Notice**. With respect to any notice requirements contained in these Bylaws, notice shall be delivered or given either personally, by mail (including U.S. postal service, electronic mail, and any nationally recognized delivery service), or by facsimile. Any notice sent by United States mail shall be deemed to be delivered when deposited in the United States mail with postage thereon prepaid addressed to the notice recipient at the recipient's address as it appears on the records of the Corporation. If notice is provided in person, by electronic mail, or by facsimile, such notice shall be deemed to be delivered when transmitted for delivery to the recipient.~~

~~8.9 **Waiver of Notice**. Whenever any notice is required to be given under the provisions of the North Carolina Nonprofit Corporation Act or under the provisions of the articles of incorporation or the Bylaws of the Corporation, a waiver thereof in writing~~

signed by the person or persons entitled to such notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice.

8.10 **Policies and Procedures.** The Directors shall execute and abide by the conflicts of interest policy as may be adopted and amended from time to time by the Board of Directors. The officers of the Corporation and Directors shall abide by such other policies and procedures as may be adopted from time to time by the Board of Directors.

ARTICLE IX - EXPENSES

9.1 **Allocation of Specific Expenses.** The expenses of Directors and Board Officers shall be borne by that person's regular employer.— except for expenses of Independent Directors related to their duties associated with the Board of Directors. Expenses of Independent Directors shall be reimbursable subject to these Amended and Restated Bylaws and the Board's policy as may be amended from time to time, if any.

9.2 **Statutory Functions.** The Corporation anticipates that as a general rule all of its expenses shall be incurred in the furtherance of statutory activities pursuant to Section 215 of the Federal Power Act, and that all such expenses shall be funded by NERC, subject to FERC approval.

9.3 **Non-Statutory Functions.** —Notwithstanding Section 9.2, the Board of Directors may from time to time authorize the Corporation to participate in non-statutory activities (i.e., activities not described in Section 215 of the Federal Power Act). —In the event that the Corporation proposes to engage in non-statutory activities, such activities shall be identified in the Corporation's annual business plan that is submitted to NERC and, if approved by NERC, shall be submitted to FERC for approval in advance of engaging in such non-statutory activities. —The expenses incurred by the Corporation for any such approved non-statutory activities shall be allocated by the Board of Directors to the beneficiaries of such activities on a basis proposed in the business plan submitted for NERC and FERC approval.

ARTICLE X - DISPUTE RESOLUTION PROCESS

10.1 **Dispute Resolution.** All disputes regarding non-compliance with Reliability Standards shall be handled in accordance with the NERC Rules of Procedure. The organizational units of the Corporation shall deal with all other disputes within the framework of their respective organizations. For such other disputes, Member Companies of the Corporation are encouraged to utilize the appropriate Dispute Resolution Process within the Corporation prior to seeking resolution at NERC, FERC, or with legal counsel.

~~Approved by the SERC Board of Directors on October 24, 2018~~

~~Approved the NERC Board of Trustees on February 7, 2019~~

~~Approved by the Federal Energy Regulatory Commission on April 30, 2019~~

ARTICLE XI - DISSOLUTION

11.1 **Dissolution.** The Corporation may be voluntarily dissolved upon unanimous consent of the Board of Directors to recommend dissolution followed by approval by the Members of the Board's recommendation, and in accordance with Section 55A-14-02 of the North Carolina Nonprofit Corporation Act, as amended from time to time.

11.2 **Distribution of Assets.** Upon dissolution of the Corporation as provided in Section 11.1, the residual assets, after payment of all just obligations, shall be distributed exclusively to organizations which are exempt from federal income tax under Section 501(c)(6) of the Internal Revenue Code of 1986, or corresponding provisions of any subsequent federal tax laws, as the Board of Directors shall determine.

ARTICLE XII - ~~WAIVER OF NOTICE~~

~~12.1 **Waiver.** Whenever any notice is required to be given under the provisions of the North Carolina Nonprofit Corporation Act or under the provisions of the articles of incorporation or the Bylaws of the Corporation, a waiver thereof in writing signed by the person or persons entitled to such notice, whether before or after the time stated therein, shall be deemed equivalent to the giving of such notice.~~

ARTICLE XIII - ~~INDEMNIFICATION~~

~~1312.1 **Indemnification of Directors, Alternate Directors, Customer Advisors, Board Advisors, Committee Members, Officers, Employees and Agents.** Every person who is, or has served as, a Director, ~~Alternate Director, Customer Advisor, Board Advisor,~~ committee member, Officer, employee, or agent of the Corporation shall be indemnified by the Corporation in the manner and to the extent authorized by the North Carolina Nonprofit Corporation Act. The foregoing rights of indemnification shall be without prejudice to any other rights to which any such Director, ~~Alternate Director, Customer Advisor, Board Advisor,~~ committee member, Officer, employee, or agent may be entitled as a matter of law.~~

ARTICLE ~~XIV~~XIII - AMENDMENT OF THE BYLAWS AND ARTICLES OF INCORPORATION

~~44~~13.1 **Amendment of Process.** Any proposal to amend the **Bylaws and** Articles of Incorporation. ~~After a request by twenty percent (20%) of the Board of Directors or Bylaws (an affirmative vote of the Executive Committee, a proposal to amend the Bylaws or the Articles of Incorporation shall~~ "Amendment") shall first be put before the Board of Directors at any regular or special meeting for a vote: to recommend such Amendment to the Members. Copies of the proposed ~~amendments~~ Amendment shall be distributed to the Board of Directors at least thirty (30) calendar days before the meeting at which they are to be considered. ~~An amendment to~~ A recommendation that the Bylaws or Members approve the Articles of Incorporation Amendment shall be ~~adopted after being~~ approved by ~~a Supermajority vote at~~ least two-thirds (2/3) of the Board of Directors, provided that a quorum is present. ~~Upon approval of the recommendation by the Board, the Members may approve the recommended Amendment at any regular or special meeting.~~ Copies of the proposed Amendment shall be distributed to the Members at least thirty (30) calendar days before the Meeting of the Members at which they are to be considered. An Amendment recommended by the Board of Directors shall be adopted and proposed to the NERC Board of Trustees for approval after being approved by at least two-thirds (2/3) of the Members, provided that a quorum of the Members is present.

13.2 Board Amendment of Bylaws. Notwithstanding the Members reserved power in Section 4.7 or the amendment process outlined in Section 13.1, upon the passage of any federal electric reliability legislation, and/or the adoption of any rules or regulations of FERC, NERC or other governmental entity with jurisdiction, the Board shall have authority to amend these Bylaws as necessary and appropriate to comply with such law, legislation, rules and regulations.

ReliabilityFirst Bylaws Amendments

Action

Approve proposed amendments to the Bylaws of ReliabilityFirst (“Bylaws”) and file with the Applicable Governmental Authority for approval. The proposed amendments to the ReliabilityFirst Bylaws do not affect ReliabilityFirst’s qualifications or ability to function as a Regional Entity under its Regional Delegation Agreement with the North American Electric Reliability Corporation (“NERC”).

Background

ReliabilityFirst is proposing amendments to its Bylaws to address the NERC Board of Trustees’s inquiry on governance independence principles. In developing the proposed Bylaw amendments, ReliabilityFirst used the Independence Principles for Regional Entities (“Independence Principles”) that were developed by the NERC Board of Trustees as guiding principles. The proposed amendments were approved by ReliabilityFirst’s Board of Directors on August 22, 2019.

The proposed changes to ReliabilityFirst’s governance and oversight guidelines are:

1. Modifying the CEO and Independent Director compensation approval process.
2. Appointing a Lead Independent Director to serve along with an appointed stakeholder chair and vice-chair.
3. Implementing term limits for Board directors.
4. Appointing the ReliabilityFirst CEO as a non-voting ex officio member of the Board.
5. Setting limitations on outside board participation by Board directors.

The limitation on outside board participation by Board directors does not require ReliabilityFirst Bylaws changes to implement and, therefore, is not included in the proposed redlines. Rather, it will be implemented through amendments to ReliabilityFirst’s policies and guidelines. Currently, there is no limitation on the number of outside boards on which a Board director may serve, but in the interest of adopting best practices, and ensuring the full participation of all Board members, the Board has proposed to require directors to disclose their outside board participation, and seek Board approval to serve on more than five outside boards.

Description of Proposed Amendments

Article VII- Board of Directors

- *Section 7.2(h) – Management of Corporation*

Under the current Bylaws, the ReliabilityFirst Board has appointed stakeholder directors to serve as the Board chair. A stakeholder chair provides the ReliabilityFirst Board and management team with context, focus and industry expertise, which facilitates enhanced board engagement and oversight.

The proposed amendment will establish that the ReliabilityFirst Board will select, on an annual basis, a chair, vice chair and a Lead Independent Director, each with duties as specified in accordance with ReliabilityFirst's governance guidelines. The Lead Independent Director will be rotated amongst the Board's independent directors. A Lead Independent Director can provide balanced leadership between stakeholder and independent directors, as well as, provide a leadership role in those instances where a stakeholder chair is conflicted out of a Board-related matter. This proposal is consistent with the Independence Principles.

- *Section 7.4(a) – Composition of the Board*

Under the current Bylaws, the CEO's input and interaction with the ReliabilityFirst Board is informal.

The proposed amendment will provide for the appointment of the ReliabilityFirst CEO as a non-voting ex officio member of the ReliabilityFirst Board to provide continued meaningful participation and interaction on Board matters. The non-voting status avoids the appearance, or creation, of conflicts in sensitive matters. It also explicitly carves out the CEO's participation in ReliabilityFirst Board matters that are directly related to the CEO's performance, contract and/or compensation matters.

- *Section 7.5 – Terms of Directors*

Under the current Bylaws, ReliabilityFirst does not have term limits for ReliabilityFirst Board directors.

The proposed amendment will implement term limits for ReliabilityFirst Board directors, which will limit a director's eligibility to four consecutive three year terms. It provides for an allowance of a one term discretionary exception in the event that the Board deems it necessary to retain a specific Board director. The term limit will ensure that the Board retains skilled and valuable Board directors while allowing for new Board Directors on a periodic basis.

- *Section 7.10.1 – Board Action*

Under the current Bylaws, ReliabilityFirst's Board Compensation Committee is comprised of both stakeholder directors and an independent director, who recommend CEO compensation to the Board. ReliabilityFirst approves CEO compensation through a majority vote by the Board.

The proposed amendment will establish a new ReliabilityFirst Board voting structure to approve CEO Compensation, whereby an affirmative vote by all independent directors and a majority of stakeholder directors is required. This ensures that there is no stakeholder conflict of interest when it comes to recommending and adopting CEO compensation. This practice is consistent with the Independence Principles.



RELIABILITY FIRST

AMENDED AND RESTATED BYLAWS

OF

ReliabilityFirst Corporation
a Delaware nonprofit corporation

Adopted December 19, 2006

Amended September 21, 2007¹

Amended December 6, 2007²

Amended May 22, 2008³

Amended December 4, 2008⁴

Amended December 1, 2011⁵

Amended August 17, 2012⁶

Amended May 15, 2019⁷

¹ Section 5.9.2

² Sections 1.2, 1.26, 16.1

³ Sections 1.12, 7.13, 7.14

⁴ Sections 5.8, 6.8, 6.9, 6.10.2, 6.10.4, 7.4, 7.5, 7.7, 7.9, 7.11, 7.13

⁵ Sections 1.24, 2.2, 6.8, 7.4, 7.7

⁶ Sections 2.1, 2.2

⁷ Section 7.14

TABLE OF CONTENTS

ARTICLE I. DEFINITIONS	- 1 -
Section 1.1. Act.....	- 1 -
Section 1.2. Adjunct Member	- 1 -
Section 1.3. Affiliate	- 1 -
Section 1.4. Associate Member	- 1 -
Section 1.5. Board.....	- 1 -
Section 1.6. Bulk Power System.....	- 1 -
Section 1.7. Certificate of Incorporation.....	- 1 -
Section 1.8. Commission.....	- 2 -
Section 1.9. Delegation Agreement.....	- 2 -
Section 1.10. Electronic Transmission	- 2 -
Section 1.11. ERO.....	- 2 -
Section 1.12. Hearing Body.. ..	- 2 -
Section 1.13. Industry Sector.....	- 2 -
Section 1.14. Large LSEs.....	- 2 -
Section 1.15. Medium LSEs.....	- 2 -
Section 1.16. Members.....	- 2 -
Section 1.17. NERC	- 2 -
Section 1.18. NERC Rules.....	- 3 -
Section 1.19. Net Energy for Load.....	- 3 -
Section 1.20. Person.....	- 3 -
Section 1.21. Region.....	- 3 -
Section 1.22. Regional Entity.....	- 3 -
Section 1.23. Regional Variance.....	- 3 -
Section 1.24. Regional Reliability Standard	- 3 -
Section 1.25. Regular Member.....	- 3 -
Section 1.26. Regulatory Participant	- 4 -
Section 1.27. Related Party	- 4 -
Section 1.28. Reliability Coordinator	- 4 -
Section 1.29. Reliability Standard	- 4 -
Section 1.30. Reliable Operation	- 4 -
Section 1.31. RTOs	- 4 -
Section 1.32. Small LSEs.....	- 4 -
Section 1.33. Suppliers.....	- 5 -
Section 1.34. Transmission Companies	- 5 -
ARTICLE II. PURPOSE AND ACTIVITIES	- 5 -
Section 2.1. Purpose.....	- 5 -
Section 2.2. Activities.....	- 5 -
Section 2.3. Not-for-Profit Corporation.....	- 6 -
ARTICLE III. POWERS	- 6 -
Section 3.1. Powers	- 6 -
ARTICLE IV. OFFICES	- 7 -
Section 4.1. Principal Office.....	- 7 -
ARTICLE V. MEMBERS	- 7 -

Section 5.1.	General	- 7 -
Section 5.2.	Classes of Members	- 7 -
5.2.1	Regular Members.....	- 7 -
5.2.2	Associate Members	- 7 -
5.2.3	Adjunct Members	- 7 -
Section 5.3.	Qualifications of Members	- 7 -
Section 5.4.	Admission of Members.....	- 7 -
Section 5.5.	Voting Rights.....	- 8 -
Section 5.6.	Transfer of Membership	- 8 -
Section 5.7.	Obligations of Members	- 8 -
Section 5.8.	Withdrawal.....	- 8 -
Section 5.9.	Funding and Dues.....	- 8 -
5.9.1	NERC Funding.....	- 8 -
5.9.2	Application Fee, User-Fees and Other Charges.....	- 9 -
Section 5.10.	Penalties	- 9 -
ARTICLE VI. MEETING OF MEMBERS		- 9 -
Section 6.1.	Annual Meeting of Members	- 9 -
Section 6.2.	Special Meetings of Members.....	- 9 -
Section 6.3.	Location of Meetings of Members	- 10 -
Section 6.4.	Notice of Meetings	- 10 -
6.4.1	Notice Requirements	- 10 -
6.4.2	Waiver of Notice; Objections	- 10 -
Section 6.5.	Record Date	- 10 -
Section 6.6.	Right to Vote; Act of Members	- 10 -
6.6.1	Industry Sector Voting	- 11 -
6.6.2	Act of Members.....	- 11 -
6.6.3	Special Voting Requirements.....	- 11 -
Section 6.7.	Quorum	- 11 -
Section 6.8.	Action by Written Ballot	- 11 -
Section 6.9.	Action by Electronic Communication	- 11 -
Section 6.10.	Member Representatives; Proxies	- 12 -
6.10.1	Designation of Representative.....	- 12 -
6.10.2	Authorization	- 12 -
6.10.3	Effective Period.....	- 12 -
6.10.4	Revocation.....	- 12 -
Section 6.11.	Public Notice of Member Meetings.....	- 12 -
Section 6.12.	Posting of Minutes.....	- 13 -
Section 6.13.	Reimbursement of Member Expenses	- 13 -
ARTICLE VII. BOARD OF DIRECTORS.....		- 13 -
Section 7.1.	General	- 13 -
Section 7.2.	Management of Corporation.....	- 13 -
Section 7.3.	Voting	- 13 -
Section 7.4.	Composition of the Board	- 13 -
Section 7.5.	Terms of Directors.....	- 15 -
Section 7.6.	Reimbursement	- 15 -
Section 7.7.	Resignations; Vacancies.....	- 15 -

Section 7.8.	Meetings; Notice; Waiver	- 16-
Section 7.9.	Quorum	- 17-
Section 7.10.	Board Action.....	- 17 -
Section 7.11.	Action Without a Meeting	- 17-
Section 7.12.	Action by Electronic Communication	- 17-
Section 7.13.	Board Committees	- 18-
Section 7.14.	Hearing Body	- 18-
7.14.1	Quorum	- 18-
7.14.2	Voting	- 18-
Section 7.15.	Public Notice of Board Meetings.....	- 18 -
Section 7.16.	Posting of Minutes-	18 -
Section 7.17.	Compensation of Directors	- 19-
ARTICLE VIII.	ORGANIZATIONAL GROUPS.....	- 19 -
Section 8.1.	Establishment of Organizational Groups.....	- 19 -
Section 8.2.	Reimbursement	- 19-
ARTICLE IX.	OFFICERS	- 19 -
Section 9.1.	Officers.....	- 19 -
Section 9.2.	Election and Term of Office	- 19 -
Section 9.3.	Removal.....	- 20 -
Section 9.4.	Vacancies	- 20-
Section 9.5.	President.....	- 20 -
Section 9.6.	Vice Presidents.....	- 20 -
Section 9.7.	Secretary	- 20 -
Section 9.8.	Treasurer	- 21 -
ARTICLE X.	CERTIFICATES OF MEMBERSHIP	- 21 -
Section 10.1.	Certificates of Membership.....	- 21 -
ARTICLE XI.	BOOKS AND RECORDS.....	- 21 -
Section 11.1.	Books and Records; Financial Statements	- 21-
ARTICLE XII.	FISCAL YEAR	- 21 -
Section 12.1.	Fiscal Year.....	- 21 -
ARTICLE XIII.	TRANSFER OF ASSETS	- 22 -
Section 13.1.	Member Approval Not Required	- 22-
Section 13.2.	Member Approval Required.....	- 22 -
ARTICLE XIV.	CONTRACTS, CHECKS, DEPOSITS, AND GIFTS.....	- 22 -
Section 14.1.	Contracts	- 22 -
Section 14.2.	Checks, Drafts, or Orders	- 22-
Section 14.3.	Deposits	- 22-
Section 14.4.	Gifts	- 22-
ARTICLE XV.	INSURANCE, LIMITATION ON LIABILITY AND INDEMNIFICATION -	23 -
Section 15.1.	Insurance	- 23-
Section 15.2.	Limitations on Liability	- 23-
Section 15.3.	Right to Indemnification.....	- 23 -
15.3.1	Indemnified Persons	- 23-

15.3.2	Denial of Authorization for Certain Proceedings	- 23 -
15.3.3	Certain Defined Terms	- 24 -
15.3.4	Expenses	- 24 -
15.3.5	Protection of Rights.....	- 24 -
15.3.6	Miscellaneous	- 25 -
ARTICLE XVI. TRANSITION.....		- 26 -
Section 16.1.	Transition Standards.....	- 26 -
ARTICLE XVII. PARTICIPATION BY REGULATORY PARTICIPANTS.....		- 26 -
Section 17.1.	Regulatory Participants	- 26 -
ARTICLE XVIII. BUDGET AND BUSINESS PLAN		- 26 -
Section 18.1.	Budget and Business Plan.....	- 26 -
ARTICLE XIX. AMENDMENT OF BYLAWS.....		- 27 -
Section 19.1.	Amendment Of Bylaws.....	- 27 -

**AMENDED AND RESTATED
BYLAWS OF
ReliabilityFirst Corporation
a Delaware nonprofit corporation
(the “Corporation”)**

[As adopted by the Members on December 19, 2006,
amended by the Board of Directors on September 21, 2007,
amended by the Members on December 6, 2007,
amended by the Board of Directors on May 22, 2008,
amended by the Members on December 4, 2008,
amended by the Members on December 1, 2011,
and amended by the Members on August 17, 2012]

**ARTICLE I.
DEFINITIONS**

Section 1.1. Act. “Act” shall mean Section 215 of the Federal Power Act (16 U.S.C. §824n).

Section 1.2. Adjunct Member. “Adjunct Member” shall mean any entity that does not qualify to join an Industry Sector but has been approved for membership. Adjunct Members may include Regulatory Participants.

Section 1.3. Affiliate. “Affiliate” shall mean, with respect to any entity, any other entity that, directly or indirectly, through one or more intermediaries, controls, or is controlled by, or is under common control with, such entity, as determined in the sole discretion of the Board of the Corporation. For this purpose, “control” may be presumed by the direct or indirect ownership of ten percent (10%) or more of the outstanding voting capital stock or other equity interests having ordinary voting power.

Section 1.4. Associate Member. “Associate Member” shall mean any entity that has joined an Industry Sector and is an Affiliate or Related Party of a Regular Member.

Section 1.5. Board. “Board” shall mean the Board of Directors of the Corporation.

Section 1.6. Bulk Power System. “Bulk Power System” shall mean facilities and control systems necessary for operating an interconnected electric energy transmission network (or any portion thereof) and electric energy from generation facilities needed to maintain transmission system reliability, but does not include facilities used in the local distribution of electricity.

Section 1.7. Certificate of Incorporation. “Certificate of Incorporation” shall mean the Certificate of Incorporation of the Corporation filed with the Delaware Secretary of State, as from time to time amended.

Section 1.8. Commission. “Commission” shall mean the Federal Energy Regulatory Commission.

Section 1.9. Delegation Agreement. “Delegation Agreement” shall mean the delegation agreement, as supplemented or amended from time to time, between NERC and the Corporation pursuant to which NERC has delegated its authority to the Corporation to propose and enforce Reliability Standards within the Region.

Section 1.10. Electronic Transmission. “Electronic transmission” shall mean any form of communication, not directly involving the physical transmission of paper, that creates a record that may be retained, retrieved and reviewed by a recipient thereof, and that may be directly reproduced in paper form by such a recipient through an automated process.

Section 1.11. ERO. “ERO” shall mean the electric reliability organization established under the Act to enforce Reliability Standards applicable to all owners, operators and users of the Bulk Power System in North America.

Section 1.12. Hearing Body. “Hearing Body” shall mean a group established with authority to conduct and render decisions in a formal compliance hearing of an entity registered in the NERC compliance registry who is the subject of a notice of alleged violation, proposed penalty or sanction, contested mitigation plan or contested remedial action directive.

Section 1.13. Industry Sector. “Industry Sector” shall mean a group of Bulk Power System owners, operators or users in the Region with substantially similar interests as pertinent to the purposes and operations of the Corporation of the Bulk Power System. The Industry Sectors shall consist of the following: (1) Suppliers, (2) Transmission Companies, (3) RTOs, (4) Small LSEs, (5) Medium LSEs, and (6) Large LSEs.

Section 1.14. Large LSEs. “Large LSEs” shall mean entities that serve, or whose Related Parties serve, end use load with annual energy delivery to such load in the Region of 50,000 GWh or greater.

Section 1.15. Medium LSEs. “Medium LSEs” shall mean entities that serve, or whose Related Parties serve, end use load with annual energy delivery to such load in the Region between 10,000 GWh and 50,000 GWh.

Section 1.16. Members. “Members” shall mean Regular Members, Associate Members and Adjunct Members.

Section 1.17. NERC. “NERC” shall mean the North American Electric Reliability Corporation, or any successor entity, which has been certified by the Commission as the ERO pursuant to the Act to establish and enforce Reliability Standards for the Bulk Power System.

Section 1.18. NERC Rules. “NERC Rules” shall mean the NERC Rules of Procedure as approved by the Commission.

Section 1.19. Net Energy for Load. “Net Energy for Load” shall mean net generation of an electric system plus energy received from others less energy delivered to others through interchange. It includes system losses, but excludes energy required for storage of energy at energy storage facilities. Calculations of net energy for load for all purposes under these Bylaws shall be based on the most recent calendar year for which data on net energy for load of the Region is available.

Section 1.20. Person. “Person” shall mean a natural person, corporation, cooperative, partnership, association, or other private or public entity.

Section 1.21. Region. “Region” shall mean the geographic boundaries of the Corporation described in the Delegation Agreement.

Section 1.22. Regional Entity. “Regional Entity” shall mean any entity with which NERC has entered into a delegation agreement to delegate, or which the Commission or a governmental authority in Canada or Mexico has directly assigned, enforcement authority for reliability standards for the Bulk Power System in a defined geographic area of North America.

Section 1.23. Regional Variance. “Regional Variance” shall mean an aspect of a Reliability Standard that applies only within a particular Regional Entity or group of Regional Entities. A Regional Variance may be used to qualify how a particular Regional Entity or Regional Entities achieves the objectives of a Reliability Standard or may establish different measures or performance criteria as necessary to achieve reliability within the particular Regional Entity or group of Regional Entities. A Regional Variance may not be inconsistent with any Reliability Standard as it would otherwise exist without the Regional Variance. Such a Regional Variance may be proposed by a Regional Entity and, if adopted by NERC and approved by the Commission, shall be enforced within the applicable Regional Entity or Regional Entities pursuant to delegated authority.

Section 1.24. Regional Reliability Standard. “Regional Reliability Standard” shall mean a type of Reliability Standard that is applicable only within a particular Regional Entity or group of Regional Entities. A Regional Reliability Standard may augment, add detail to, or implement another Reliability Standard or cover matters not addressed by other Reliability Standards. A Regional Reliability Standard is not binding upon any Member or Registered Entity, nor is it effective or enforceable, until the Regional Reliability Standard has been adopted by NERC and approved by the Commission as a Reliability Standard within the applicable Regional Entity or Regional Entities pursuant to delegated authorities.

Section 1.25. Regular Member. “Regular Member” shall mean any entity that has joined an Industry Sector that either (i) has no Affiliates or Related Parties that are Members or (ii) is the entity designated to be the Regular Member by any related group of Associate Members.

Section 1.26. Regulatory Participant. “Regulatory Participant” shall mean any state, District of Columbia or any provincial regulatory agency in the Region exercising authority over the rates, terms or conditions of electric service of an entity other than itself within the Region, or the planning, siting, construction or operation of electric facilities of an entity other than itself within the Region, as well as the Commission, regional advisory bodies that may be established by the Commission, or any federal regulator or agency or any entity authorized by any state, the District of Columbia or any province to represent utility consumers.

Section 1.27. Related Party. “Related Party” shall mean, solely for purposes of the governance provisions of these Bylaws, any entity that is registered as part of another entity or is registered for other entities in the NERC Compliance Registry. For purposes of these Bylaws, a representative of a state or federal government agency shall not be deemed a Related Party with respect to each other, and a public body’s regulatory authority, if any, over a Member shall not be deemed to make it a Related Party with respect to that Member.

Section 1.28. Reliability Coordinator. “Reliability Coordinator” shall mean any entity that is recognized as a reliability coordinator by NERC in the Region that does not otherwise qualify as a Transmission Company or RTO.

Section 1.29. Reliability Standard. “Reliability Standard” shall mean a requirement to provide for Reliable Operation of the Bulk Power System, including, without limitation, the foregoing requirements for the operation of existing Bulk Power System facilities, including cyber security protection, and the design of planned additions or modifications to such facilities to the extent necessary for reliable operation of the Bulk Power System, but shall not include any requirement to enlarge Bulk Power System facilities or to construct new transmission capacity or generation capacity.

Section 1.30. Reliable Operation. “Reliable Operation” shall mean operating the elements of the Bulk Power System within equipment and electric system thermal, voltage and stability limits so that instability, uncontrolled separation, or cascading failure of the Bulk Power System will not occur as a result of a sudden disturbance, including a cyber security incident, or unanticipated failure of system elements.

Section 1.31. RTOs. “RTOs” shall mean PJM Interconnection L.L.C. and Midwest Independent Transmission System Operator, Inc., or such other entity that has been recognized by the Commission as a regional transmission operator or recognized functional equivalent in the Region.

Section 1.32. Small LSEs. “Small LSEs” shall mean (i) owners or operators of entities (or their representatives) that serve, or whose Related Parties serve, end use load with annual energy delivery to such load in the Region of 10,000 GWh or less, and (ii) end-use customers interconnected with the Bulk Power System with load of at least 100 MW at one location in the Region.

Section 1.33. Suppliers. "Suppliers" shall mean owners or operators of electric generation connected to the transmission system and wholesale power marketers in the Region.

Section 1.34. Transmission Companies. "Transmission companies" shall mean (i) owners (or those with ownership entitlement), planners and operators of transmission facilities included in the Bulk Power System in the Region and (ii) Reliability Coordinators.

ARTICLE II. PURPOSE AND ACTIVITIES

Section 2.1. Purpose. The business or purposes to be conducted or promoted by the Corporation are:

- (a) to be a Regional Entity and exercise enforcement authority for Reliability Standards for the Bulk Power System in the Region pursuant to the Delegation Agreement;
- (b) to carry out certain of NERC's activities that are in furtherance of NERC's responsibilities as the ERO under the Act or in support of delegated functions, as specified in the NERC Rules or the Delegation Agreement; and
- (c) to engage in any other lawful act or activity for which not for profit corporations may be organized under the Delaware General Corporation Law.

The Corporation shall be exempt from federal income taxation pursuant to Section 501(c) of the Internal Revenue Code of 1986, as amended (hereinafter the "Code") as an organization described in Section 501(c)(3) of the Code. The Corporation shall not engage directly or indirectly in any activity which would invalidate its status as an organization exempt from taxation under Section 501(a) of the Code as an organization described in Section 501(c)(3) of the Code. No part of the net income to the Corporation shall inure to the benefit of or be distributed to its directors, officers, members or other private persons, except that the Corporation shall be authorized and empowered to pay reasonable compensation for services actually rendered.

Section 2.2. Activities. In support and furtherance of its purpose, and in accordance with and at all times subject to the NERC Rules and the Delegation Agreement, the Corporation's responsibilities shall include, but not be limited to, the following:

- (a) Reliability Standards. The Corporation shall:
 - (1) propose Reliability Standards, Regional Variances or modifications thereof to NERC; and

(2) develop Regional Reliability Standards through the Corporation's standards development procedure.

(b) Enforcement. The Corporation shall enforce Reliability Standards (including Regional Variances) within the Region through the Corporation's compliance enforcement program.

(c) Delegation-Related Services. The Corporation, on behalf of NERC, shall carry out certain of NERC's activities that are in furtherance of NERC's responsibilities as the ERO under the Act or in support of delegated functions, including:

- (1) Organization registration and certification.
- (2) Reliability readiness audit and improvement.
- (3) Reliability assessment and performance analysis.
- (4) Training and education.
- (5) Situational awareness and infrastructure security.

(d) Budget. The Corporation shall prepare and submit a budget to NERC for the amount of costs the Corporation will incur in support of delegated functions that are in furtherance of NERC's responsibilities as the ERO under the Act.

(e) Non-delegated Functions. The Corporation may conduct such other activities for or on behalf of the Members that are not delegated to the Corporation by NERC under the Delegation Agreement if authorized by the Board and not inconsistent with the Act, NERC Rules, Section 501(c)(3) of the Internal Revenue Code, the Delegation Agreement or these Bylaws.

Section 2.3. Not-for-Profit Corporation. The Corporation is operated as a Delaware non-stock nonprofit corporation and is organized pursuant to the general corporation law of the State of Delaware.

ARTICLE III. POWERS

Section 3.1. Powers. The Corporation shall have the power to engage in any lawful act or activity for which corporations may be organized under the general corporation law of the State of Delaware, subject to any limitations provided in applicable federal, provincial or state law or in the Certificate of Incorporation or these Bylaws.

ARTICLE IV. OFFICES

Section 4.1. Principal Office. The principal office of the Corporation shall be located initially within the Region, at such location as the Board may from time to time determine, giving consideration to the total cost to the Corporation and convenience of travel for staff, Members and Regulatory Participants. Once established, the principal office may remain in its location, even if outside the Region.

ARTICLE V. MEMBERS

Section 5.1. General. The terms and conditions of membership in the Corporation shall be as provided in the Certificate of Incorporation and these Bylaws if not inconsistent therewith. All Regular Members and Associate Members shall be required to join a single Industry Sector.

Section 5.2. Classes of Members. The Corporation shall have three (3) classes of Members: Regular Members, Associate Members and Adjunct Members.

5.2.1 Regular Members. Except as set forth in Sections 5.5 and 6.5 of these Bylaws, Regular Members shall have the right to vote on all matters within their Industry Sector. Regular Members shall have all the rights and obligations of being a Member in the Corporation.

5.2.2 Associate Members. Associate Members shall not be entitled to vote within their Industry Sector or for any other purpose as a Member. Associate Members shall otherwise have all the rights and obligations of being a Member in the Corporation.

5.2.3 Adjunct Members. Adjunct Members shall not be entitled to vote for any purpose as a Member. Adjunct Members shall otherwise have all the rights of being a Member in the Corporation.

Section 5.3. Qualifications of Members. Any entity eligible to join an Industry Sector may be a Regular Member or Associate Member of the Corporation. Any entity not eligible to join an Industry Sector may be an Adjunct Member of the Corporation.

Section 5.4. Admission of Members. New Members may join the Corporation upon submittal of an application, in a form approved by the Board, and upon payment of such fees or charges, if any, as may be established by the Board or required by NERC. Each Regular Member and Associate Member shall designate the Industry Sector it wishes to join. A Regular Member and Associate Member may change its Industry Sector designation once each calendar year upon notice to the Corporation. Such notice must be provided to the Secretary of the Corporation at least sixty (60) days before an annual or other meeting of Members if the change is to be effective for such meeting. The President shall review a membership application and may request demonstration by the applicant that it qualifies for membership in a particular Industry Sector. Any dispute with respect to a Regular Member's or Associate Member's

qualifications for a particular Industry Sector shall be resolved by the Board. The President shall have authority to approve an application for membership, subject to review by the Board.

Section 5.5. Voting Rights. Each Regular Member in good standing shall be entitled to one vote in the Industry Sector in which it belongs on all matters submitted to a vote of Members. The Board may suspend voting rights for a Regular Member delinquent by more than 60 days in payment of any penalties or because of the Regular Member's failure to meet other obligations to the Corporation. Except with respect to the election of Industry Sector directors as described elsewhere in the Certificate of Incorporation and these Bylaws, matters properly brought before the Members at an annual or special meeting shall be acted upon by the Industry Sectors voting together as a single class. The vote of each Industry Sector shall be split into an affirmative component based on votes for the matter(s) presented, and a negative component based on votes against the matter(s) presented, in direct proportion to the votes cast within the Industry Sector for and against the matter presented, rounded to two decimal places. If authorized in advance by the Board, voting may be held electronically under such terms and conditions as are approved by the Board.

Section 5.6. Transfer of Membership. A Member of the Corporation may not transfer its membership or a right arising from it except to any Person succeeding to all or substantially all of the assets of the Member. If challenged, the President shall have authority to approve any such transfer, subject to review by the Board.

Section 5.7. Obligations of Members. By applying for and becoming a Regular or Associate Member of the Corporation, each Member agrees to comply with all Reliability Standards, all NERC standards and requirements, and the other obligations of Members of the Corporation set forth in these Bylaws or duly adopted by the Board in order to achieve the purposes of the Corporation. A Regular or Associate Member also agrees to obligate all of its Affiliates that have an impact on reliability in the Region to comply with all Reliability Standards and NERC standards and requirements. These obligations include but are not limited to: (a) obligations to provide data and information needed to perform the functions of the Corporation, (b) payment of any authorized penalties resulting from non-compliance with Reliability Standards, (c) in the case of Regular Members, electing the Board, and (d) providing qualified candidates to serve on organizational working groups. Adjunct Members agree to provide data and information needed to perform the functions of the Corporation.

Section 5.8. Withdrawal. A Member may withdraw from participation in the Corporation upon notice given in writing or by electronic transmission to the Corporation. Such notice shall specify a date, not earlier than thirty (30) days from the date of notice, on which the withdrawal shall become effective.

Section 5.9. Funding and Dues.

5.9.1 NERC Funding. In accordance with and at all times subject to the NERC Rules and the Delegation Agreement, the Corporation shall equitably allocate its dues, fees and other charges for the delegated functions conducted by the Corporation

among all end users. The Corporation shall submit to NERC annually a list of all load-serving entities within the Region. NERC will bill all load-serving entities in the Region for the Corporation's costs for the delegated functions based on Net Energy for Load and be responsible for collection.

5.9.2 Application Fee, User-Fees and Other Charges. The Corporation may charge a nominal fee, which shall be determined by the President, for the submission of applications for membership. The Board of Directors may from time to time fix the amount of user-fees or other charges, if any, for activities that are not delegated to the Corporation by NERC under the Delegation Agreement and determine the methods of collection from entities that choose to participate in such activities.

Section 5.10. Penalties. If the Corporation initiates an investigation that leads to the imposition of a penalty, the Corporation shall receive any penalty monies that results from the investigation. All monies which the Corporation collects from the issuance of penalties shall be applied as a general offset to the Corporation's budget requirements for the subsequent fiscal year. Funds from financial penalties shall not be directly applied to any program maintained by the Corporation.

ARTICLE VI. MEETING OF MEMBERS

Section 6.1. Annual Meeting of Members. The Members shall hold an annual meeting in December of each year, or at such other time specified by the Board. At the annual meeting of Members: (i) each Industry Sector shall elect the successor(s), if any, for any director(s) from their Industry Sector whose term will expire before the next annual meeting of the Members, provided however, that any Industry Sector may elect a successor director representing such Industry Sector prior to such annual meeting, in accordance with the provisions of this Article VI, in which case the election of such succeeding director(s) shall be reported to the Corporation at such annual meeting; (ii) the President and Treasurer shall report on the activities and financial condition of the Corporation; (iii) the Industry Sectors shall elect a slate of at-large and independent directors to fill vacancies or expiring terms; and (iv) the Industry Sectors shall consider and act upon such other matters as are consistent with the notice of the annual meeting. The failure to hold an annual meeting in accordance with these Bylaws shall not affect the validity of a corporate action.

Section 6.2. Special Meetings of Members. Special meetings of the Members may be called by six (6) directors on the Board, by the President, or by Members if at least ten percent (10%) of the Regular Members sign, date, and deliver to the President one or more written demands for a special meeting describing the purpose for which it is to be held. Within fifteen (15) days after receipt of a demand for a special meeting from Regular Members, the President shall cause a special meeting to be called and held on notice in accordance with Section 6.4 of these Bylaws. If the President fails to cause a special meeting to be called and held as required by this Section 6.2, a Regular Member making the demand may call the meeting by giving notice under Section 6.4. In either event, notice of the meeting and the costs of the meeting shall be at the expense of the Corporation. The business transacted at a special meeting is limited to

the purposes stated within the notice of the meeting. Business transacted at a special meeting that is not included in those stated purposes is voidable by or on behalf of the Corporation, unless ninety percent (90%) of the Regular Members entitled to vote were present at such meeting or have waived notice of the meeting under Section 6.4.

Section 6.3. Location of Meetings of Members. Meetings of Members shall be held at a location designated by the President or the Board. If a Regular Member calls a meeting pursuant to Section 6.2, the Regular Members making the demand for the meeting may designate the location, provided the meeting must be held within the Region and in a facility of appropriate size to accommodate the Members.

Section 6.4. Notice of Meetings.

6.4.1 Notice Requirements. Notice of meetings of Members must be given at least five (5) days before the date of a meeting and not more than sixty (60) days before the date of a meeting. The notice must contain the date, time and place of the meeting, instructions for electronic attendance or voting, if applicable, and an agenda of the matters upon which action may be taken at the meeting. A matter may be added to the agenda of a meeting at the meeting upon the affirmative vote of three-quarters (3/4) of the Industry Sector votes cast on a motion to amend the agenda. If the meeting is an adjourned meeting and the date, time and place of the meeting were announced at the time of the adjournment, notice is not required unless a new record date for the adjourned meeting is or must be fixed. Notice shall be deemed given by the Corporation to the Members when (a) posted on the Corporation's public website in a reasonably prominent location, and (b) sent by mail, facsimile or reputable overnight delivery service or by electronic transmission to each Member's representative authorized pursuant to Section 6.10.1

6.4.2 Waiver of Notice; Objections. A Member may waive notice of a meeting of Members. A waiver of notice by a Member entitled to notice is effective whether given before, at, or after the meeting, and whether given in writing, or by attendance. Attendance by a Member at a meeting is a waiver of notice of that meeting, unless the Member objects at the beginning of the meeting to the transaction of business because the meeting is not lawfully called or convened, or objects before a vote on an item of business because the item may not lawfully be considered at that meeting and does not participate in the consideration of the item at that meeting.

Section 6.5. Record Date. The Board may fix a date not more than sixty (60) days before the date of a meeting of Members as the date for the determination of the Members entitled to notice of and entitled to vote at the meeting. When a date is so fixed, only Members on that date are entitled to notice and to vote at the meeting unless the Board fixes a new date for determining the right to notice and to vote, which it must do if the meeting is adjourned to a date more than sixty (60) days after the record date for determining Members entitled to notice of the original meeting.

Section 6.6. Right to Vote; Act of Members.

6.6.1 Industry Sector Voting. Voting of the Members shall be by Industry Sector, with each Industry Sector entitled to cast one vote. Each Member entitled to vote in an Industry Sector shall be entitled to cast one vote in its Industry Sector. The vote of each Industry Sector shall be split into an affirmative component based on votes for the pending motion, and a negative component based on votes against the pending motion, in direct proportion to the votes cast within the Industry Sector for and against the pending motion, rounded to two decimal places. To the extent practicable, all Member votes may be held electronically under such terms and conditions as are approved by the Board.

6.6.2 Act of Members. If a quorum is present, except with respect to any matter described in Section 6.6.3, a majority of the Industry Sector votes cast on the matter shall be the act of the Members.

6.6.3 Special Voting Requirements. Notwithstanding any other provision of these Bylaws, and except as set forth in the Certificate of Incorporation and Section 13.2 of these Bylaws, two-thirds (2/3) of the Industry Sector votes cast shall be required to:

(a) Amend the Bylaws, except as otherwise provided in Section 19.1 of these Bylaws. The substance of the proposed amendment must be contained in the notice of the meeting at which the vote will be taken; however, the Members may modify a proposed Bylaw amendment at the meeting.

(b) Approve any proposal to terminate the Corporation.

Section 6.7. Quorum. A quorum for a meeting of Members is a majority of the Regular Members entitled to vote in each Industry Sector at the meeting. A quorum for a meeting of an Industry Sector is a majority of the Regular Members of that Industry Sector entitled to vote at the meeting. In both cases, electronic participation is acceptable if authorized by the Board. A quorum is necessary for the transaction of business at a meeting of Members or of any Industry Sector. If a quorum is not present, a meeting may be adjourned for that reason by the Industry Sectors or Regular Members then represented or present.

Section 6.8. Action by Written Ballot. All elections of directors shall be by written ballot. The requirement of a written ballot shall be satisfied by a ballot submitted by electronic transmission provided that any such electronic transmission must either set forth or be submitted with information from which it can be determined that the electronic transmission was authorized by the Member.

Section 6.9. Action by Electronic Communication. A conference among Members by a means of communication through which the participants may simultaneously hear each other during the conference is a meeting of the Members, if the same notice is given of the conference as would be required for a meeting and if the number of persons participating in the conference is a quorum. Participation in a meeting by this means is personal presence at the meeting. A Member may participate in a meeting of the Members by a means of communication through which the Member,

other persons participating, and all persons physically present at the meeting may simultaneously communicate with each other during the meeting. Participation in a meeting by this means constitutes personal presence at the meeting.

Section 6.10. Member Representatives; Proxies.

6.10.1 Designation of Representative. Each year prior to the annual meeting of Members, each Regular Member shall designate the individual authorized to vote on Corporation matters on behalf of the Member, in accordance with procedures approved by the Board. A Regular Member may change such designation at any time by providing at least twenty-four (24) hour written notice to the Secretary of the Corporation. Such notice may be provided by electronic transmission.

6.10.2 Authorization. The individual designated to vote by a Regular Member may appoint a proxy to vote or otherwise act for the Regular Member at any meeting by signing an appointment form either personally or by an attorney so designated by the Regular Member. Such authorization may be in writing or by means of electronic transmission to the person who will be the holder of the proxy, provided that such electronic transmission must either set forth or be submitted with information from which it can be determined that the electronic transmission was authorized by the Member representative.

6.10.3 Effective Period. An appointment of a proxy is effective when received by the Secretary or other officer or agent authorized to tabulate votes. An appointment is valid for the next regular or specially scheduled meeting or ballot by electronic transmission. However, a proxy is not valid for more than sixty (60) days from its date of execution.

6.10.4 Revocation. An appointment of a proxy is revocable by a Regular Member. Appointment of a proxy is revoked by the person appointing the proxy either by open declaration at a meeting or by signing and delivering a revocation in writing or by electronic transmission to the Secretary or other officer or agent authorized to tabulate proxy votes. This may be done either in a statement that the appointment of the proxy is revoked or by a subsequent appointment that shall serve to cancel all prior proxies.

Section 6.11. Public Notice of Member Meetings. Notice to the public of the dates, times and places of meetings of the Members, and all nonconfidential material provided to the Members, shall be posted on the Corporation's website at approximately the same time that notice is given to the Members. Meetings of the Members shall be open to the public, subject to reasonable limitations due to the availability and size of meeting facilities; provided, that the meeting may be held in or adjourn to closed session to discuss matters of a confidential nature, including, but not limited to, personnel matters, compliance and enforcement matters, litigation or commercially sensitive or critical infrastructure information of a Member or other Person.

Section 6.12. Posting of Minutes. Minutes of meetings of Members shall be posted on the Corporation's website when available.

Section 6.13. Reimbursement of Member Expenses. The Corporation will be under no obligation to reimburse Members for expenses associated with their attendance at regular or special Member meetings.

ARTICLE VII. BOARD OF DIRECTORS

Section 7.1. General. The composition of the Board and the terms of office of the directors, the manner of their nomination, election or appointment, and other terms and conditions of their service, shall be as provided in the Certificate of Incorporation and these Bylaws if not inconsistent therewith.

Section 7.2. Management of Corporation. The business of the Corporation shall be managed under the direction of the Board. Specific functions of the Board shall include, but not be limited to:

- (a) govern the Corporation and oversee all of its activities;
- (b) establish and oversee all organizational groups;
- (c) approve, revise and enforce Reliability Standards utilizing a fair, open, balanced and inclusive process;
- (d) establish compliance monitoring procedures and requirements, and penalties and sanctions for non-compliance consistent with applicable NERC Rules;
- (e) impose penalties and sanctions consistent with the NERC Rules and the procedures approved by the Board;
- (f) establish and approve an annual budget for submission to NERC;
- (g) hire the Corporation's president and approve his or her salary;
- (h) annually at the first regular Board meeting following the annual meeting of Members, elect a Chair ("Chair") and a vice-chair from among the directors on the Board, and a lead independent director from among the independent directors on the Board; and
- (i) establish Board committees as appropriate.

Section 7.3. Voting. Each director shall have one vote with respect to decisions of the Board.

Section 7.4. Composition of the Board.

(a) The Board shall consist of fourteen (14) or fifteen (15) directors which number shall be established from time to time by resolution of the Board, which resolution shall in no event have the effect of terminating the term of any incumbent director. The President of ReliabilityFirst shall be a non-voting ex officio member of the Board of Directors. The President shall be entitled to notice of and attendance at meetings, except those portions of a meeting at which matters directly relating to the President's performance, contract and/or compensation are discussed.

(b) Eight directors shall be elected by the Industry Sectors as follows:

- (i) Suppliers shall elect two (2) directors;
- (ii) Transmission Companies shall elect two (2) directors;
- (iii) RTOs shall select one (1) director;
- (iv) Small LSEs shall elect one (1) director;
- (v) Medium LSEs shall elect one (1) director; and
- (vi) Large LSEs shall elect one (1) director.

(c) Three (3) directors shall be at-large. At-large directors shall be elected by all of the Industry Sectors voting together as a single class.

(d) Three (3) directors, if the Board consists of fourteen (14) directors, and four (4) directors, if the Board consists of fifteen (15) directors, shall be independent from the Corporation and any Member or any Affiliate or Related Party of any Member. Independent directors shall be elected by all of the Industry Sectors voting together as a single class.

(e) Industry Sectors shall elect their respective sector and at-large directors from among individuals holding senior management positions in Member organizations. Any sector-elected or at-large director whose Member organization changes Industry Sectors or who ceases to hold a senior management position in a Member organization shall continue to serve out his or her remaining term, unless such director resigns or is removed. No two directors may be employees of a single Member or any Affiliate or Related Party of a Member or any Affiliate.

(f) An independent director is a person (i) who is not an officer or employee of the Corporation, an officer, director, or employee of a Member, or an officer, director or employee of any entity that would reasonably be perceived as having a direct financial interest in the outcome the Board's decisions, or (ii) who does not have a relationship that would interfere with the exercise of independent judgment in carry out the responsibilities of a director. The Board may adopt additional standards for director independence not inconsistent herewith.

(g) At-large and independent directors shall be nominated by the nominating and governance committee of the Board. When nominating at-large directors, the nominating and governance committee shall consider such factors as the geographic and functional representation of the Board. The nominating

and governance committee shall seek out for nomination independent directors from diverse backgrounds, who will contribute to the effective functioning of the Board and the Corporation by bringing a broad range of industry expertise, viewpoints, experiences, skill sets and knowledge. If an incumbent independent director is not re-nominated, the nominating and governance committee will use reasonable efforts to ensure that diverse candidates are in the pool of potential nominees for the open independent director position and may retain an independent consultant to identify individuals qualified and willing to serve as an independent director.

(h) Any director which the full Board has determined has a conflict of interest on any compliance or enforcement matter brought before the Board shall not vote on such matter and shall recuse himself or herself from all Board deliberations concerning such matter.

(i) There will be no alternates or proxies for directors.

Section 7.5. Terms of Directors. The directors will be divided into three classes. The number of directors in each class shall be as nearly equal as possible. The term of office of the first class will expire at the second annual meeting of Members; the term of office of the second class will expire one year thereafter; and the term of office of the third class two years thereafter. At each annual meeting of Members, directors shall be chosen for a three year term to succeed those whose term expires. No two at-large directors and no two directors of the same Industry Sector shall be in the same class. At least one (1) independent director shall be in each class. Each director shall hold office until (a) the expiration of the term for which he or she was elected and until his or her successor is elected and qualified, or (b) his or her earlier death, resignation or removal. Any director may be removed at any time by the affirmative vote of two-thirds of the Industry Sector or Industry Sectors, as applicable, electing such director. A director may be removed by the Board for non-attendance at three consecutive Board meetings.

Directors shall not be eligible to serve more than four (4) consecutive full terms; provided, however, that the Board may act to allow a one (1) term discretionary exception to this limitation for any director.

Section 7.6. Reimbursement. Independent directors shall have the right to reimbursement by the Corporation of their actual reasonable travel expenses to Board meetings or when specifically selected to represent the Corporation at a business meeting. The directors elected by the Industry Sectors and the at-large directors shall not be reimbursed by the Corporation for any expenses, unless specifically approved in advance by resolution of the Board.

Section 7.7. Resignations; Vacancies.

(a) Resignations. A director may resign from the Board upon notice given in writing or by electronic transmission to the Corporation. Such resignation shall take effect at the time identified in the notice as the effective

date of resignation.

(b) Vacancies. If a notice of resignation provides that the effective date of resignation will occur on a future date within an unexpired term, the Industry

Sector or Industry Sectors, as applicable, may elect a successor director to fill the impending vacancy prior to the effective date of the resignation, in accordance with the procedures and requirements set forth above. The successor director elected by the Industry Sector or Industry Sectors, as applicable, shall commence on the effective date of the resigning director's resignation and hold office for the unexpired term of the vacated directorship replaced.

If a successor Industry Sector or at-large director is not elected prior to the resignation effective date, or if an Industry Sector or at-large director resigns, dies or otherwise becomes incapacitated or is removed during the term of office for which elected, the directorship shall thereupon be vacant and shall be filled by the Industry Sector or Industry Sectors, as applicable, by written or electronic ballot in accordance with the procedures and requirements set forth above. The successor director elected by the Industry Sector or Industry Sectors, as applicable, shall hold office for the unexpired term of the vacated directorship replaced.

If a successor independent director is not elected prior to the resignation effective date, or if an independent director resigns, dies or otherwise becomes incapacitated or is removed during the term of office for which elected or ceases to be independent, as determined by the Board, his or her directorship shall thereupon be vacant and may be filled by resolution of the Board and any independent director so chosen shall hold office until the next annual meeting of Members, at which time a permanent successor shall be elected by the Industry Sectors for the remainder of the unexpired term. Upon an increase in the number of directors on the Board in accordance with Section 7.4(a) of these Bylaws, the independent directorship created thereby may be filled by resolution of the Board and any independent director so chosen shall hold office until the next annual meeting of Members, at which time a permanent successor shall be elected by the Industry Sectors for the remainder of such director's unexpired term.

Section 7.8. Meetings; Notice; Waiver.

(a) Meetings. An annual meeting of the Board shall be held without notice immediately following the annual meeting of the Members. The Board shall elect the Chair and Vice-Chair for the next year at the annual meeting. In addition, regular meetings may be held at such time or times as fixed by the Board. Special meetings of the Board may be called by the Board's Chair, the President or by any three directors and shall be held at the principal office of the Corporation, or such other place within the Region as determined by the Chair or the President after consultation with the Board.

(b) Notice. Notice of the dates, times, and places of all regular and special meetings of the Board shall be published by the Secretary and provided to all directors and Members not less than three (3) days prior to the date of the meeting. Notice shall be deemed given by the Corporation to directors and the Members when (a) posted on the Corporation's public website in a reasonably

prominent location, and (b) sent by mail, facsimile or reputable overnight delivery service or by electronic transmission to each director and each Member's representative authorized pursuant to Section 6.10.1.

(c) Waiver. Any person entitled to notice of a regular or special meeting of the Board may waive notice thereof. A waiver of notice by a person entitled to notice is effective whether given before, at, or after the meeting, and whether given in writing or by attendance. Attendance by a director at a meeting of the Board is a waiver of notice of that meeting, unless the director objects at the beginning of the meeting to the transaction of business because the meeting is not lawfully called or convened, or objects before a vote on an item of business because the item may not lawfully be considered at that meeting and does not participate in the consideration of the item at that meeting.

Section 7.9. Quorum. For the Board to take action at a meeting, a quorum of directors must be present. A quorum is a majority of the directors then in office, provided that: (a) if there are three or four independent directors holding office, two independent directors must be present to constitute a quorum, or (b) if there are two independent directors holding office, one independent director must be present to constitute a quorum. If there is only one independent director or no independent directors holding office, there is no requirement that an independent director be present in order for the Board to have a quorum. In the absence of a quorum, a majority of the directors present may adjourn a meeting, without notice, except as may be given at such meeting, until a quorum is present.

Section 7.10. Board Action. The act of a majority of the directors present at a meeting at which a quorum is present shall be the act of the Board, unless the act of a greater number is required by law or these Bylaws.

Section 7.10.1 Board Approval of President's Compensation. Notwithstanding the foregoing, Board approval of the President's compensation requires both: 1) endorsement by all independent directors, and 2) approval by a majority of the Board.

Section 7.11. Action Without a Meeting. Any action required or permitted to be taken at any meeting of the Board or any committee thereof may be taken without a meeting if all members of the Board or committee, as the case may be, consent thereto in writing or by electronic transmission, and the writing or writings or electronic transmission or transmissions are filed with the minutes of proceeding of the Board or the committee. Any nonconfidential material provided to the Board or a committee in connection with such action shall be posted on the Corporation's website at approximately the same time that it is given to the Board or the committee. The results of all actions taken by the Board or any committee thereof without a meeting shall be promptly posted on the Corporation's website.

Section 7.12. Action by Electronic Communication. A conference among directors by a means of communication through which the directors may simultaneously hear each other during the conference is a Board meeting if the same notice is given of the conference as would be required for a meeting and if the number of directors

participating in the conference is a quorum. Participation in a meeting by this means constitutes personal presence at the meeting. A director may participate in a Board meeting by any means of communication through which the director, other directors

participating, and all directors physically present at the meeting may simultaneously communicate with each other during the meeting.

Section 7.13. Board Committees. The Board shall have an audit committee, compensation committee, nominating and governance committee and compliance committee, and such other committees the Board deems necessary and appropriate. Each committee shall be comprised of not less than three directors. The compliance committee shall be comprised of a minimum of five directors, a majority of whom are independent directors. All independent directors shall serve on the compliance committee. The Board may require that a minimum number of independent directors serve on any or all other Board committees. The Board shall have the power to appoint, and to delegate authority to, such other committees of the Board as it determines to be appropriate from time to time. The Board may require any committee to adopt a charter, subject to approval by the Board, governing the activities and authority of the committee and the composition of its members.

Section 7.14. Hearing Body. The Board shall establish policies and procedures governing the designation of members to the Hearing Body pursuant to the NERC Rules of Procedure's Consolidated Hearing Process.

Section 7.15. Public Notice of Board Meetings. Notice to the public of the dates, times and places of Board meetings, including committees thereof, and all nonconfidential material provided to the Board or the committees, shall be posted on the Corporation's website, and notice of Board and committee meetings shall be sent by electronic transmission to Members, at approximately the same time that notice is given to the Board or the committee, as the case may be. Board and committee Meetings shall be open to all Members and the public, subject to reasonable limitations due to the availability and size of meeting facilities; provided, that any meeting may be held in or adjourn to closed session to discuss matters of a confidential nature, including, but not limited to, personnel matters, compliance and enforcement matters, litigation or commercially sensitive or critical infrastructure information of a Member or other Person.

Section 7.16. Posting of Minutes. Minutes of Board and committee meetings shall be posted on the Corporation's website when available.

Section 7.17. Compensation of Directors. The directors elected by the Industry Sectors and the at-large directors shall not receive compensation for their service to the Corporation as directors on the Board. The independent directors shall be entitled to such compensation as the Board may from time to time determine. Nothing contained in these Bylaws shall preclude any director from receiving compensation for services to the Corporation in any other capacity.

ARTICLE VIII. ORGANIZATIONAL GROUPS

Section 8.1. Establishment of Organizational Groups. The Board shall establish such organizational groups, consisting of committees, sub-committees, task forces and working groups of Members, as are necessary and appropriate to accomplish the purposes of the Corporation in an efficient and cost-effective manner. All organizational groups shall be subject to the direction and control of the Board. The membership of organizational groups shall be determined based upon experience, expertise and geographic diversity and to the extent practicable shall include balanced representation of the Industry Sectors. The Board shall establish policies and procedures governing the creation of organizational groups, how they are populated, how voting and related matters are conducted, how they may be reorganized and the direction and termination of such groups. The Board shall conduct a review of all organizational groups of the Corporation on an annual basis to ensure that the business of the Corporation is conducted in an efficient, cost-effective manner.

Section 8.2. Reimbursement. The Board may authorize reimbursement for persons acting on behalf of the Corporation, as necessary in the interests of the Corporation.

ARTICLE IX. OFFICERS

Section 9.1. Officers. The officers of the Corporation shall include a President, one or more Vice Presidents, a Secretary, a Treasurer and any other officers as may be elected or appointed in accordance with the provisions of this Article. The Board may elect or appoint any additional officers that it deems desirable, such other officers to have the authority and perform the duties prescribed by the Board. The same individual may hold any number of offices, except that of President.

Section 9.2. Election and Term of Office. The officers of the Corporation shall be elected annually by the Board at the annual meeting of the Board. Each officer shall hold office at the pleasure of the Board. If the election of officers is not held at such meeting, such election shall be held as soon thereafter as is convenient. New officers may be created and the positions filled at any meeting of the Board. Each elected officer shall hold office until his or her successor has been duly elected and qualified or upon his or her earlier resignation or removal.

Section 9.3. Removal. Any officer elected by the Board may be removed by the affirmative vote of two-thirds (2/3) of the Board whenever in its judgment the best interests of the Corporation would be served thereby, but such removal shall be without prejudice to the contract rights, if any, of the officer so removed. Election or appointment of an officer or agent shall not of itself create contract rights.

Section 9.4. Vacancies. A vacancy in any office because of death, incapacity, resignation, removal, disqualification, or otherwise, may be filled by the Board for the unexpired portion of the term.

Section 9.5. President. The President shall:

- (a) be the principal executive and operating officer of the Corporation;
- (b) sign certificates of membership, and may sign any deeds, mortgages, deeds of trust, notes, bonds, contracts or other instruments authorized by the Board to be executed, except in cases in which the signing and execution thereof shall be expressly delegated by the Board or by these Bylaws to some other officer or agent of the Corporation; and
- (c) perform all duties incident to the office of President, including hiring and directing staff, and such other duties as may be prescribed by the Board from time to time.

Section 9.6. Vice Presidents. The Vice President(s) shall perform such duties and have such powers as the Board or President may from time to time prescribe. At the request of the Board, the Vice President (or in the event there be more than one Vice President, the Vice Presidents in the order designated, or in the absence of any designation, then in the order of their election) shall perform the duties of the President, and when so acting, shall have all the powers of and be subject to all the restrictions upon the President.

Section 9.7. Secretary. The Secretary shall ensure that the following duties are carried out:

- (a) the minutes of the meetings of the Members and of the Board, and each committee thereof, are recorded;
- (b) all required notices are duly given in accordance with these Bylaws and as required by law;
- (c) a register of the current names and addresses of all Members is maintained and posted on the Corporation's website;
- (d) a complete copy of the Certificate of Incorporation and Bylaws of the Corporation containing all amendments thereto are kept on file at all times and posted on the Corporation's website, which copies shall always be open to the inspection of any Member; and

(e) generally perform all duties incident to the office of Secretary and such other duties as may be prescribed by the Board from time to time.

Section 9.8. Treasurer. The Treasurer shall be responsible for the following activities:

(a) maintain custody of all funds and securities of the Corporation;

(b) receipt of and the issuance of receipts for all monies due and payable to the Corporation and for deposit of all such monies in the name of the Corporation in such bank or banks or financial institutions as shall be selected by the Board; and

(c) generally perform all duties incident to the office of Treasurer and such other duties as may be prescribed by the Board from time to time.

ARTICLE X. CERTIFICATES OF MEMBERSHIP

Section 10.1. Certificates of Membership. The Board may, but need not, provide for the issuance of certificates evidencing membership in the Corporation, which certificates shall be in such form as may be determined by the Board.

ARTICLE XI. BOOKS AND RECORDS

Section 11.1. Books and Records; Financial Statements. The Corporation shall keep at such office selected by the Board correct and complete copies of its Certificate of Incorporation and Bylaws, accounting records, and minutes of meetings of Members, Board, and committees having any of the authority of the Board. A Member, or the agent or attorney of a Member, may inspect all books and records for any proper purpose at any reasonable time. Upon request, the Corporation shall give the Member a statement showing the financial result of all operations and transactions affecting income and expenses during its last annual accounting period and a balance sheet containing a summary of its assets and liabilities as of the closing date of the accounting period.

ARTICLE XII. FISCAL YEAR

Section 12.1. Fiscal Year. The fiscal year of the Corporation shall be the calendar year.

ARTICLE XIII.
TRANSFER OF ASSETS

Section 13.1. Member Approval Not Required. Subject to restrictions set forth in the Certificate of Incorporation, the Corporation, by affirmative vote of the Board, may sell, lease, transfer, or dispose of its property and assets in the usual and regular course of its activities and grant a security interest in all or substantially all of its property and assets in the usual and regular course of its activities, upon those terms and conditions and for those considerations, which may be money, securities, or other instruments for the payment of money or other property, as the Board considers expedient, in which case no Member approval is required.

Section 13.2. Member Approval Required. Subject to restrictions set forth in the Certificate of Incorporation, the Corporation may sell, lease, transfer, or dispose of all or substantially all of its property and assets, including its good will, not in the usual and regular course of its activities, upon those terms and conditions and for those considerations, which may be money, securities, or other instruments for the payment of money or other property, as the Board considers expedient only when approved at a regular or special meeting of the Members by the affirmative vote of two-thirds (2/3) of all the Members. Notice of the meeting must be given to the Members. The notice must state that a purpose of the meeting is to consider the sale, lease, transfer, or other disposition of all or substantially all of the property and assets of the Corporation.

ARTICLE XIV.
CONTRACTS, CHECKS, DEPOSITS, AND GIFTS

Section 14.1. Contracts. The Board may authorize any officer or officers or agent or agents of the Corporation, in addition to the officers so authorized by these Bylaws, to enter into any contract or execute and deliver any instrument in the name of and on behalf of the Corporation, and such authority may be general or may be confined to specific instances.

Section 14.2. Checks, Drafts, or Orders. All checks, drafts, or orders for the payment of money, notes, or other evidences of indebtedness issued in the name of the Corporation, may be signed by such officer or officers or agent or agents of the Corporation, and in such manner, as shall from time to time be determined by resolution of the Board.

Section 14.3. Deposits. All funds of the Corporation shall be deposited to the credit of the Corporation in such banks, trust companies, or other depositories as the Board may select.

Section 14.4. Gifts. The Board may accept on behalf of the Corporation any contribution, gift, bequest, or devise for any purpose of the Corporation.

ARTICLE XV.
INSURANCE, LIMITATION ON LIABILITY AND INDEMNIFICATION

Section 15.1. Insurance. The President is authorized to procure insurance to protect the Corporation against damages arising out of or related to any directive, order, procedure, action or requirement of the Corporation.

Section 15.2. Limitations on Liability. As provided in Article Fourteenth of the Certificate of Incorporation, a director of the Corporation shall not be personally liable to the Corporation or its Members for monetary damages for breach of fiduciary duty as a director, except for liability (i) for any breach of the director's duty of loyalty to the Corporation or its Members, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) under Section 174 of the Delaware General Corporation Law or (iv) for any transaction from which the director derived any improper personal benefit. If the Delaware General Corporation Law is amended to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the Delaware General Corporation Law, as so amended. Any repeal or modification of Article Fifteenth of these Bylaws by the Members of the Corporation shall not adversely affect any right or protection of a director of the Corporation existing at the time of such repeal or modification.

Section 15.3. Right to Indemnification.

15.3.1 Indemnified Persons. Each person who was or is made a party or is threatened to be made a party to or is involved in or called as a witness in any Proceeding because he or she is an Indemnified Person shall be indemnified and held harmless by the Corporation to the fullest extent permitted under the Delaware General Corporation Law (the "DGCL"), as the same now exists or may hereafter be amended (but, in the case of any such amendment, only to the extent that such amendment permits the Corporation to provide broader indemnification rights than the DGCL permitted the Corporation to provide prior to such amendment). Such indemnification shall cover all expenses incurred by an Indemnified Person (including, but not limited to, attorneys' fees and other expenses of litigation) and all liabilities and losses (including, but not limited to, judgments, fines, ERISA or other excise taxes or penalties and amounts paid or to be paid in settlement) incurred by such person in connection therewith.

15.3.2 Denial of Authorization for Certain Proceedings. Notwithstanding anything to the contrary in this Section 15.3, except with respect to indemnification of Indemnified Persons specified in paragraph 15.3.3 of this Section 15.3, the Corporation shall indemnify an Indemnified Person in connection with a Proceeding (or part thereof) initiated by such person only if authorization for such Proceeding (or part thereof) was not denied by the Board of the Corporation prior to the earlier of 60 days after receipt of notice thereof from such Indemnified Person.

15.3.3 Certain Defined Terms. For purposes of this Section 15.3, the following terms shall have the following meanings (such meanings to be equally applicable to both the singular and plural forms of the terms defined):

(1) a “Proceeding” is any investigation, action, suit or proceeding, whether civil, criminal, administrative or investigative, and any appeal therefrom.

(2) an “Indemnified Person” is a person who is, was, or had agreed to become a Director of the Corporation (including, in the case of such person seeking indemnification while serving as a Director who is or was an officer of the Corporation, such person in his capacity as an officer.)

15.3.4 Expenses. Expenses, including attorneys’ fees, incurred by a person indemnified pursuant to paragraph 15.3.1 in defending or otherwise being involved in a Proceeding shall be paid by the Corporation in advance of the final disposition of such Proceeding, including any appeal therefrom, upon receipt of an undertaking (the “Undertaking”) by or on behalf of such person to repay such amount if it shall ultimately be determined that he or she is not entitled to be indemnified by the Corporation; provided that in connection with a Proceeding (or part thereof) initiated by such person, except a Proceeding authorized by paragraph 15.3.5, the Corporation shall pay said expenses in advance of final disposition only if authorization for such Proceeding (or part thereof) was not denied by the Board of the Corporation prior to the earlier of 60 days after receipt of a request for such advancement accompanied by the Undertaking. A person to whom expenses are advanced pursuant hereto shall not be obligated to repay such expenses until the final determination of any pending Proceeding in a court of competent jurisdiction concerning the right of such person to be indemnified or the obligation of such person to repay such expenses.

15.3.5 Protection of Rights. If a claim by an Indemnified Person under paragraph 15.3.1 is not promptly paid in full by the Corporation after a written claim has been received by the Corporation or if expenses pursuant to paragraph 15.3.4 have not been promptly advanced after a written request for such advancement by an Indemnified Person (accompanied by the Undertaking required by paragraph 15.3.4) has been received by the Corporation, the claimant may at any time thereafter bring suit against the Corporation to recover the unpaid amount of the claim or the advancement of expenses. If successful, in whole or in part, in such suit, such claimant shall also be entitled to be paid the reasonable expense thereof. It shall be a defense to any such action (other than an action brought to enforce a claim for expenses incurred in defending any Proceeding in advance of its final disposition where the Undertaking has been tendered to the Corporation that indemnification of the claimant is prohibited by law, but the burden of proving such defense shall be on the Corporation. Neither the failure of the Corporation (including the Board, independent legal counsel, or the Members) to have made a determination, if required, prior to the commencement of such action that indemnification of the claimant is proper in the circumstances, nor an actual determination by the Corporation (including the Board, independent legal counsel, or the Members) that indemnification of the claimant is prohibited, shall be a defense to the action or create a presumption that indemnification of the claimant is prohibited.

15.3.6 Miscellaneous.

(a) Non-Exclusivity of Rights. The rights conferred on any person by this Section 15.3 shall not be exclusive of any other rights which such person may have or hereafter acquire under any statute, provision of the Certificate of Incorporation, Bylaw, agreement, vote of Members or disinterested directors or otherwise. The Board shall have the authority, by resolution, to provide for such other indemnification of directors, and such indemnification of officers, delegates, employees, agents, or others of the Corporation as it shall deem appropriate.

(b) Insurance, contracts, and funding. The Corporation may maintain insurance, at its expense, to protect itself and any director, officer, employee, delegate or agent of the Corporation against any expenses, liabilities or losses, whether or not the Corporation would have the power to indemnify such person against such expenses, liabilities or losses under the DGCL. The Corporation may enter into contracts with any director, officer, or employee of the Corporation in furtherance of the provisions of this Section 15.3 and may create a trust fund, grant a security interest or use other means (including, without limitation, a letter of credit) to ensure the payment of such amounts as may be necessary to effect the advancing of expenses and indemnification as provided in such contracts or as otherwise provided in this Section 15.3.

(c) Contractual nature. The provisions of this Section 15.3 shall continue as to a person who has ceased to be a director and shall inure to the benefit of the heirs, executors and administrators of such person. This Section 15.3 shall be deemed to be a contract between the Corporation and each person who, at any time that this Section 15.3 is in effect, serves or agrees to serve in any capacity which entitles him to indemnification and advancement of expenses hereunder and any repeal or other modification of this Section 15.3 or any repeal or modification of the DGCL or any other applicable law shall not limit any rights of indemnification for Proceedings then existing or arising out of events, acts or omissions occurring prior to such repeal or modification, including, without limitation, the right to indemnification and advancement of expenses for Proceedings commenced after such repeal or modification to enforce this Section 15.3 with regard to Proceedings arising out of acts, omissions or events arising prior to such repeal or modification.

(d) Cooperation. Each Indemnified Person shall cooperate with the person, persons or entity making the determination with respect to such Indemnified Person's entitlement to indemnification under this Section 15.3, including providing to such person, persons or entity upon reasonable advance request any documentation or information which is not privileged or otherwise protected from disclosure and which is reasonably available to such Indemnified Person and reasonably necessary to such determination. Any costs or expenses (including attorneys' fees and disbursements) incurred by such Indemnified Person in so cooperating with the person, persons or entity making such determination shall be borne by the Corporation (irrespective of the determination as to such Indemnified Person's entitlement to indemnification) and the

Corporation hereby indemnifies and agrees to hold such Indemnified Person harmless therefrom.

(e) Subrogation. In the event of any payment under this Section 15.3 to an Indemnified Person, the Corporation shall be subrogated to the extent of such payment to all of the rights of recovery of such Indemnified Person, who shall execute all papers required and take all action necessary to secure such rights, including execution of such documents as are necessary to enable the Corporation to bring suit to enforce such rights.

(f) Severability. If this Section 15.3 or any portion hereof shall be invalidated or held to be unenforceable on any ground by any court of competent jurisdiction, the decision of which shall not have been reversed on appeal, this Section 15.3 shall be deemed to be modified to the minimum extent necessary to avoid a violation of law and, as so modified, this Section 15.3 and the remaining provisions hereof shall remain valid and enforceable in accordance with their terms to the fullest extent permitted by law.

ARTICLE XVI. TRANSITION

Section 16.1. Transition Standards. The Corporation will use the existing standards, criteria, rules or guides from each existing reliability council region for those Members that join the Corporation as in effect immediately prior to formation of the Corporation until such standards, criteria, rules or guides are adopted, superseded, or rejected by the Corporation. The Corporation will establish any necessary transition committees, subcommittees, working groups or task forces to administer the existing regional reliability standards, criteria, rules and guides until they are adopted, superseded, or rejected by the Corporation. The Corporation will employ its best efforts, within two (2) years of its formation, to work toward a uniform set of Reliability Standards for the entire Region. The Board will develop and implement a standards process and a plan for transition to new Reliability Standards. This process will include a requirement that two-thirds of the directors present at a meeting must vote to adopt new Reliability Standards.

ARTICLE XVII. PARTICIPATION BY REGULATORY PARTICIPANTS

Section 17.1. Regulatory Participants. All Regulatory Participants shall be entitled to and be provided with the same rights to notice of and participation in meetings or other activities of the Corporation as are provided to Members, but shall not have the right to vote.

ARTICLE XVIII. BUDGET AND BUSINESS PLAN

Section 18.1. Budget and Business Plan. Each annual budget and business plan of the Corporation shall be approved by the Board in sufficient time in each fiscal

year to allow for timely submittal of the approved annual budget and business plan to NERC in accordance with the NERC Rules. The Corporation shall post a draft of each budget and business plan on the Corporation's website for purposes of review and comment by the Members at least ten (10) days prior to the Board meeting at which the budget and business plan are to be approved.

ARTICLE XIX.
AMENDMENT OF BYLAWS

Section 19.1. Amendment Of Bylaws. The power to adopt, amend or repeal these Bylaws is vested in the Members as set forth in Section 6.6.3 of these Bylaws; provided, however, that upon the passage of any federal electric reliability legislation, and/or the adoption of any rules or regulations of the Commission, NERC or other governmental entity with jurisdiction, the Board shall have authority to amend these Bylaws as necessary and appropriate to comply with such law, legislation, rules and regulations.



RELIABILITY FIRST

AMENDED AND RESTATED BYLAWS

OF

ReliabilityFirst Corporation
a Delaware nonprofit corporation

Adopted December 19, 2006

Amended September 21, 2007¹

Amended December 6, 2007²

Amended May 22, 2008³

Amended December 4, 2008⁴

Amended December 1, 2011⁵

Amended August 17, 2012⁶

Amended May 15, 2019⁷

¹ Section 5.9.2

² Sections 1.2, 1.26, 16.1

³ Sections 1.12, 7.13, 7.14

⁴ Sections 5.8, 6.8, 6.9, 6.10.2, 6.10.4, 7.4, 7.5, 7.7, 7.9, 7.11, 7.13

⁵ Sections 1.24, 2.2, 6.8, 7.4, 7.7

⁶ Sections 2.1, 2.2

⁷ Section 7.14

TABLE OF CONTENTS

ARTICLE I. DEFINITIONS	- 1 -
Section 1.1. Act.....	- 1 -
Section 1.2. Adjunct Member	- 1 -
Section 1.3. Affiliate	- 1 -
Section 1.4. Associate Member	- 1 -
Section 1.5. Board.....	- 1 -
Section 1.6. Bulk Power System.....	- 1 -
Section 1.7. Certificate of Incorporation.....	- 1 -
Section 1.8. Commission.....	- 2 -
Section 1.9. Delegation Agreement.....	- 2 -
Section 1.10. Electronic Transmission	- 2 -
Section 1.11. ERO.....	- 2 -
Section 1.12. Hearing Body..	- 2 -
Section 1.13. Industry Sector.....	- 2 -
Section 1.14. Large LSEs.....	- 2 -
Section 1.15. Medium LSEs.....	- 2 -
Section 1.16. Members.....	- 2 -
Section 1.17. NERC	- 2 -
Section 1.18. NERC Rules.....	- 3 -
Section 1.19. Net Energy for Load.....	- 3 -
Section 1.20. Person.....	- 3 -
Section 1.21. Region.....	- 3 -
Section 1.22. Regional Entity.....	- 3 -
Section 1.23. Regional Variance.....	- 3 -
Section 1.24. Regional Reliability Standard	- 3 -
Section 1.25. Regular Member.....	- 3 -
Section 1.26. Regulatory Participant	- 4 -
Section 1.27. Related Party	- 4 -
Section 1.28. Reliability Coordinator	- 4 -
Section 1.29. Reliability Standard	- 4 -
Section 1.30. Reliable Operation	- 4 -
Section 1.31. RTOs	- 4 -
Section 1.32. Small LSEs.....	- 4 -
Section 1.33. Suppliers.....	- 5 -
Section 1.34. Transmission Companies	- 5 -
ARTICLE II. PURPOSE AND ACTIVITIES	- 5 -
Section 2.1. Purpose.....	- 5 -
Section 2.2. Activities.....	- 5 -
Section 2.3. Not-for-Profit Corporation.....	- 6 -
ARTICLE III. POWERS	- 6 -
Section 3.1. Powers	- 6 -
ARTICLE IV. OFFICES	- 7 -
Section 4.1. Principal Office.....	- 7 -
ARTICLE V. MEMBERS	- 7 -

Section 5.1.	General	- 7 -
Section 5.2.	Classes of Members	- 7 -
5.2.1	Regular Members.....	- 7 -
5.2.2	Associate Members	- 7 -
5.2.3	Adjunct Members	- 7 -
Section 5.3.	Qualifications of Members	- 7 -
Section 5.4.	Admission of Members.....	- 7 -
Section 5.5.	Voting Rights.....	- 8 -
Section 5.6.	Transfer of Membership	- 8 -
Section 5.7.	Obligations of Members	- 8 -
Section 5.8.	Withdrawal.....	- 8 -
Section 5.9.	Funding and Dues.....	- 8 -
5.9.1	NERC Funding.....	- 8 -
5.9.2	Application Fee, User-Fees and Other Charges.....	- 9 -
Section 5.10.	Penalties	- 9 -
ARTICLE VI. MEETING OF MEMBERS		- 9 -
Section 6.1.	Annual Meeting of Members	- 9 -
Section 6.2.	Special Meetings of Members.....	- 9 -
Section 6.3.	Location of Meetings of Members	- 10 -
Section 6.4.	Notice of Meetings	- 10 -
6.4.1	Notice Requirements	- 10 -
6.4.2	Waiver of Notice; Objections	- 10 -
Section 6.5.	Record Date	- 10 -
Section 6.6.	Right to Vote; Act of Members	- 10 -
6.6.1	Industry Sector Voting	- 11 -
6.6.2	Act of Members.....	- 11 -
6.6.3	Special Voting Requirements.....	- 11 -
Section 6.7.	Quorum	- 11 -
Section 6.8.	Action by Written Ballot	- 11 -
Section 6.9.	Action by Electronic Communication	- 11 -
Section 6.10.	Member Representatives; Proxies	- 12 -
6.10.1	Designation of Representative.....	- 12 -
6.10.2	Authorization	- 12 -
6.10.3	Effective Period.....	- 12 -
6.10.4	Revocation.....	- 12 -
Section 6.11.	Public Notice of Member Meetings.....	- 12 -
Section 6.12.	Posting of Minutes.....	- 13 -
Section 6.13.	Reimbursement of Member Expenses	- 13 -
ARTICLE VII. BOARD OF DIRECTORS.....		- 13 -
Section 7.1.	General	- 13 -
Section 7.2.	Management of Corporation.....	- 13 -
Section 7.3.	Voting	- 13 -
Section 7.4.	Composition of the Board	- 13 -
Section 7.5.	Terms of Directors.....	- 15 -
Section 7.6.	Reimbursement	- 15 -
Section 7.7.	Resignations; Vacancies.....	- 15 -

Section 7.8.	Meetings; Notice; Waiver	- 16-
Section 7.9.	Quorum	- 17-
Section 7.10.	Board Action.....	- 17 -
Section 7.11.	Action Without a Meeting	- 17-
Section 7.12.	Action by Electronic Communication	- 17-
Section 7.13.	Board Committees	- 18-
Section 7.14.	Hearing Body	- 18-
7.14.1	Quorum	- 18-
7.14.2	Voting	- 18-
Section 7.15.	Public Notice of Board Meetings.....	- 18 -
Section 7.16.	Posting of Minutes-	18 -
Section 7.17.	Compensation of Directors	- 19-
ARTICLE VIII.	ORGANIZATIONAL GROUPS.....	- 19 -
Section 8.1.	Establishment of Organizational Groups.....	- 19 -
Section 8.2.	Reimbursement	- 19-
ARTICLE IX.	OFFICERS	- 19 -
Section 9.1.	Officers.....	- 19 -
Section 9.2.	Election and Term of Office	- 19 -
Section 9.3.	Removal.....	- 20 -
Section 9.4.	Vacancies	- 20-
Section 9.5.	President.....	- 20 -
Section 9.6.	Vice Presidents.....	- 20 -
Section 9.7.	Secretary	- 20 -
Section 9.8.	Treasurer	- 21 -
ARTICLE X.	CERTIFICATES OF MEMBERSHIP	- 21 -
Section 10.1.	Certificates of Membership.....	- 21 -
ARTICLE XI.	BOOKS AND RECORDS.....	- 21 -
Section 11.1.	Books and Records; Financial Statements	- 21-
ARTICLE XII.	FISCAL YEAR	- 21 -
Section 12.1.	Fiscal Year.....	- 21 -
ARTICLE XIII.	TRANSFER OF ASSETS	- 22 -
Section 13.1.	Member Approval Not Required	- 22-
Section 13.2.	Member Approval Required.....	- 22 -
ARTICLE XIV.	CONTRACTS, CHECKS, DEPOSITS, AND GIFTS.....	- 22 -
Section 14.1.	Contracts	- 22 -
Section 14.2.	Checks, Drafts, or Orders	- 22-
Section 14.3.	Deposits	- 22-
Section 14.4.	Gifts	- 22-
ARTICLE XV.	INSURANCE, LIMITATION ON LIABILITY AND INDEMNIFICATION -	23 -
Section 15.1.	Insurance	- 23-
Section 15.2.	Limitations on Liability	- 23-
Section 15.3.	Right to Indemnification.....	- 23 -
15.3.1	Indemnified Persons	- 23-

15.3.2	Denial of Authorization for Certain Proceedings	- 23 -
15.3.3	Certain Defined Terms	- 24 -
15.3.4	Expenses	- 24 -
15.3.5	Protection of Rights.....	- 24 -
15.3.6	Miscellaneous	- 25 -
ARTICLE XVI. TRANSITION.....		- 26 -
Section 16.1.	Transition Standards.....	- 26 -
ARTICLE XVII. PARTICIPATION BY REGULATORY PARTICIPANTS.....		- 26 -
Section 17.1.	Regulatory Participants	- 26 -
ARTICLE XVIII. BUDGET AND BUSINESS PLAN		- 26 -
Section 18.1.	Budget and Business Plan.....	- 26 -
ARTICLE XIX. AMENDMENT OF BYLAWS.....		- 27 -
Section 19.1.	Amendment Of Bylaws.....	- 27 -

**AMENDED AND RESTATED
BYLAWS OF
ReliabilityFirst Corporation
a Delaware nonprofit corporation
(the “Corporation”)**

[As adopted by the Members on December 19, 2006,
amended by the Board of Directors on September 21, 2007,
amended by the Members on December 6, 2007,
amended by the Board of Directors on May 22, 2008,
amended by the Members on December 4, 2008,
amended by the Members on December 1, 2011,
and amended by the Members on August 17, 2012]

**ARTICLE I.
DEFINITIONS**

Section 1.1. Act. “Act” shall mean Section 215 of the Federal Power Act (16 U.S.C. §824n).

Section 1.2. Adjunct Member. “Adjunct Member” shall mean any entity that does not qualify to join an Industry Sector but has been approved for membership. Adjunct Members may include Regulatory Participants.

Section 1.3. Affiliate. “Affiliate” shall mean, with respect to any entity, any other entity that, directly or indirectly, through one or more intermediaries, controls, or is controlled by, or is under common control with, such entity, as determined in the sole discretion of the Board of the Corporation. For this purpose, “control” may be presumed by the direct or indirect ownership of ten percent (10%) or more of the outstanding voting capital stock or other equity interests having ordinary voting power.

Section 1.4. Associate Member. “Associate Member” shall mean any entity that has joined an Industry Sector and is an Affiliate or Related Party of a Regular Member.

Section 1.5. Board. “Board” shall mean the Board of Directors of the Corporation.

Section 1.6. Bulk Power System. “Bulk Power System” shall mean facilities and control systems necessary for operating an interconnected electric energy transmission network (or any portion thereof) and electric energy from generation facilities needed to maintain transmission system reliability, but does not include facilities used in the local distribution of electricity.

Section 1.7. Certificate of Incorporation. “Certificate of Incorporation” shall mean the Certificate of Incorporation of the Corporation filed with the Delaware Secretary of State, as from time to time amended.

Section 1.8. Commission. “Commission” shall mean the Federal Energy Regulatory Commission.

Section 1.9. Delegation Agreement. “Delegation Agreement” shall mean the delegation agreement, as supplemented or amended from time to time, between NERC and the Corporation pursuant to which NERC has delegated its authority to the Corporation to propose and enforce Reliability Standards within the Region.

Section 1.10. Electronic Transmission. “Electronic transmission” shall mean any form of communication, not directly involving the physical transmission of paper, that creates a record that may be retained, retrieved and reviewed by a recipient thereof, and that may be directly reproduced in paper form by such a recipient through an automated process.

Section 1.11. ERO. “ERO” shall mean the electric reliability organization established under the Act to enforce Reliability Standards applicable to all owners, operators and users of the Bulk Power System in North America.

Section 1.12. Hearing Body. “Hearing Body” shall mean a group established with authority to conduct and render decisions in a formal compliance hearing of an entity registered in the NERC compliance registry who is the subject of a notice of alleged violation, proposed penalty or sanction, contested mitigation plan or contested remedial action directive.

Section 1.13. Industry Sector. “Industry Sector” shall mean a group of Bulk Power System owners, operators or users in the Region with substantially similar interests as pertinent to the purposes and operations of the Corporation of the Bulk Power System. The Industry Sectors shall consist of the following: (1) Suppliers, (2) Transmission Companies, (3) RTOs, (4) Small LSEs, (5) Medium LSEs, and (6) Large LSEs.

Section 1.14. Large LSEs. “Large LSEs” shall mean entities that serve, or whose Related Parties serve, end use load with annual energy delivery to such load in the Region of 50,000 GWh or greater.

Section 1.15. Medium LSEs. “Medium LSEs” shall mean entities that serve, or whose Related Parties serve, end use load with annual energy delivery to such load in the Region between 10,000 GWh and 50,000 GWh.

Section 1.16. Members. “Members” shall mean Regular Members, Associate Members and Adjunct Members.

Section 1.17. NERC. “NERC” shall mean the North American Electric Reliability Corporation, or any successor entity, which has been certified by the Commission as the ERO pursuant to the Act to establish and enforce Reliability Standards for the Bulk Power System.

Section 1.18. NERC Rules. “NERC Rules” shall mean the NERC Rules of Procedure as approved by the Commission.

Section 1.19. Net Energy for Load. “Net Energy for Load” shall mean net generation of an electric system plus energy received from others less energy delivered to others through interchange. It includes system losses, but excludes energy required for storage of energy at energy storage facilities. Calculations of net energy for load for all purposes under these Bylaws shall be based on the most recent calendar year for which data on net energy for load of the Region is available.

Section 1.20. Person. “Person” shall mean a natural person, corporation, cooperative, partnership, association, or other private or public entity.

Section 1.21. Region. “Region” shall mean the geographic boundaries of the Corporation described in the Delegation Agreement.

Section 1.22. Regional Entity. “Regional Entity” shall mean any entity with which NERC has entered into a delegation agreement to delegate, or which the Commission or a governmental authority in Canada or Mexico has directly assigned, enforcement authority for reliability standards for the Bulk Power System in a defined geographic area of North America.

Section 1.23. Regional Variance. “Regional Variance” shall mean an aspect of a Reliability Standard that applies only within a particular Regional Entity or group of Regional Entities. A Regional Variance may be used to qualify how a particular Regional Entity or Regional Entities achieves the objectives of a Reliability Standard or may establish different measures or performance criteria as necessary to achieve reliability within the particular Regional Entity or group of Regional Entities. A Regional Variance may not be inconsistent with any Reliability Standard as it would otherwise exist without the Regional Variance. Such a Regional Variance may be proposed by a Regional Entity and, if adopted by NERC and approved by the Commission, shall be enforced within the applicable Regional Entity or Regional Entities pursuant to delegated authority.

Section 1.24. Regional Reliability Standard. “Regional Reliability Standard” shall mean a type of Reliability Standard that is applicable only within a particular Regional Entity or group of Regional Entities. A Regional Reliability Standard may augment, add detail to, or implement another Reliability Standard or cover matters not addressed by other Reliability Standards. A Regional Reliability Standard is not binding upon any Member or Registered Entity, nor is it effective or enforceable, until the Regional Reliability Standard has been adopted by NERC and approved by the Commission as a Reliability Standard within the applicable Regional Entity or Regional Entities pursuant to delegated authorities.

Section 1.25. Regular Member. “Regular Member” shall mean any entity that has joined an Industry Sector that either (i) has no Affiliates or Related Parties that are Members or (ii) is the entity designated to be the Regular Member by any related group of Associate Members.

Section 1.26. Regulatory Participant. “Regulatory Participant” shall mean any state, District of Columbia or any provincial regulatory agency in the Region exercising authority over the rates, terms or conditions of electric service of an entity other than itself within the Region, or the planning, siting, construction or operation of electric facilities of an entity other than itself within the Region, as well as the Commission, regional advisory bodies that may be established by the Commission, or any federal regulator or agency or any entity authorized by any state, the District of Columbia or any province to represent utility consumers.

Section 1.27. Related Party. “Related Party” shall mean, solely for purposes of the governance provisions of these Bylaws, any entity that is registered as part of another entity or is registered for other entities in the NERC Compliance Registry. For purposes of these Bylaws, a representative of a state or federal government agency shall not be deemed a Related Party with respect to each other, and a public body’s regulatory authority, if any, over a Member shall not be deemed to make it a Related Party with respect to that Member.

Section 1.28. Reliability Coordinator. “Reliability Coordinator” shall mean any entity that is recognized as a reliability coordinator by NERC in the Region that does not otherwise qualify as a Transmission Company or RTO.

Section 1.29. Reliability Standard. “Reliability Standard” shall mean a requirement to provide for Reliable Operation of the Bulk Power System, including, without limitation, the foregoing requirements for the operation of existing Bulk Power System facilities, including cyber security protection, and the design of planned additions or modifications to such facilities to the extent necessary for reliable operation of the Bulk Power System, but shall not include any requirement to enlarge Bulk Power System facilities or to construct new transmission capacity or generation capacity.

Section 1.30. Reliable Operation. “Reliable Operation” shall mean operating the elements of the Bulk Power System within equipment and electric system thermal, voltage and stability limits so that instability, uncontrolled separation, or cascading failure of the Bulk Power System will not occur as a result of a sudden disturbance, including a cyber security incident, or unanticipated failure of system elements.

Section 1.31. RTOs. “RTOs” shall mean PJM Interconnection L.L.C. and Midwest Independent Transmission System Operator, Inc., or such other entity that has been recognized by the Commission as a regional transmission operator or recognized functional equivalent in the Region.

Section 1.32. Small LSEs. “Small LSEs” shall mean (i) owners or operators of entities (or their representatives) that serve, or whose Related Parties serve, end use load with annual energy delivery to such load in the Region of 10,000 GWh or less, and (ii) end-use customers interconnected with the Bulk Power System with load of at least 100 MW at one location in the Region.

Section 1.33. Suppliers. "Suppliers" shall mean owners or operators of electric generation connected to the transmission system and wholesale power marketers in the Region.

Section 1.34. Transmission Companies. "Transmission companies" shall mean (i) owners (or those with ownership entitlement), planners and operators of transmission facilities included in the Bulk Power System in the Region and (ii) Reliability Coordinators.

ARTICLE II. PURPOSE AND ACTIVITIES

Section 2.1. Purpose. The business or purposes to be conducted or promoted by the Corporation are:

- (a) to be a Regional Entity and exercise enforcement authority for Reliability Standards for the Bulk Power System in the Region pursuant to the Delegation Agreement;
- (b) to carry out certain of NERC's activities that are in furtherance of NERC's responsibilities as the ERO under the Act or in support of delegated functions, as specified in the NERC Rules or the Delegation Agreement; and
- (c) to engage in any other lawful act or activity for which not for profit corporations may be organized under the Delaware General Corporation Law.

The Corporation shall be exempt from federal income taxation pursuant to Section 501(c) of the Internal Revenue Code of 1986, as amended (hereinafter the "Code") as an organization described in Section 501(c)(3) of the Code. The Corporation shall not engage directly or indirectly in any activity which would invalidate its status as an organization exempt from taxation under Section 501(a) of the Code as an organization described in Section 501(c)(3) of the Code. No part of the net income to the Corporation shall inure to the benefit of or be distributed to its directors, officers, members or other private persons, except that the Corporation shall be authorized and empowered to pay reasonable compensation for services actually rendered.

Section 2.2. Activities. In support and furtherance of its purpose, and in accordance with and at all times subject to the NERC Rules and the Delegation Agreement, the Corporation's responsibilities shall include, but not be limited to, the following:

- (a) Reliability Standards. The Corporation shall:
 - (1) propose Reliability Standards, Regional Variances or modifications thereof to NERC; and

(2) develop Regional Reliability Standards through the Corporation's standards development procedure.

(b) Enforcement. The Corporation shall enforce Reliability Standards (including Regional Variances) within the Region through the Corporation's compliance enforcement program.

(c) Delegation-Related Services. The Corporation, on behalf of NERC, shall carry out certain of NERC's activities that are in furtherance of NERC's responsibilities as the ERO under the Act or in support of delegated functions, including:

- (1) Organization registration and certification.
- (2) Reliability readiness audit and improvement.
- (3) Reliability assessment and performance analysis.
- (4) Training and education.
- (5) Situational awareness and infrastructure security.

(d) Budget. The Corporation shall prepare and submit a budget to NERC for the amount of costs the Corporation will incur in support of delegated functions that are in furtherance of NERC's responsibilities as the ERO under the Act.

(e) Non-delegated Functions. The Corporation may conduct such other activities for or on behalf of the Members that are not delegated to the Corporation by NERC under the Delegation Agreement if authorized by the Board and not inconsistent with the Act, NERC Rules, Section 501(c)(3) of the Internal Revenue Code, the Delegation Agreement or these Bylaws.

Section 2.3. Not-for-Profit Corporation. The Corporation is operated as a Delaware non-stock nonprofit corporation and is organized pursuant to the general corporation law of the State of Delaware.

ARTICLE III. POWERS

Section 3.1. Powers. The Corporation shall have the power to engage in any lawful act or activity for which corporations may be organized under the general corporation law of the State of Delaware, subject to any limitations provided in applicable federal, provincial or state law or in the Certificate of Incorporation or these Bylaws.

ARTICLE IV. OFFICES

Section 4.1. Principal Office. The principal office of the Corporation shall be located initially within the Region, at such location as the Board may from time to time determine, giving consideration to the total cost to the Corporation and convenience of travel for staff, Members and Regulatory Participants. Once established, the principal office may remain in its location, even if outside the Region.

ARTICLE V. MEMBERS

Section 5.1. General. The terms and conditions of membership in the Corporation shall be as provided in the Certificate of Incorporation and these Bylaws if not inconsistent therewith. All Regular Members and Associate Members shall be required to join a single Industry Sector.

Section 5.2. Classes of Members. The Corporation shall have three (3) classes of Members: Regular Members, Associate Members and Adjunct Members.

5.2.1 Regular Members. Except as set forth in Sections 5.5 and 6.5 of these Bylaws, Regular Members shall have the right to vote on all matters within their Industry Sector. Regular Members shall have all the rights and obligations of being a Member in the Corporation.

5.2.2 Associate Members. Associate Members shall not be entitled to vote within their Industry Sector or for any other purpose as a Member. Associate Members shall otherwise have all the rights and obligations of being a Member in the Corporation.

5.2.3 Adjunct Members. Adjunct Members shall not be entitled to vote for any purpose as a Member. Adjunct Members shall otherwise have all the rights of being a Member in the Corporation.

Section 5.3. Qualifications of Members. Any entity eligible to join an Industry Sector may be a Regular Member or Associate Member of the Corporation. Any entity not eligible to join an Industry Sector may be an Adjunct Member of the Corporation.

Section 5.4. Admission of Members. New Members may join the Corporation upon submittal of an application, in a form approved by the Board, and upon payment of such fees or charges, if any, as may be established by the Board or required by NERC. Each Regular Member and Associate Member shall designate the Industry Sector it wishes to join. A Regular Member and Associate Member may change its Industry Sector designation once each calendar year upon notice to the Corporation. Such notice must be provided to the Secretary of the Corporation at least sixty (60) days before an annual or other meeting of Members if the change is to be effective for such meeting. The President shall review a membership application and may request demonstration by the applicant that it qualifies for membership in a particular Industry Sector. Any dispute with respect to a Regular Member's or Associate Member's

qualifications for a particular Industry Sector shall be resolved by the Board. The President shall have authority to approve an application for membership, subject to review by the Board.

Section 5.5. Voting Rights. Each Regular Member in good standing shall be entitled to one vote in the Industry Sector in which it belongs on all matters submitted to a vote of Members. The Board may suspend voting rights for a Regular Member delinquent by more than 60 days in payment of any penalties or because of the Regular Member's failure to meet other obligations to the Corporation. Except with respect to the election of Industry Sector directors as described elsewhere in the Certificate of Incorporation and these Bylaws, matters properly brought before the Members at an annual or special meeting shall be acted upon by the Industry Sectors voting together as a single class. The vote of each Industry Sector shall be split into an affirmative component based on votes for the matter(s) presented, and a negative component based on votes against the matter(s) presented, in direct proportion to the votes cast within the Industry Sector for and against the matter presented, rounded to two decimal places. If authorized in advance by the Board, voting may be held electronically under such terms and conditions as are approved by the Board.

Section 5.6. Transfer of Membership. A Member of the Corporation may not transfer its membership or a right arising from it except to any Person succeeding to all or substantially all of the assets of the Member. If challenged, the President shall have authority to approve any such transfer, subject to review by the Board.

Section 5.7. Obligations of Members. By applying for and becoming a Regular or Associate Member of the Corporation, each Member agrees to comply with all Reliability Standards, all NERC standards and requirements, and the other obligations of Members of the Corporation set forth in these Bylaws or duly adopted by the Board in order to achieve the purposes of the Corporation. A Regular or Associate Member also agrees to obligate all of its Affiliates that have an impact on reliability in the Region to comply with all Reliability Standards and NERC standards and requirements. These obligations include but are not limited to: (a) obligations to provide data and information needed to perform the functions of the Corporation, (b) payment of any authorized penalties resulting from non-compliance with Reliability Standards, (c) in the case of Regular Members, electing the Board, and (d) providing qualified candidates to serve on organizational working groups. Adjunct Members agree to provide data and information needed to perform the functions of the Corporation.

Section 5.8. Withdrawal. A Member may withdraw from participation in the Corporation upon notice given in writing or by electronic transmission to the Corporation. Such notice shall specify a date, not earlier than thirty (30) days from the date of notice, on which the withdrawal shall become effective.

Section 5.9. Funding and Dues.

5.9.1 NERC Funding. In accordance with and at all times subject to the NERC Rules and the Delegation Agreement, the Corporation shall equitably allocate its dues, fees and other charges for the delegated functions conducted by the Corporation

among all end users. The Corporation shall submit to NERC annually a list of all load-serving entities within the Region. NERC will bill all load-serving entities in the Region for the Corporation's costs for the delegated functions based on Net Energy for Load and be responsible for collection.

5.9.2 Application Fee, User-Fees and Other Charges. The Corporation may charge a nominal fee, which shall be determined by the President, for the submission of applications for membership. The Board of Directors may from time to time fix the amount of user-fees or other charges, if any, for activities that are not delegated to the Corporation by NERC under the Delegation Agreement and determine the methods of collection from entities that choose to participate in such activities.

Section 5.10. Penalties. If the Corporation initiates an investigation that leads to the imposition of a penalty, the Corporation shall receive any penalty monies that results from the investigation. All monies which the Corporation collects from the issuance of penalties shall be applied as a general offset to the Corporation's budget requirements for the subsequent fiscal year. Funds from financial penalties shall not be directly applied to any program maintained by the Corporation.

ARTICLE VI. MEETING OF MEMBERS

Section 6.1. Annual Meeting of Members. The Members shall hold an annual meeting in December of each year, or at such other time specified by the Board. At the annual meeting of Members: (i) each Industry Sector shall elect the successor(s), if any, for any director(s) from their Industry Sector whose term will expire before the next annual meeting of the Members, provided however, that any Industry Sector may elect a successor director representing such Industry Sector prior to such annual meeting, in accordance with the provisions of this Article VI, in which case the election of such succeeding director(s) shall be reported to the Corporation at such annual meeting; (ii) the President and Treasurer shall report on the activities and financial condition of the Corporation; (iii) the Industry Sectors shall elect a slate of at-large and independent directors to fill vacancies or expiring terms; and (iv) the Industry Sectors shall consider and act upon such other matters as are consistent with the notice of the annual meeting. The failure to hold an annual meeting in accordance with these Bylaws shall not affect the validity of a corporate action.

Section 6.2. Special Meetings of Members. Special meetings of the Members may be called by six (6) directors on the Board, by the President, or by Members if at least ten percent (10%) of the Regular Members sign, date, and deliver to the President one or more written demands for a special meeting describing the purpose for which it is to be held. Within fifteen (15) days after receipt of a demand for a special meeting from Regular Members, the President shall cause a special meeting to be called and held on notice in accordance with Section 6.4 of these Bylaws. If the President fails to cause a special meeting to be called and held as required by this Section 6.2, a Regular Member making the demand may call the meeting by giving notice under Section 6.4. In either event, notice of the meeting and the costs of the meeting shall be at the expense of the Corporation. The business transacted at a special meeting is limited to

the purposes stated within the notice of the meeting. Business transacted at a special meeting that is not included in those stated purposes is voidable by or on behalf of the Corporation, unless ninety percent (90%) of the Regular Members entitled to vote were present at such meeting or have waived notice of the meeting under Section 6.4.

Section 6.3. Location of Meetings of Members. Meetings of Members shall be held at a location designated by the President or the Board. If a Regular Member calls a meeting pursuant to Section 6.2, the Regular Members making the demand for the meeting may designate the location, provided the meeting must be held within the Region and in a facility of appropriate size to accommodate the Members.

Section 6.4. Notice of Meetings.

6.4.1 Notice Requirements. Notice of meetings of Members must be given at least five (5) days before the date of a meeting and not more than sixty (60) days before the date of a meeting. The notice must contain the date, time and place of the meeting, instructions for electronic attendance or voting, if applicable, and an agenda of the matters upon which action may be taken at the meeting. A matter may be added to the agenda of a meeting at the meeting upon the affirmative vote of three-quarters (3/4) of the Industry Sector votes cast on a motion to amend the agenda. If the meeting is an adjourned meeting and the date, time and place of the meeting were announced at the time of the adjournment, notice is not required unless a new record date for the adjourned meeting is or must be fixed. Notice shall be deemed given by the Corporation to the Members when (a) posted on the Corporation's public website in a reasonably prominent location, and (b) sent by mail, facsimile or reputable overnight delivery service or by electronic transmission to each Member's representative authorized pursuant to Section 6.10.1

6.4.2 Waiver of Notice; Objections. A Member may waive notice of a meeting of Members. A waiver of notice by a Member entitled to notice is effective whether given before, at, or after the meeting, and whether given in writing, or by attendance. Attendance by a Member at a meeting is a waiver of notice of that meeting, unless the Member objects at the beginning of the meeting to the transaction of business because the meeting is not lawfully called or convened, or objects before a vote on an item of business because the item may not lawfully be considered at that meeting and does not participate in the consideration of the item at that meeting.

Section 6.5. Record Date. The Board may fix a date not more than sixty (60) days before the date of a meeting of Members as the date for the determination of the Members entitled to notice of and entitled to vote at the meeting. When a date is so fixed, only Members on that date are entitled to notice and to vote at the meeting unless the Board fixes a new date for determining the right to notice and to vote, which it must do if the meeting is adjourned to a date more than sixty (60) days after the record date for determining Members entitled to notice of the original meeting.

Section 6.6. Right to Vote; Act of Members.

6.6.1 Industry Sector Voting. Voting of the Members shall be by Industry Sector, with each Industry Sector entitled to cast one vote. Each Member entitled to vote in an Industry Sector shall be entitled to cast one vote in its Industry Sector. The vote of each Industry Sector shall be split into an affirmative component based on votes for the pending motion, and a negative component based on votes against the pending motion, in direct proportion to the votes cast within the Industry Sector for and against the pending motion, rounded to two decimal places. To the extent practicable, all Member votes may be held electronically under such terms and conditions as are approved by the Board.

6.6.2 Act of Members. If a quorum is present, except with respect to any matter described in Section 6.6.3, a majority of the Industry Sector votes cast on the matter shall be the act of the Members.

6.6.3 Special Voting Requirements. Notwithstanding any other provision of these Bylaws, and except as set forth in the Certificate of Incorporation and Section 13.2 of these Bylaws, two-thirds (2/3) of the Industry Sector votes cast shall be required to:

- (a) Amend the Bylaws, except as otherwise provided in Section 19.1 of these Bylaws. The substance of the proposed amendment must be contained in the notice of the meeting at which the vote will be taken; however, the Members may modify a proposed Bylaw amendment at the meeting.
- (b) Approve any proposal to terminate the Corporation.

Section 6.7. Quorum. A quorum for a meeting of Members is a majority of the Regular Members entitled to vote in each Industry Sector at the meeting. A quorum for a meeting of an Industry Sector is a majority of the Regular Members of that Industry Sector entitled to vote at the meeting. In both cases, electronic participation is acceptable if authorized by the Board. A quorum is necessary for the transaction of business at a meeting of Members or of any Industry Sector. If a quorum is not present, a meeting may be adjourned for that reason by the Industry Sectors or Regular Members then represented or present.

Section 6.8. Action by Written Ballot. All elections of directors shall be by written ballot. The requirement of a written ballot shall be satisfied by a ballot submitted by electronic transmission provided that any such electronic transmission must either set forth or be submitted with information from which it can be determined that the electronic transmission was authorized by the Member.

Section 6.9. Action by Electronic Communication. A conference among Members by a means of communication through which the participants may simultaneously hear each other during the conference is a meeting of the Members, if the same notice is given of the conference as would be required for a meeting and if the number of persons participating in the conference is a quorum. Participation in a meeting by this means is personal presence at the meeting. A Member may participate in a meeting of the Members by a means of communication through which the Member,

other persons participating, and all persons physically present at the meeting may simultaneously communicate with each other during the meeting. Participation in a meeting by this means constitutes personal presence at the meeting.

Section 6.10. Member Representatives; Proxies.

6.10.1 Designation of Representative. Each year prior to the annual meeting of Members, each Regular Member shall designate the individual authorized to vote on Corporation matters on behalf of the Member, in accordance with procedures approved by the Board. A Regular Member may change such designation at any time by providing at least twenty-four (24) hour written notice to the Secretary of the Corporation. Such notice may be provided by electronic transmission.

6.10.2 Authorization. The individual designated to vote by a Regular Member may appoint a proxy to vote or otherwise act for the Regular Member at any meeting by signing an appointment form either personally or by an attorney so designated by the Regular Member. Such authorization may be in writing or by means of electronic transmission to the person who will be the holder of the proxy, provided that such electronic transmission must either set forth or be submitted with information from which it can be determined that the electronic transmission was authorized by the Member representative.

6.10.3 Effective Period. An appointment of a proxy is effective when received by the Secretary or other officer or agent authorized to tabulate votes. An appointment is valid for the next regular or specially scheduled meeting or ballot by electronic transmission. However, a proxy is not valid for more than sixty (60) days from its date of execution.

6.10.4 Revocation. An appointment of a proxy is revocable by a Regular Member. Appointment of a proxy is revoked by the person appointing the proxy either by open declaration at a meeting or by signing and delivering a revocation in writing or by electronic transmission to the Secretary or other officer or agent authorized to tabulate proxy votes. This may be done either in a statement that the appointment of the proxy is revoked or by a subsequent appointment that shall serve to cancel all prior proxies.

Section 6.11. Public Notice of Member Meetings. Notice to the public of the dates, times and places of meetings of the Members, and all nonconfidential material provided to the Members, shall be posted on the Corporation's website at approximately the same time that notice is given to the Members. Meetings of the Members shall be open to the public, subject to reasonable limitations due to the availability and size of meeting facilities; provided, that the meeting may be held in or adjourn to closed session to discuss matters of a confidential nature, including, but not limited to, personnel matters, compliance and enforcement matters, litigation or commercially sensitive or critical infrastructure information of a Member or other Person.

Section 6.12. Posting of Minutes. Minutes of meetings of Members shall be posted on the Corporation's website when available.

Section 6.13. Reimbursement of Member Expenses. The Corporation will be under no obligation to reimburse Members for expenses associated with their attendance at regular or special Member meetings.

ARTICLE VII. BOARD OF DIRECTORS

Section 7.1. General. The composition of the Board and the terms of office of the directors, the manner of their nomination, election or appointment, and other terms and conditions of their service, shall be as provided in the Certificate of Incorporation and these Bylaws if not inconsistent therewith.

Section 7.2. Management of Corporation. The business of the Corporation shall be managed under the direction of the Board. Specific functions of the Board shall include, but not be limited to:

- (a) govern the Corporation and oversee all of its activities;
- (b) establish and oversee all organizational groups;
- (c) approve, revise and enforce Reliability Standards utilizing a fair, open, balanced and inclusive process;
- (d) establish compliance monitoring procedures and requirements, and penalties and sanctions for non-compliance consistent with applicable NERC Rules;
- (e) impose penalties and sanctions consistent with the NERC Rules and the procedures approved by the Board;
- (f) establish and approve an annual budget for submission to NERC;
- (g) hire the Corporation's president and approve his or her salary;
- (h) annually at the first regular Board meeting following the annual meeting of Members, elect a Chair ("Chair") and a vice-chair from among the directors on the Board, and a lead independent director from among the independent directors on the Board; and
- (i) establish Board committees as appropriate.

Section 7.3. Voting. Each director shall have one vote with respect to decisions of the Board.

Section 7.4. Composition of the Board.

(a) The Board shall consist of fourteen (14) or fifteen (15) directors which number shall be established from time to time by resolution of the Board, which resolution shall in no event have the effect of terminating the term of any incumbent director. The President of ReliabilityFirst shall be a non-voting ex officio member of the Board of Directors. The President shall be entitled to notice of and attendance at meetings, except those portions of a meeting at which matters directly relating to the President's performance, contract and/or compensation are discussed.

(b) Eight directors shall be elected by the Industry Sectors as follows:

- (i) Suppliers shall elect two (2) directors;
- (ii) Transmission Companies shall elect two (2) directors;
- (iii) RTOs shall select one (1) director;
- (iv) Small LSEs shall elect one (1) director;
- (v) Medium LSEs shall elect one (1) director; and
- (vi) Large LSEs shall elect one (1) director.

(c) Three (3) directors shall be at-large. At-large directors shall be elected by all of the Industry Sectors voting together as a single class.

(d) Three (3) directors, if the Board consists of fourteen (14) directors, and four (4) directors, if the Board consists of fifteen (15) directors, shall be independent from the Corporation and any Member or any Affiliate or Related Party of any Member. Independent directors shall be elected by all of the Industry Sectors voting together as a single class.

(e) Industry Sectors shall elect their respective sector and at-large directors from among individuals holding senior management positions in Member organizations. Any sector-elected or at-large director whose Member organization changes Industry Sectors or who ceases to hold a senior management position in a Member organization shall continue to serve out his or her remaining term, unless such director resigns or is removed. No two directors may be employees of a single Member or any Affiliate or Related Party of a Member or any Affiliate.

(f) An independent director is a person (i) who is not an officer or employee of the Corporation, an officer, director, or employee of a Member, or an officer, director or employee of any entity that would reasonably be perceived as having a direct financial interest in the outcome the Board's decisions, or (ii) who does not have a relationship that would interfere with the exercise of independent judgment in carry out the responsibilities of a director. The Board may adopt additional standards for director independence not inconsistent herewith.

(g) At-large and independent directors shall be nominated by the nominating and governance committee of the Board. When nominating at-large directors, the nominating and governance committee shall consider such factors as the geographic and functional representation of the Board. The nominating

and governance committee shall seek out for nomination independent directors from diverse backgrounds, who will contribute to the effective functioning of the Board and the Corporation by bringing a broad range of industry expertise, viewpoints, experiences, skill sets and knowledge. If an incumbent independent director is not re-nominated, the nominating and governance committee will use reasonable efforts to ensure that diverse candidates are in the pool of potential nominees for the open independent director position and may retain an independent consultant to identify individuals qualified and willing to serve as an independent director.

(h) Any director which the full Board has determined has a conflict of interest on any compliance or enforcement matter brought before the Board shall not vote on such matter and shall recuse himself or herself from all Board deliberations concerning such matter.

(i) There will be no alternates or proxies for directors.

Section 7.5. Terms of Directors. The directors will be divided into three classes. The number of directors in each class shall be as nearly equal as possible. The term of office of the first class will expire at the second annual meeting of Members; the term of office of the second class will expire one year thereafter; and the term of office of the third class two years thereafter. At each annual meeting of Members, directors shall be chosen for a three year term to succeed those whose term expires. No two at-large directors and no two directors of the same Industry Sector shall be in the same class. At least one (1) independent director shall be in each class. Each director shall hold office until (a) the expiration of the term for which he or she was elected and until his or her successor is elected and qualified, or (b) his or her earlier death, resignation or removal. Any director may be removed at any time by the affirmative vote of two-thirds of the Industry Sector or Industry Sectors, as applicable, electing such director. A director may be removed by the Board for non-attendance at three consecutive Board meetings.

Directors shall not be eligible to serve more than four (4) consecutive full terms; provided, however, that the Board may act to allow a one (1) term discretionary exception to this limitation for any director.

Section 7.6. Reimbursement. Independent directors shall have the right to reimbursement by the Corporation of their actual reasonable travel expenses to Board meetings or when specifically selected to represent the Corporation at a business meeting. The directors elected by the Industry Sectors and the at-large directors shall not be reimbursed by the Corporation for any expenses, unless specifically approved in advance by resolution of the Board.

Section 7.7. Resignations; Vacancies.

(a) Resignations. A director may resign from the Board upon notice given in writing or by electronic transmission to the Corporation. Such resignation shall take effect at the time identified in the notice as the effective

date of resignation.

(b) Vacancies. If a notice of resignation provides that the effective date of resignation will occur on a future date within an unexpired term, the Industry

Sector or Industry Sectors, as applicable, may elect a successor director to fill the impending vacancy prior to the effective date of the resignation, in accordance with the procedures and requirements set forth above. The successor director elected by the Industry Sector or Industry Sectors, as applicable, shall commence on the effective date of the resigning director's resignation and hold office for the unexpired term of the vacated directorship replaced.

If a successor Industry Sector or at-large director is not elected prior to the resignation effective date, or if an Industry Sector or at-large director resigns, dies or otherwise becomes incapacitated or is removed during the term of office for which elected, the directorship shall thereupon be vacant and shall be filled by the Industry Sector or Industry Sectors, as applicable, by written or electronic ballot in accordance with the procedures and requirements set forth above. The successor director elected by the Industry Sector or Industry Sectors, as applicable, shall hold office for the unexpired term of the vacated directorship replaced.

If a successor independent director is not elected prior to the resignation effective date, or if an independent director resigns, dies or otherwise becomes incapacitated or is removed during the term of office for which elected or ceases to be independent, as determined by the Board, his or her directorship shall thereupon be vacant and may be filled by resolution of the Board and any independent director so chosen shall hold office until the next annual meeting of Members, at which time a permanent successor shall be elected by the Industry Sectors for the remainder of the unexpired term. Upon an increase in the number of directors on the Board in accordance with Section 7.4(a) of these Bylaws, the independent directorship created thereby may be filled by resolution of the Board and any independent director so chosen shall hold office until the next annual meeting of Members, at which time a permanent successor shall be elected by the Industry Sectors for the remainder of such director's unexpired term.

Section 7.8. Meetings; Notice; Waiver.

(a) Meetings. An annual meeting of the Board shall be held without notice immediately following the annual meeting of the Members. The Board shall elect the Chair and Vice-Chair for the next year at the annual meeting. In addition, regular meetings may be held at such time or times as fixed by the Board. Special meetings of the Board may be called by the Board's Chair, the President or by any three directors and shall be held at the principal office of the Corporation, or such other place within the Region as determined by the Chair or the President after consultation with the Board.

(b) Notice. Notice of the dates, times, and places of all regular and special meetings of the Board shall be published by the Secretary and provided to all directors and Members not less than three (3) days prior to the date of the meeting. Notice shall be deemed given by the Corporation to directors and the Members when (a) posted on the Corporation's public website in a reasonably

prominent location, and (b) sent by mail, facsimile or reputable overnight delivery service or by electronic transmission to each director and each Member's representative authorized pursuant to Section 6.10.1.

(c) Waiver. Any person entitled to notice of a regular or special meeting of the Board may waive notice thereof. A waiver of notice by a person entitled to notice is effective whether given before, at, or after the meeting, and whether given in writing or by attendance. Attendance by a director at a meeting of the Board is a waiver of notice of that meeting, unless the director objects at the beginning of the meeting to the transaction of business because the meeting is not lawfully called or convened, or objects before a vote on an item of business because the item may not lawfully be considered at that meeting and does not participate in the consideration of the item at that meeting.

Section 7.9. Quorum. For the Board to take action at a meeting, a quorum of directors must be present. A quorum is a majority of the directors then in office, provided that: (a) if there are three or four independent directors holding office, two independent directors must be present to constitute a quorum, or (b) if there are two independent directors holding office, one independent director must be present to constitute a quorum. If there is only one independent director or no independent directors holding office, there is no requirement that an independent director be present in order for the Board to have a quorum. In the absence of a quorum, a majority of the directors present may adjourn a meeting, without notice, except as may be given at such meeting, until a quorum is present.

Section 7.10. Board Action. The act of a majority of the directors present at a meeting at which a quorum is present shall be the act of the Board, unless the act of a greater number is required by law or these Bylaws.

Section 7.10.1 Board Approval of President's Compensation. Notwithstanding the foregoing, Board approval of the President's compensation requires both: 1) endorsement by all independent directors, and 2) approval by a majority of the Board.

Section 7.11. Action Without a Meeting. Any action required or permitted to be taken at any meeting of the Board or any committee thereof may be taken without a meeting if all members of the Board or committee, as the case may be, consent thereto in writing or by electronic transmission, and the writing or writings or electronic transmission or transmissions are filed with the minutes of proceeding of the Board or the committee. Any nonconfidential material provided to the Board or a committee in connection with such action shall be posted on the Corporation's website at approximately the same time that it is given to the Board or the committee. The results of all actions taken by the Board or any committee thereof without a meeting shall be promptly posted on the Corporation's website.

Section 7.12. Action by Electronic Communication. A conference among directors by a means of communication through which the directors may simultaneously hear each other during the conference is a Board meeting if the same notice is given of the conference as would be required for a meeting and if the number of directors

participating in the conference is a quorum. Participation in a meeting by this means constitutes personal presence at the meeting. A director may participate in a Board meeting by any means of communication through which the director, other directors

participating, and all directors physically present at the meeting may simultaneously communicate with each other during the meeting.

Section 7.13. Board Committees. The Board shall have an audit committee, compensation committee, nominating and governance committee and compliance committee, and such other committees the Board deems necessary and appropriate. Each committee shall be comprised of not less than three directors. The compliance committee shall be comprised of a minimum of five directors, a majority of whom are independent directors. All independent directors shall serve on the compliance committee. The Board may require that a minimum number of independent directors serve on any or all other Board committees. The Board shall have the power to appoint, and to delegate authority to, such other committees of the Board as it determines to be appropriate from time to time. The Board may require any committee to adopt a charter, subject to approval by the Board, governing the activities and authority of the committee and the composition of its members.

Section 7.14. Hearing Body. The Board shall establish policies and procedures governing the designation of members to the Hearing Body pursuant to the NERC Rules of Procedure's Consolidated Hearing Process.

Section 7.15. Public Notice of Board Meetings. Notice to the public of the dates, times and places of Board meetings, including committees thereof, and all nonconfidential material provided to the Board or the committees, shall be posted on the Corporation's website, and notice of Board and committee meetings shall be sent by electronic transmission to Members, at approximately the same time that notice is given to the Board or the committee, as the case may be. Board and committee Meetings shall be open to all Members and the public, subject to reasonable limitations due to the availability and size of meeting facilities; provided, that any meeting may be held in or adjourn to closed session to discuss matters of a confidential nature, including, but not limited to, personnel matters, compliance and enforcement matters, litigation or commercially sensitive or critical infrastructure information of a Member or other Person.

Section 7.16. Posting of Minutes. Minutes of Board and committee meetings shall be posted on the Corporation's website when available.

Section 7.17. Compensation of Directors. The directors elected by the Industry Sectors and the at-large directors shall not receive compensation for their service to the Corporation as directors on the Board. The independent directors shall be entitled to such compensation as the Board may from time to time determine. Nothing contained in these Bylaws shall preclude any director from receiving compensation for services to the Corporation in any other capacity.

ARTICLE VIII. ORGANIZATIONAL GROUPS

Section 8.1. Establishment of Organizational Groups. The Board shall establish such organizational groups, consisting of committees, sub-committees, task forces and working groups of Members, as are necessary and appropriate to accomplish the purposes of the Corporation in an efficient and cost-effective manner. All organizational groups shall be subject to the direction and control of the Board. The membership of organizational groups shall be determined based upon experience, expertise and geographic diversity and to the extent practicable shall include balanced representation of the Industry Sectors. The Board shall establish policies and procedures governing the creation of organizational groups, how they are populated, how voting and related matters are conducted, how they may be reorganized and the direction and termination of such groups. The Board shall conduct a review of all organizational groups of the Corporation on an annual basis to ensure that the business of the Corporation is conducted in an efficient, cost-effective manner.

Section 8.2. Reimbursement. The Board may authorize reimbursement for persons acting on behalf of the Corporation, as necessary in the interests of the Corporation.

ARTICLE IX. OFFICERS

Section 9.1. Officers. The officers of the Corporation shall include a President, one or more Vice Presidents, a Secretary, a Treasurer and any other officers as may be elected or appointed in accordance with the provisions of this Article. The Board may elect or appoint any additional officers that it deems desirable, such other officers to have the authority and perform the duties prescribed by the Board. The same individual may hold any number of offices, except that of President.

Section 9.2. Election and Term of Office. The officers of the Corporation shall be elected annually by the Board at the annual meeting of the Board. Each officer shall hold office at the pleasure of the Board. If the election of officers is not held at such meeting, such election shall be held as soon thereafter as is convenient. New officers may be created and the positions filled at any meeting of the Board. Each elected officer shall hold office until his or her successor has been duly elected and qualified or upon his or her earlier resignation or removal.

Section 9.3. Removal. Any officer elected by the Board may be removed by the affirmative vote of two-thirds (2/3) of the Board whenever in its judgment the best interests of the Corporation would be served thereby, but such removal shall be without prejudice to the contract rights, if any, of the officer so removed. Election or appointment of an officer or agent shall not of itself create contract rights.

Section 9.4. Vacancies. A vacancy in any office because of death, incapacity, resignation, removal, disqualification, or otherwise, may be filled by the Board for the unexpired portion of the term.

Section 9.5. President. The President shall:

- (a) be the principal executive and operating officer of the Corporation;
- (b) sign certificates of membership, and may sign any deeds, mortgages, deeds of trust, notes, bonds, contracts or other instruments authorized by the Board to be executed, except in cases in which the signing and execution thereof shall be expressly delegated by the Board or by these Bylaws to some other officer or agent of the Corporation; and
- (c) perform all duties incident to the office of President, including hiring and directing staff, and such other duties as may be prescribed by the Board from time to time.

Section 9.6. Vice Presidents. The Vice President(s) shall perform such duties and have such powers as the Board or President may from time to time prescribe. At the request of the Board, the Vice President (or in the event there be more than one Vice President, the Vice Presidents in the order designated, or in the absence of any designation, then in the order of their election) shall perform the duties of the President, and when so acting, shall have all the powers of and be subject to all the restrictions upon the President.

Section 9.7. Secretary. The Secretary shall ensure that the following duties are carried out:

- (a) the minutes of the meetings of the Members and of the Board, and each committee thereof, are recorded;
- (b) all required notices are duly given in accordance with these Bylaws and as required by law;
- (c) a register of the current names and addresses of all Members is maintained and posted on the Corporation's website;
- (d) a complete copy of the Certificate of Incorporation and Bylaws of the Corporation containing all amendments thereto are kept on file at all times and posted on the Corporation's website, which copies shall always be open to the inspection of any Member; and

(e) generally perform all duties incident to the office of Secretary and such other duties as may be prescribed by the Board from time to time.

Section 9.8. Treasurer. The Treasurer shall be responsible for the following activities:

(a) maintain custody of all funds and securities of the Corporation;

(b) receipt of and the issuance of receipts for all monies due and payable to the Corporation and for deposit of all such monies in the name of the Corporation in such bank or banks or financial institutions as shall be selected by the Board; and

(c) generally perform all duties incident to the office of Treasurer and such other duties as may be prescribed by the Board from time to time.

ARTICLE X. CERTIFICATES OF MEMBERSHIP

Section 10.1. Certificates of Membership. The Board may, but need not, provide for the issuance of certificates evidencing membership in the Corporation, which certificates shall be in such form as may be determined by the Board.

ARTICLE XI. BOOKS AND RECORDS

Section 11.1. Books and Records; Financial Statements. The Corporation shall keep at such office selected by the Board correct and complete copies of its Certificate of Incorporation and Bylaws, accounting records, and minutes of meetings of Members, Board, and committees having any of the authority of the Board. A Member, or the agent or attorney of a Member, may inspect all books and records for any proper purpose at any reasonable time. Upon request, the Corporation shall give the Member a statement showing the financial result of all operations and transactions affecting income and expenses during its last annual accounting period and a balance sheet containing a summary of its assets and liabilities as of the closing date of the accounting period.

ARTICLE XII. FISCAL YEAR

Section 12.1. Fiscal Year. The fiscal year of the Corporation shall be the calendar year.

ARTICLE XIII.
TRANSFER OF ASSETS

Section 13.1. Member Approval Not Required. Subject to restrictions set forth in the Certificate of Incorporation, the Corporation, by affirmative vote of the Board, may sell, lease, transfer, or dispose of its property and assets in the usual and regular course of its activities and grant a security interest in all or substantially all of its property and assets in the usual and regular course of its activities, upon those terms and conditions and for those considerations, which may be money, securities, or other instruments for the payment of money or other property, as the Board considers expedient, in which case no Member approval is required.

Section 13.2. Member Approval Required. Subject to restrictions set forth in the Certificate of Incorporation, the Corporation may sell, lease, transfer, or dispose of all or substantially all of its property and assets, including its good will, not in the usual and regular course of its activities, upon those terms and conditions and for those considerations, which may be money, securities, or other instruments for the payment of money or other property, as the Board considers expedient only when approved at a regular or special meeting of the Members by the affirmative vote of two-thirds (2/3) of all the Members. Notice of the meeting must be given to the Members. The notice must state that a purpose of the meeting is to consider the sale, lease, transfer, or other disposition of all or substantially all of the property and assets of the Corporation.

ARTICLE XIV.
CONTRACTS, CHECKS, DEPOSITS, AND GIFTS

Section 14.1. Contracts. The Board may authorize any officer or officers or agent or agents of the Corporation, in addition to the officers so authorized by these Bylaws, to enter into any contract or execute and deliver any instrument in the name of and on behalf of the Corporation, and such authority may be general or may be confined to specific instances.

Section 14.2. Checks, Drafts, or Orders. All checks, drafts, or orders for the payment of money, notes, or other evidences of indebtedness issued in the name of the Corporation, may be signed by such officer or officers or agent or agents of the Corporation, and in such manner, as shall from time to time be determined by resolution of the Board.

Section 14.3. Deposits. All funds of the Corporation shall be deposited to the credit of the Corporation in such banks, trust companies, or other depositories as the Board may select.

Section 14.4. Gifts. The Board may accept on behalf of the Corporation any contribution, gift, bequest, or devise for any purpose of the Corporation.

ARTICLE XV.
INSURANCE, LIMITATION ON LIABILITY AND INDEMNIFICATION

Section 15.1. Insurance. The President is authorized to procure insurance to protect the Corporation against damages arising out of or related to any directive, order, procedure, action or requirement of the Corporation.

Section 15.2. Limitations on Liability. As provided in Article Fourteenth of the Certificate of Incorporation, a director of the Corporation shall not be personally liable to the Corporation or its Members for monetary damages for breach of fiduciary duty as a director, except for liability (i) for any breach of the director's duty of loyalty to the Corporation or its Members, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) under Section 174 of the Delaware General Corporation Law or (iv) for any transaction from which the director derived any improper personal benefit. If the Delaware General Corporation Law is amended to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the Delaware General Corporation Law, as so amended. Any repeal or modification of Article Fifteenth of these Bylaws by the Members of the Corporation shall not adversely affect any right or protection of a director of the Corporation existing at the time of such repeal or modification.

Section 15.3. Right to Indemnification.

15.3.1 Indemnified Persons. Each person who was or is made a party or is threatened to be made a party to or is involved in or called as a witness in any Proceeding because he or she is an Indemnified Person shall be indemnified and held harmless by the Corporation to the fullest extent permitted under the Delaware General Corporation Law (the "DGCL"), as the same now exists or may hereafter be amended (but, in the case of any such amendment, only to the extent that such amendment permits the Corporation to provide broader indemnification rights than the DGCL permitted the Corporation to provide prior to such amendment). Such indemnification shall cover all expenses incurred by an Indemnified Person (including, but not limited to, attorneys' fees and other expenses of litigation) and all liabilities and losses (including, but not limited to, judgments, fines, ERISA or other excise taxes or penalties and amounts paid or to be paid in settlement) incurred by such person in connection therewith.

15.3.2 Denial of Authorization for Certain Proceedings. Notwithstanding anything to the contrary in this Section 15.3, except with respect to indemnification of Indemnified Persons specified in paragraph 15.3.3 of this Section 15.3, the Corporation shall indemnify an Indemnified Person in connection with a Proceeding (or part thereof) initiated by such person only if authorization for such Proceeding (or part thereof) was not denied by the Board of the Corporation prior to the earlier of 60 days after receipt of notice thereof from such Indemnified Person.

15.3.3 Certain Defined Terms. For purposes of this Section 15.3, the following terms shall have the following meanings (such meanings to be equally applicable to both the singular and plural forms of the terms defined):

(1) a “Proceeding” is any investigation, action, suit or proceeding, whether civil, criminal, administrative or investigative, and any appeal therefrom.

(2) an “Indemnified Person” is a person who is, was, or had agreed to become a Director of the Corporation (including, in the case of such person seeking indemnification while serving as a Director who is or was an officer of the Corporation, such person in his capacity as an officer.)

15.3.4 Expenses. Expenses, including attorneys’ fees, incurred by a person indemnified pursuant to paragraph 15.3.1 in defending or otherwise being involved in a Proceeding shall be paid by the Corporation in advance of the final disposition of such Proceeding, including any appeal therefrom, upon receipt of an undertaking (the “Undertaking”) by or on behalf of such person to repay such amount if it shall ultimately be determined that he or she is not entitled to be indemnified by the Corporation; provided that in connection with a Proceeding (or part thereof) initiated by such person, except a Proceeding authorized by paragraph 15.3.5, the Corporation shall pay said expenses in advance of final disposition only if authorization for such Proceeding (or part thereof) was not denied by the Board of the Corporation prior to the earlier of 60 days after receipt of a request for such advancement accompanied by the Undertaking. A person to whom expenses are advanced pursuant hereto shall not be obligated to repay such expenses until the final determination of any pending Proceeding in a court of competent jurisdiction concerning the right of such person to be indemnified or the obligation of such person to repay such expenses.

15.3.5 Protection of Rights. If a claim by an Indemnified Person under paragraph 15.3.1 is not promptly paid in full by the Corporation after a written claim has been received by the Corporation or if expenses pursuant to paragraph 15.3.4 have not been promptly advanced after a written request for such advancement by an Indemnified Person (accompanied by the Undertaking required by paragraph 15.3.4) has been received by the Corporation, the claimant may at any time thereafter bring suit against the Corporation to recover the unpaid amount of the claim or the advancement of expenses. If successful, in whole or in part, in such suit, such claimant shall also be entitled to be paid the reasonable expense thereof. It shall be a defense to any such action (other than an action brought to enforce a claim for expenses incurred in defending any Proceeding in advance of its final disposition where the Undertaking has been tendered to the Corporation that indemnification of the claimant is prohibited by law, but the burden of proving such defense shall be on the Corporation. Neither the failure of the Corporation (including the Board, independent legal counsel, or the Members) to have made a determination, if required, prior to the commencement of such action that indemnification of the claimant is proper in the circumstances, nor an actual determination by the Corporation (including the Board, independent legal counsel, or the Members) that indemnification of the claimant is prohibited, shall be a defense to the action or create a presumption that indemnification of the claimant is prohibited.

15.3.6 Miscellaneous.

(a) Non-Exclusivity of Rights. The rights conferred on any person by this Section 15.3 shall not be exclusive of any other rights which such person may have or hereafter acquire under any statute, provision of the Certificate of Incorporation, Bylaw, agreement, vote of Members or disinterested directors or otherwise. The Board shall have the authority, by resolution, to provide for such other indemnification of directors, and such indemnification of officers, delegates, employees, agents, or others of the Corporation as it shall deem appropriate.

(b) Insurance, contracts, and funding. The Corporation may maintain insurance, at its expense, to protect itself and any director, officer, employee, delegate or agent of the Corporation against any expenses, liabilities or losses, whether or not the Corporation would have the power to indemnify such person against such expenses, liabilities or losses under the DGCL. The Corporation may enter into contracts with any director, officer, or employee of the Corporation in furtherance of the provisions of this Section 15.3 and may create a trust fund, grant a security interest or use other means (including, without limitation, a letter of credit) to ensure the payment of such amounts as may be necessary to effect the advancing of expenses and indemnification as provided in such contracts or as otherwise provided in this Section 15.3.

(c) Contractual nature. The provisions of this Section 15.3 shall continue as to a person who has ceased to be a director and shall inure to the benefit of the heirs, executors and administrators of such person. This Section 15.3 shall be deemed to be a contract between the Corporation and each person who, at any time that this Section 15.3 is in effect, serves or agrees to serve in any capacity which entitles him to indemnification and advancement of expenses hereunder and any repeal or other modification of this Section 15.3 or any repeal or modification of the DGCL or any other applicable law shall not limit any rights of indemnification for Proceedings then existing or arising out of events, acts or omissions occurring prior to such repeal or modification, including, without limitation, the right to indemnification and advancement of expenses for Proceedings commenced after such repeal or modification to enforce this Section 15.3 with regard to Proceedings arising out of acts, omissions or events arising prior to such repeal or modification.

(d) Cooperation. Each Indemnified Person shall cooperate with the person, persons or entity making the determination with respect to such Indemnified Person's entitlement to indemnification under this Section 15.3, including providing to such person, persons or entity upon reasonable advance request any documentation or information which is not privileged or otherwise protected from disclosure and which is reasonably available to such Indemnified Person and reasonably necessary to such determination. Any costs or expenses (including attorneys' fees and disbursements) incurred by such Indemnified Person in so cooperating with the person, persons or entity making such determination shall be borne by the Corporation (irrespective of the determination as to such Indemnified Person's entitlement to indemnification) and the

Corporation hereby indemnifies and agrees to hold such Indemnified Person harmless therefrom.

(e) Subrogation. In the event of any payment under this Section 15.3 to an Indemnified Person, the Corporation shall be subrogated to the extent of such payment to all of the rights of recovery of such Indemnified Person, who shall execute all papers required and take all action necessary to secure such rights, including execution of such documents as are necessary to enable the Corporation to bring suit to enforce such rights.

(f) Severability. If this Section 15.3 or any portion hereof shall be invalidated or held to be unenforceable on any ground by any court of competent jurisdiction, the decision of which shall not have been reversed on appeal, this Section 15.3 shall be deemed to be modified to the minimum extent necessary to avoid a violation of law and, as so modified, this Section 15.3 and the remaining provisions hereof shall remain valid and enforceable in accordance with their terms to the fullest extent permitted by law.

ARTICLE XVI. TRANSITION

Section 16.1. Transition Standards. The Corporation will use the existing standards, criteria, rules or guides from each existing reliability council region for those Members that join the Corporation as in effect immediately prior to formation of the Corporation until such standards, criteria, rules or guides are adopted, superseded, or rejected by the Corporation. The Corporation will establish any necessary transition committees, subcommittees, working groups or task forces to administer the existing regional reliability standards, criteria, rules and guides until they are adopted, superseded, or rejected by the Corporation. The Corporation will employ its best efforts, within two (2) years of its formation, to work toward a uniform set of Reliability Standards for the entire Region. The Board will develop and implement a standards process and a plan for transition to new Reliability Standards. This process will include a requirement that two-thirds of the directors present at a meeting must vote to adopt new Reliability Standards.

ARTICLE XVII. PARTICIPATION BY REGULATORY PARTICIPANTS

Section 17.1. Regulatory Participants. All Regulatory Participants shall be entitled to and be provided with the same rights to notice of and participation in meetings or other activities of the Corporation as are provided to Members, but shall not have the right to vote.

ARTICLE XVIII. BUDGET AND BUSINESS PLAN

Section 18.1. Budget and Business Plan. Each annual budget and business plan of the Corporation shall be approved by the Board in sufficient time in each fiscal

year to allow for timely submittal of the approved annual budget and business plan to NERC in accordance with the NERC Rules. The Corporation shall post a draft of each budget and business plan on the Corporation's website for purposes of review and comment by the Members at least ten (10) days prior to the Board meeting at which the budget and business plan are to be approved.

ARTICLE XIX.
AMENDMENT OF BYLAWS

Section 19.1. Amendment Of Bylaws. The power to adopt, amend or repeal these Bylaws is vested in the Members as set forth in Section 6.6.3 of these Bylaws; provided, however, that upon the passage of any federal electric reliability legislation, and/or the adoption of any rules or regulations of the Commission, NERC or other governmental entity with jurisdiction, the Board shall have authority to amend these Bylaws as necessary and appropriate to comply with such law, legislation, rules and regulations.

2019 and 2020 ERO Enterprise Dashboard Update

Action Update

Summary

The [2019 ERO Enterprise Dashboard](#) identify key accomplishments that align closely with the performance goals in the [ERO Enterprise Operating Plan](#). Each quarter, NERC staff provides a summary of the status towards achievement of each metric. The status of each metric is reviewed and validated by NERC management as well as internal audit staff. NERC staff will also provide a status on the draft 2020 ERO Enterprise Dashboard.

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

2019 ERO Enterprise Dashboard

Fourth Quarter Status

Thomas Coleman, Director of Risk Issue Management
Board of Trustees Meeting
November 5, 2019

RELIABILITY | RESILIENCE | SECURITY



Green



Risk indicator getting better

Neutral



Risk indicator between getting better and getting worse

Red



Risk indicator getting worse

Pass/Fail




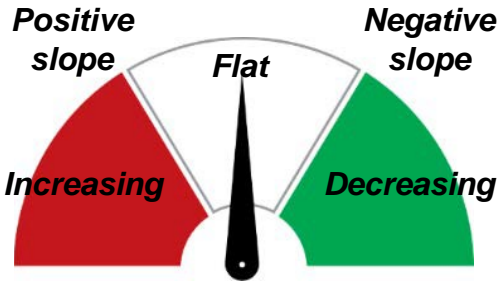
Risk indicator either met or not

- **Why is it important?**

- Measures risk to the bulk power system (BPS) from events on the Bulk Electric System (BES)

- **How is it measured?**

- Cumulative eSRI line in the composite daily event Severity Risk Index (eSRI) for Category 1–3 events (see pages 2-3 of [ERO Event Analysis Process](#) for category determination)




<p>Data (Annual Measurement)</p> <ul style="list-style-type: none"> ▪ Threshold: No Category 3 or above events: <i>Zero is green, else is red</i> 	<p>2019 Status</p> 
<p>Data (Compared to a 5-year rolling average)</p> <ul style="list-style-type: none"> ▪ Slope of eSRI line is flat to decreasing and does not show an increase above zero that is statistically significant (95% Confidence Interval). ▪ “2019 Status” relates to the slope of the 5-year rolling average (Positive, Flat or Negative), not just the 2019 performance. 	

- **Why is it important?**

- Reduce risk to BPS reliability from Standard violations by registered entities

- **How is it measured?**

- Compliance History* of with moderate/serious risk noncompliance
- The number of violations discovered through self-reports, audits, etc.
- Risk to the BPS based on the severity of Standard violations

<p>Data (Annual Measurement)</p> <ul style="list-style-type: none"> ▪ Moderate and serious risk repeat violations filed with FERC on organizations that have Compliance History (based on 2017 metric) ---- Current number is 95 	<p>2019 Status</p>  <p>A gauge chart with a semi-circular scale. The left side is red and the right side is green. The needle points to a value between the two. The number 48 is on the left and 45 is on the right.</p>
<p>Data (Annual Measurement)</p> <ul style="list-style-type: none"> ▪ Percent of noncompliance self-reported (Self-certified noncompliance is not included) (same as 2018 metric) ----Current number is 76.4% 	 <p>A gauge chart with a semi-circular scale. The left side is red and the right side is green. The needle points to a value between the two. The number 75% is on the left and 80% is on the right.</p>
<p>Data (Compared to a 3-year rolling average)</p> <ul style="list-style-type: none"> ▪ The number of serious risk violations resolved compared to the total noncompliance resolved (based on 2018 metric) --- Current number is 1.6% 	 <p>A gauge chart with a semi-circular scale. The left side is red and the right side is green. The needle points to a value between the two. The number 5% is on the left and 4% is on the right.</p>

* To measure the effectiveness of the risk-based CMEP in reducing noncompliance, NERC reviews moderate and serious risk violations and includes them in one of three categories: 1) noncompliance with no prior compliance history; 2) noncompliance with prior compliance history that does not involve similar conduct; and 3) noncompliance with compliance history that includes similar conduct.

- **Why is it important?**
 - Protection system misoperations exacerbate the impacts
- **How is it measured?**
 - Annual Misoperations rate and the annual loss of load for events with misoperations

Data (Year-Over-Year Comparison)

- Q3-Q2 comparison misoperations rate based on collection interval (95% Confidence Interval)

2019 Status

7.5%

7.0%



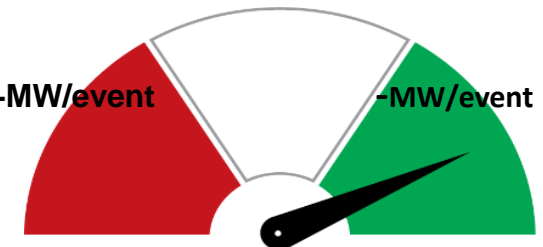
Data (Year-Over-Year Comparison)

- Q3-Q2 comparison for qualified events with misoperations and loss of load (load loss/number of events) during the collection interval (95% Confidence Interval)

No Change

+MW/event

-MW/event







- **Why is it important?**

- Reduce risk to BPS reliability due to gas-fired unit outages during cold weather or gas unavailability

- **How is it measured?**

- Firm load loss due to cold weather or gas unavailability
- MWh of potential production lost initiated by cold weather and gas unavailability

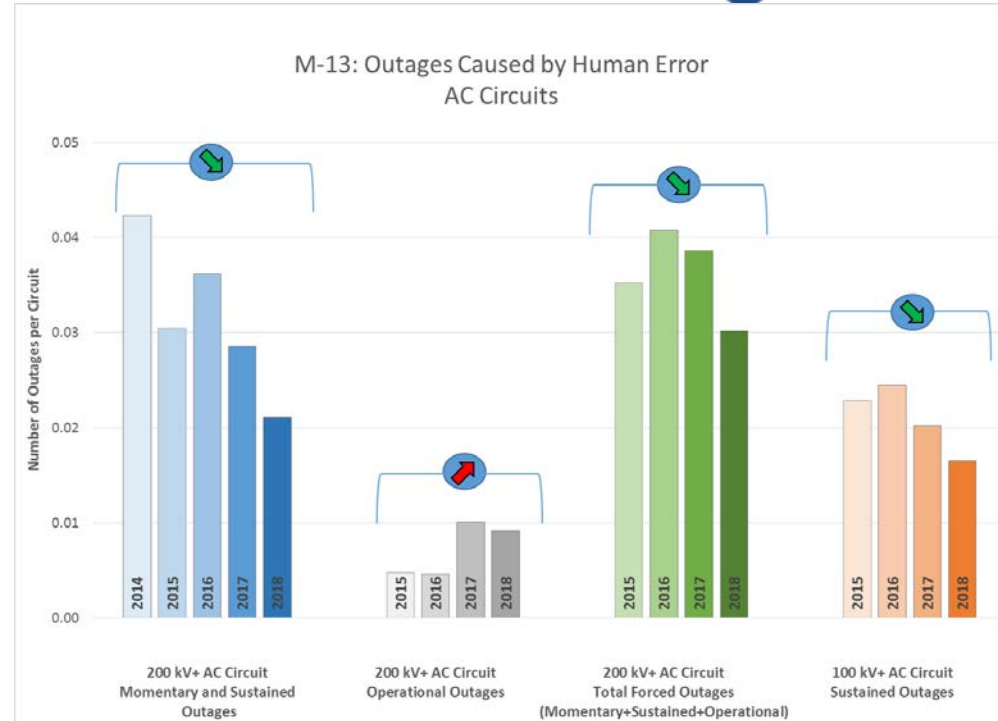
<p>Data (Annual Measurement)</p> <ul style="list-style-type: none"> ▪ No firm load loss due to gas-fired unit outages during cold weather: <i>Zero is green, else is red</i> (Cold weather months: January – March and December of the same calendar year) 	<p>2019 Status</p> 
<p>Data (Annual Measurement)</p> <ul style="list-style-type: none"> ▪ No firm load loss due to gas unavailability: <i>Zero is green, else is red</i> 	
<p>Data (Compared to a 5-year rolling average)</p> <ul style="list-style-type: none"> ▪ Percentage of winter period net MWh of potential production lost due to gas-fired unit outages during cold weather (Cold weather months: January – March and December of the same calendar year) ▪ <i>Five-year average: 0.0067%</i> 	<p>0.00149% 0.00053%</p> 
<p>Data (Compared to a 5-year rolling average)</p> <ul style="list-style-type: none"> ▪ Percentage of annual net MWh of potential production lost due gas unavailability compared to a 5-year rolling average (Due to data availability, year defined as Q3-Q2) ▪ <i>Five-year average: 0.1483%</i> 	<p>0.192% 0.0898%</p> 

- **Why is it important?**

- Measures risks to BPS reliability from three priority causes:
 1. Operator or other human performance issues
 2. Substation equipment failures or failed circuit equipment
 3. Vegetation encroachment

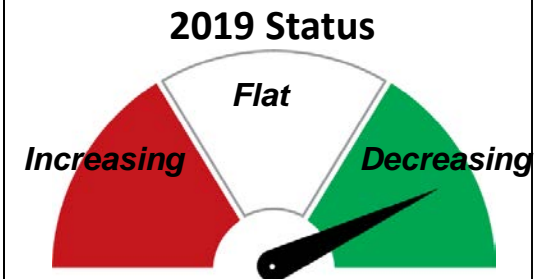
- **How is it measured?**

- Number of transmission line outages caused by Human Error divided by the total inventory of circuits



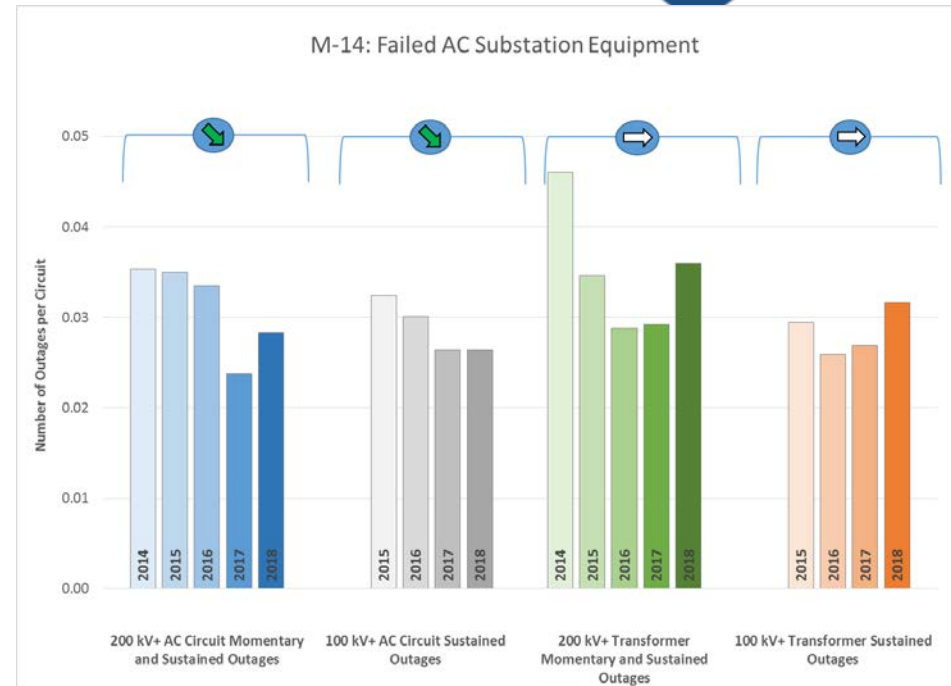
Data (Compared to a 5-year rolling average)

- Annual outage rate* decreasing compared to a 5-year rolling average (95% Confidence Interval)



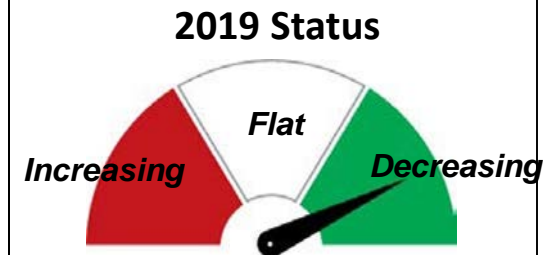
• How is it measured?

- Number of transmission line outages caused by AC substation equipment outage failures and failed AC circuit equipment (such as transformers), divided by the total inventory of circuits



Data (Compared to a 5-year rolling average)

- Annual outage rate* decreasing compared to a 5-year rolling average (95% Confidence Interval)



• How is it measured?

- Number of potential FAC-003 violations* and sustained outages**

Year: #

2019: 0

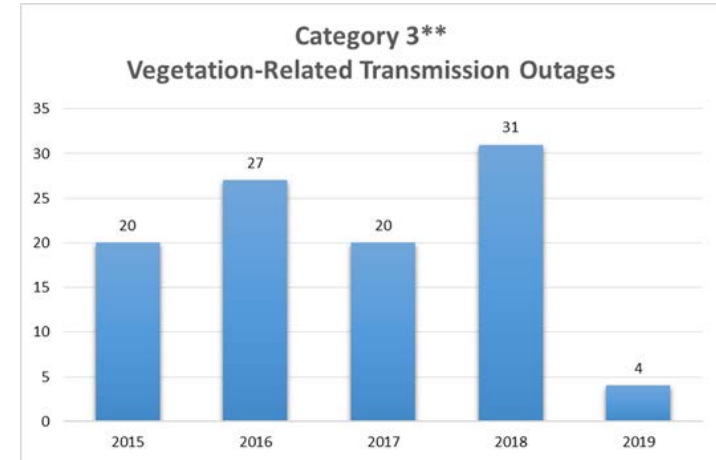
2018: 3

2017: 6

2016: 0

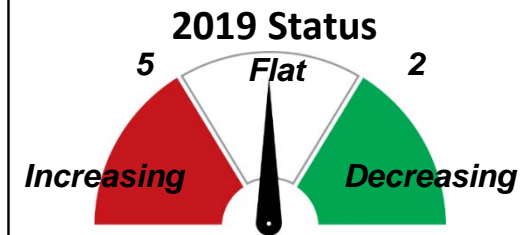
2015: 3

Mean = 3 Standard deviation = 2.7



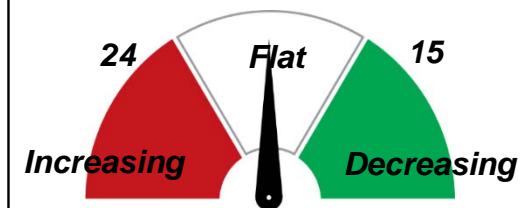
Data* (Compared to a 5-year rolling average)

- Number of vegetation encroachments, excluding fall-ins, decreasing (within one standard deviation, based on small sample size) (Based on 2018 metric) - - 5-year average is 3.0



Data** (Compared to a 5-year rolling average)

- Fall-ins: Number of sustained outages decreasing (within one standard deviation, based on 6-year sample) - - 5-year average is 23.4



- **Why is it important?**

- Measures risk and impact to the BPS from cyber or physical security attacks

- **How is it measured?**

- Based on industry-submitted OE-417 and/or EOP-004 Electric Emergency Incident and Disturbance Reports*

Two cyber security and 47 physical security events were reported in Q3 2019.

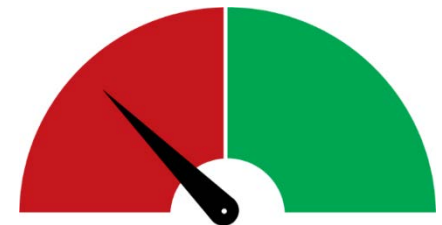
*As more data becomes available this metric will be enhanced to provide increased granularity of this risk

Data (Annual Measurement), based on 2018 metric

- No disruption** of BES operations due to cyber attacks
Zero disruptions of BES operations due to cyber attacks in 2019 Q3
- No disruption** of BES operations due to physical attacks:
Zero is green, else is red
Five disruptions of BES operations due to physical attacks in 2019 Q3

**A disruption means that a BES facility was removed from service as a result of the cyber or physical incident

2019 Status



Metric 7: Disturbance control events greater than the most severe single contingency

- **Why is it important?**

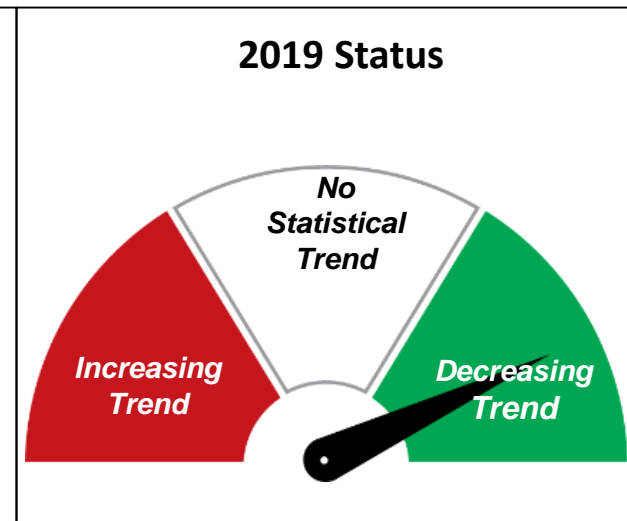
- Measures risk to the BPS by monitoring the number of Disturbance Control Standard (DCS) events that are greater than the Most Severe Single Contingency (MSSC)

- **How is it measured?**

- Information received by NERC based on the BAL-002 Reliability Standard
- Due to the timing in Balancing Authority data submittals the metric is updated one quarter in arrears
- Measures a rolling 7-year quarterly time trend testing for statistical significance

Data (Quarterly Measurement)

- **Green:** a time trend line of the most recent 7 years of quarterly DCS events > MSSC has a statistically significant negative slope
- **Middle:** no statistically significant trend for the slope
- **Red:** a time trend line of the most recent 7 years of quarterly DCS events > MSSC has a statistically significant positive slope
- **2Q19 Metric Results: Green** - DCS data for the most recent 28 quarters shows a statistically significant decreasing trend



- **Why is it important?**

- Measures risk and impact to the BPS by measuring the interconnection frequency response performance measure (IFRM) for each BAL-003-1 event as compared to the Interconnection Frequency Response Obligation (IFRO)

- **How is it measured?**

- IFROs are calculated and recommended in the Frequency Response Annual Analysis Report for Reliability Standard BAL-003-1.1 implementation
- IFRM performance is measured for each event by comparing the resource (or load) MW loss to the frequency deviation
- Due to the timing in selection of events the metric is updated one quarter in arrears

Data (Quarterly & Annual Measurement)

- IFRM for each BAL-003-1 event is compared to the IFRO for each quarter of the 2019 operating year
- Success is no Interconnection experiencing a BAL-003-1 frequency event where IFRM performance is below their respective IFRO: *Zero is green, else is red*
- **2Q19 Metric Results:** No Interconnection experienced an event where their IFRM was below their IFRO

2019 Status





Questions and Answers

Reliability Coordinator Function in the Western Interconnection

Action Update

Background

Since January 2014, Peak Reliability (Peak) has been the NERC-certified Reliability Coordinator (RC) serving the Western Interconnection (except the Canadian province of Alberta which has RC-like services provided by the Alberta Electric System Operator).

In 2018, the California Independent System Operator (CAISO) and the Southwest Power Pool (SPP) announced their intentions to perform the RC function and offer RC services to Balancing Authorities and Transmission Operators across the West. Subsequently, Peak decided to cease operations as the RC, effective at the end of 2019. In addition, British Columbia Hydro and Power Authority (BCH) decided to provide RC services for the province of British Columbia. The CAISO (doing business as RC West), SPP, and BCH initiated certification activities with WECC and NERC during Q1 and Q2 2019.

Status

- The British Columbia Utilities Commission approved the Certification Team final report on July 2, 2019 and approved BCH to perform RC functions in British Columbia. BCH RC became the RC of record on September 2, 2019.
- The Certification Team conducted a follow-up site visit with RC West on September 4, 2019. RC West began shadow operations for their expanded footprint on September 4, 2019. Shadow operations will run through October 31, 2019 and RC West is expected to become the RC of record for their expanded footprint on November 2, 2019.
- The Certification Team completed a certification site visit with SPP RC on August 13-15, 2019 and a follow-up visit on October 9, 2019. Shadow operations for SPP RC began September 7, 2019 and will run until December 3, 2019, at which time it is expected that SPP RC will become the RC of record.
- Peak Reliability will cease operations as an RC on December 3, 2019.

Operating Committee Report

Action

Information

Operating Committee's (OC) Highlights since August OC Report

During the September 2019 OC meeting, the OC endorsed one Compliance Implementation Guidance document to be submitted to the ERO for approval. The document addresses *Data Exchange Infrastructure and Testing Requirements* and *Real-time Assessment Quality of Analysis*. The OC also approved a Reliability Guideline developed by the Inverter-based Resource Performance Task Force entitled *Improvements to Interconnection Requirements for BPS-Connected Inverter-Based Resources*.

Chair David Zwergel requested each subcommittee chair to work with their subcommittee to develop their 2020 work plan for the December 2019 meeting. This is to include projects, activities designed to share best practices, and activities to share lessons learned. This is to facilitate a transition to the proposed Reliability and Security Technical Committee (RSTC).

A team led by Vice Chair Doug Hills will undertake a review of the OC Strategic Plan. Todd Lucas, Peter Brandien, and Keith Carman volunteered to assist in the review.

The OC held a roundtable discussion of the Cold Weather Bulk Electric System Event of January 17, 2018 FERC/NERC Joint Report regarding the recommendations from the report and the actions taken by the impacted Reliability Coordinators (RCs) to address the recommendations. The report, including the findings and recommendations, can be found [here](#).

OC Major Accomplishments for 2019 (through September 2019)

1. OC and Subcommittee Work Plans – The OC Executive Committee and the leadership of its subcommittees met on January 17, 2019 to review and update the OC Work Plan. At the March 2019 OC meeting, the OC reviewed and approved the OC Work Plans.
2. OC Organization Chart – At its January 17, 2019 meeting, the OC leadership reviewed its organization per Section 6.1 of the OC Charter. The OC leadership removed the Eastern Interconnection Data Sharing Network (EIDSN) and Interchange Distribution Calculator Working Group (IDCWG), which are now independent from NERC, from under the Operating Reliability Subcommittee (ORS).
3. Reliability Guidelines – The OC approved the following guidelines:
 - a. Primary Frequency Control
 - b. Improvements to Interconnection Requirements for BPS-Connected Inverter-Based Resources
4. Compliance Implementation Guidance – The OC endorsed two Compliance Implementation Guidance documents which were submitted to the ERO for approval:
 - a. Data Exchange Infrastructure and Testing Requirements

- b. Real-time Assessment Quality of Analysis.
- 5. Reference Documents – The OC approved the following reference document:
 - a. NERC Balancing Authority Area Footprint Change Tasks

OC's Major Initiatives for 2019

1. Reliability Guidelines and Reference Documents – A Quick Reference Guide is under development that contains a summary of each Reliability Guideline or Reference Document. The quick Reference Guide will also contain the Approval Date, Version Number, Applicability and a link to the document itself. The OC is reviewing and revising the following Reliability Guidelines and Reference Documents:
 - a. Periodic review and update of *Reliability Guideline: Integrating Reporting ACE with the NERC Reliability Standards*.
 - b. Periodic review and update of *Reliability Guideline: Situational Awareness for the System Operator*.
 - c. Periodic review and update of *Reliability Guideline: Generating Unit Winter Weather Readiness – Current Industry Practices*.
 - d. *Balancing Authority Area Footprint Change Tasks* and develop a summary document. The OC authorized posting the revised document at the December 2018 meeting. Revisions are being made to incorporate comments received.
 - e. *NERC Balancing and Frequency Control Reference Document* was reviewed in 2018 and will be revised in 2019.
 - f. *Time Monitoring Reference Document* and develop a summary document
 - g. *Geomagnetic Disturbance Monitoring Reference Document* and develop a summary document
 - h. Review and update *Dynamic Transfer Reference Document; Dynamic Tag Exclusion Reference Document; Pseudo-Tie Coordination Reference Document* and develop a summary document. These documents are being reviewed for overlapping content and are to be combined into a single Reference Document.
2. ORS – The ORS will focus on reviewing and approving RC Reliability Plans in the Western Interconnection to facilitate the transfer of RC duties from Peak Reliability. The ORS will continue to focus on regular review, update, and communication of Reference Documents and Reliability Guidelines within its area of responsibility and coordinate additional reviews and revisions with the Resources Subcommittee (RS). The ORS will also continue to prepare for implementation of the Interchange Distribution Calculator Parallel Flow Visualization field trial.
3. RS – The RS will review and revise several reliability guidelines, reference documents and training guides under its purview and coordinate additional reviews and revisions with the ORS. The RS will also provide ongoing support of the NERC Planning Committee's Performance Analysis Subcommittee (PAS) metric M4, Interconnection Frequency Response for the annual State of Reliability Report
4. Event Analysis Subcommittee (EAS) – The EAS collaborates with the North American Transmission Forum (NATF) and the North American Generator Forum (NAGF) regarding the development of lessons learned. The EAS will also review and revise the Reliability

Guideline: Generating Unit Winter Weather Readiness as well as conduct the annual Monitoring and Situational Awareness Technical Conference.

5. Personnel Subcommittee (PS) – The PS has started development of Continuing Education Program Manual, Version 5.0 and will coordinate with the Personnel Certification Governance Committee (PCGC) on improved efficiencies between the groups.
6. Coordination with other groups – The OC continues efforts to better coordinate its activities with other industry groups such as the NATF, NAGF and ISO/RTO Council (IRC).

September 2019 Meeting Summary:

The following is a summary of the OC's September 2019 meeting, which highlights the latest activities of the OC and its associated subcommittees in support of the NERC or OC mission and corporate goals. The [September 2019 OC Meeting Minutes](#) are posted on the NERC website.

1. OC Nominating Committee and Executive Committee – The OC unanimously consented to retaining the existing Nominating and Executive Committees due to the anticipated transition to the RSTC in 2020. The OC also elected Darrel Yohnk to the two committees to replace Gerry Beckerle.
2. ORS – ORS Chair Chris Piong summarized the subcommittee's status report. Highlights of the report include:
 - a. The ORS endorsed minor changes to the MISO Reliability Plan. The minor changes were a clean up to the Studies section.
 - b. The ORS endorsed changes to the RC West Reliability Plan. The changes were an update to the new name RC West, the RC area map and the elimination of Operating Guides.
 - c. The ORS endorsed the BC Hydro Reliability Plan.
 - d. The ORS was briefed by RC West, SPP West RC and BC Hydro on their activities and coordination of RC operations in the Western Interconnection.
 - e. The chairs of ORS and RS presented overviews of the activities of their respective subcommittees at each other's recent meetings. The groups will continue to look at ways to assist each other with their work plans.
 - f. The ORS continues to receive updates from the EIDSN Steering Committee pertaining to the IDC Tool enhancements. Specifically, the Parallel Flow Visualization (PFV) project, which is intended to improve the data quality used by the IDC during curtailment of Eastern Interconnection transactions. The EIDSN Steering Committee has endorsed the PFV Field Trial Report that summarized their observations and recommendations from the PFV field trial. This report included the confirmation that no standard modifications are necessary to address any reliability issues. For next steps, ORS anticipates that OC approval will be sought in early to mid-2020 for go-live of PFV following additional parallel operations and testing of PFV.
 - g. The group discussed the role of the Eastern Interconnection Frequency Monitor. TVA has filled this role for many years. ORS will consider whether the responsibility should rotate annually, as done with Time Error monitoring.
 - h. The NERC SMS provided a review of the January 11th Oscillation Event and Survey Results. The ORS will continue to work with the SMS to recommend improvements

to tools, training, actions and communications for system operators to help quickly identify and mitigate system oscillations. Related to this, PJM presented an update to the ORS on the Eastern Interconnection Situational Awareness Monitoring System (ESAMS) that is in a prototype phase now. This new tool may help increase the ability for RCs to identify oscillations quickly. The ORS will receive periodic updates on this tool and remain active in supporting its development and its eventual transition to the EIDSN, Inc. suite of tools.

3. RS – RS Chair Tom Pruitt provided an overview of subcommittee’s status report. Highlights of the report include:
- a. Subcommittee Leadership Changes – The RS unanimously nominated Sandip Sharma (ERCOT) to succeed Tom Pruitt as chair and Greg Park (NWPP) to succeed Sandip as vice-chair. The nominations will be presented to the OC chair for approval.
 - b. Balancing and Frequency Control Technical Document – The document has been sent to NERC publications for review and formatting changes. Upon completion, the RS will present it to the OC for approval.
 - c. Reliability Guideline: Integrating Reporting ACE with the NERC Reliability Standards – A draft for posting will be brought to the OC at the December meeting. Related to this effort, a standards authorization request (SAR) to revise the Reporting ACE definition in the NERC Glossary was considered, but the RS voted to further revise the SAR before submittal.
 - d. Dynamic Transfer Reference Document – Contributions to support the ORS in the review and revision of this document are complete and the document has been forwarded back to the ORS.
 - e. Time Monitoring Reference Document – The RS completed its review of the document and made no recommended changes to the ORS.
 - f. Frequency Working Group (FWG) – The FWG selected M4 and BAL-003-1 frequency events for April through June 2019 for the Interconnections were selected at the April RS meeting.
 - g. Inadvertent Interchange Working Group (IIWG) – The Interconnection Inadvertent Interchange update shows an uptick in EI balances. The EI fast time error trend returned after having stopped near the end of April 2019. Several investigation actions were discussed and started to improve performance.
 - h. Reserves Working Group (RWG) – Additional changes to the voluntary DCS submittal form to accommodate BA footprint changes were reviewed and implemented.
 - i. Changes in BA Area Footprints – In the EI, a partial merge of EEI into MISO is planned for December 1, 2019. In the WI, the Grant PUD/AVRN and WACM/PSCO changes are complete, and AVRN will have a pseudo tie with another BA to the north in September (causing a need to reallocate FRO in Q3).
 - j. Quarterly Reviews
 - i. BA Performance Data – CPS1/BAAL and DCS data submitted for the 2nd quarter of 2019 was reviewed. No significant issues were noted.

- ii. Time Error – Time error reports for 1st quarter of 2019 were reviewed. Other than items noted in the IIWG section above, no significant issues were noted.
 - iii. ERS Measures – Measures 1, 2, 4, and 6 were reviewed. Additional refinements in analysis and possible additional sub-measures are being considered.
- k. Interconnection Frequency Performance – performance for all the Interconnections was reviewed. No significant issues were noted.
- 4. EAS – EAS Chair Rich Hydzik provided an overview of the subcommittee’s status report. Highlights of the report include:
 - a. Data Exchange Infrastructure Requirements Task Force (DERTF) request OC approval of the *Data Exchange Infrastructure Requirements Compliance Implementation Guidance* document.
 - b. The EAS Event Analysis Process update team is continuing to address comments received from industry during the 45-day comment period and anticipates asking for OC approval of the revised documents at the December 2019 meeting.
 - c. EAS lesson learned presentation on a 115 kV Breaker Failure Event.
 - d. Five lessons learned have been published since the last OC meeting for a total of 10 in 2019. A lesson learned summary presentation has been provided to be included in the OC meeting minutes for industry use.
 - e. An industry webinar to review the Substation Fires – Working with First Responders lessons learned was held on June 19, 2019 with participation of The International Association of Fire Chiefs and The National Volunteer Fire Council. The webinar had well over 300 attendees and was highlighted in a recent IAFC Near Miss Reports of the Week reaching approximately 15,000 firefighters to provide awareness of what NERC did to help first responders. The webinar presentation and streaming video has been posted to the NERC website. The 2019 Cold Weather Preparation Webinar was held on September 5. The webinar presentation and streaming video will be posted to the NERC website.
 - f. The 2019 Monitoring and Situational Awareness Technical Conference is scheduled for September 24-25, 2019 at Southwest Power Pool in Little Rock, AR. An announcement has been sent out to industry with the conference registration links and travel information; this information is also available on the NERC calendar.
- 5. PS – Vice Chair Leslie Sink summarized the subcommittee’s status report which was included in the agenda package. She noted that PS Chair Rocky Williamson will resign from the PS as he is retiring from Southern Company. Since June 2018, PS members have been meeting twice a week (via Web-Ex) to revise the Continuing Education Administrative manual. The members have completed the revision of the manual with emphasis on Provider, Course, and Audit requirements. Additionally, the manual now addresses the process for dispute resolution. In an effort to bolster and facilitate adherence to program requirements, the group is now in the process of constructing guidelines which will contain suggested practices, examples, and templates. These guidelines focus on administrative requirements, the design, development, and assessment of structured learning activities, along with instructional fundamentals and strategies. Members of the PS are continuing to meet twice a week until such time that the guidelines are complete.

5. Reliability Assessments Subcommittee (RAS) – Chair Tim Fryfogle provided an update on RAS activities. He updated the OC on the timelines for the development of the 2019 Long-Term Reliability Assessment and the 2019-2020 Winter Reliability Assessment as well as the PAWG Work plan.
6. Industry Outreach efforts – In order to better coordinate activities within industry, the OC invited representatives from the NAGF and the NATF to participate in the September 2019 meeting. Al Schriver of the NAGF and Wayne Vanosdal of the NATF provided an overview of their respective industry activities.
7. Lessons Learned – Breaker Failure Event – Kelly McFarlane (BPA) discussed the event of breaker failure during a fault condition. This event was analyzed and a lessons learned was published by NERC. During a 115 kV permanent line fault, a line breaker malfunctioned and reclosed into the fault eight times before failing internally, resulting in a bus differential lockout clearing all breakers on the 115 kV bus. After working with the manufacturer, it was determined that the issue was caused by maintenance being done on the breaker incorrectly. The lessons learned can be found [here](#).
8. WECC Reliability Coordinator Updates – The OC received information on WECC Reliability Coordinator activities from WECC staff, California ISO, and SPP.
9. ERCOT 2019 Summer Operations – During the June 2019 OC meeting, the State of Reliability Report indicated that ERCOT was short on planning reserves. A request was made to have ERCOT discuss their peak period operations. Dan Woodfin, ERCOT, presented an update on 2019 summer operations at ERCOT. Topics included:
 - a. August peak demands and EEA1 days in context
 - b. Comparisons of August 12th-16th
 - c. August 13 EEA1
 - d. August 15 EEA1

Planning Committee Status Update

Action Information

The Planning Committee (PC) is pleased to provide this update to the Board of Trustees (Board) for their review.

Forward perspectives

- **Fuel Assurance Planning Guidance and Electric/Gas Working Group**

- No Board Approval Required

- The Electric/Gas Working Group (EGWG) is completing the draft Reliability Guideline on fuel assurance and fuel-related reliability risk analysis for the Bulk-Power System. In late October, the EGWG will seek PC Executive Committee authorization to post the draft guideline for stakeholder comment. The EGWG will update the PC on received comments at the December PC meeting and discuss next steps for finalizing the guideline.

- **Draft Standards Authorization Requests (SAR) For Consideration by the PC**

- No Board Approval Required

- PRC-019-2 – Coordination of Generating Unit or Plant Capabilities, Voltage Regulating Controls, and Protection. The NERC System Protection and Control Subcommittee (SPCS) continues is working on two deliverables in this standard.
 - The SPCS was tasked with developing a Technical Analysis Report and draft SAR on the treatment of inverter-based devices within the standard going forward. The requirement language in the standard, as well as the examples, are specific to conventional synchronous resources. The standard should look to clarify and provide examples for voltage regulating controls employed at dispersed power resource facilities. Additionally, the standard has a conflict with regards to the steady state stability limit for synchronous generation and needs to clarify the applicability of the steady state stability limit for other resource types. The SPCS has also identified a potential reliability gap with respect to the language requiring a voltage regulating control review. The proposed SAR was coordinated with the NERC Inverter-Based Resources Performance Task Force (IRPTF) and Systems Analysis and Modeling Subcommittee (SAMS).
 - The PC is currently reviewing an SPCS-drafted Implementation Guidance for the PRC-019 Reliability. The Implementation Guidance was developed to provide entities with examples of calculations used to coordinate control systems, protective functions, and equipment capabilities to meet the intent of the standard.

- **MOD-032-1 – Data for Power System Modeling and Analysis.** The System Planning Impacts from Distributed Energy Resources Working Group (SPIDERWG) continues to develop a draft SAR for changes to NERC Reliability Standard MOD-032-1 and is

incorporating feedback from PC reviewers. You may recall that certain needs of this standard were originally outlined in the [2017 Distributed Energy Resource Report](#) (DER Report) approved by the NERC Board. The SPIDERWG proposal adopts those recommendations plus potentially addresses gaps in data collection for the purposes of modeling and interconnection-wide case creation that could result from inadequate aggregate Distributed Energy Resource (DER) modeling information in BPS planning.

- **Review of NERC Reliability Assessments**

- Board Action Anticipated Prior to Year End*

- The PC is reviewing the 2019 Long-Term Reliability Assessment (LTRA) and the 2019-2020 Winter Reliability Assessment (WRA) in October. NERC Staff will provide the LTRA and WRA to the PC for endorsement as part of the process of finalizing the assessments.

- **Continued Planning Committee Process and Structure Review**

- No Board Approval Required*

- The PCEC has continued to evaluate the current work plans and deliverables as they have been outlined by the subteams associated with the Committee. The September strategic review meeting provided the Executive Committee the opportunity to discuss further efficiencies and subteam scope updates. Some work was: 1) prioritized and or adjusted to this or the next quarter, 2) identified as curtailable, and 3) some committees have nearly completed their objectives and tasks and are looking at possible disbandment as a result. The currently updated PC Work Plan for all subteams is available on the PC page of the NERC website.

Recently Completed Committee Activities and Initiatives

- **Battery and Storage Workshop Initiative**

- No Board Approval Required*

- PC leadership supported a joint workshop with NERC, the North American Generator Forum (NAGF), and Energy Systems Integration Group (ESIG) on reliability implications for increasing battery and storage penetrations. Workshop topics included current battery and storage implementation practices, battery and storage trends in interconnection queues, current planning practices and considerations for battery and storage installations. PC leadership is coordinating various activities of subcommittees, working groups, and task forces to address potential reliability issues.

- **Approved Reliability Guidelines**

- No Board Approval Required*

- The PC approved the reliability guideline Improvements to Interconnection Requirements for BPS-Connected Inverter-Based Resources. The guideline was developed by the Inverter-based Resource Performance Task Force (IRPTF) to provide entities with approaches to incorporate recommendations from the IRPTF guideline BPS-Connected Inverter-Based Resource Performance through their interconnection requirements.
 - The PC approved the reliability guideline DER-A Model Parameterization. The guideline was developed by System Planning Impacts of Distributed Energy Resources Working Group (SPIDERWG) to provide Transmission Planners with methods to determine parameters associated with frequency, voltage, and trip settings of DER for use in currently available planning software.

Future Meetings

- December 10-11, 2019 – Atlanta, GA
- March 3-4, 2019 – Location TBD

Critical Infrastructure Protection Committee Report

Action Information

Summary

Critical Infrastructure Protection Committee's (CIPC's) third quarter meeting was held on September 17-18, 2019, at the Intercontinental Hotel at the Minneapolis/St. Paul International Airport. (The meeting was not held concurrently with the other technical committee meetings due to a schedule conflict with another event in which many CIPC attendees also participate.)

Highlights from the September CIPC meeting include the following items:

- The nominating subcommittee recommended that the current chair and two vice-chairs remain in those positions for the upcoming term; CIPC members voted unanimously to approve that motion. The length of that "term" is likely to be brief in light of the proposed restructuring of the technical committees.
- Five "Supply Chain Security Guidelines" were approved unanimously by CIPC and subsequently posted for industry reference.
 - Each guideline is accompanied by a presentation with an overview of the topic.
 - The Supply Chain Working Group is continuing to develop guidelines; two more are nearly ready for review and subsequent vote.
- The restructuring of the technical committees prompted discussion at various times throughout the meeting. Lloyd Linke spoke on behalf of the Stakeholder Engagement Team with a detailed overview of the proposal, while other reports and discussions mentioned possible implications and approaches to address ongoing issues and concerns.
- The 2019 ERO enterprise risk priorities report was highlighted, with emphasis on the report's revised format and the impact of risk profiles on security plans and practices. The CIPC work plan should have clear linkages to RISC risk priorities, with Chair Child emphasizing that planning for issues remains critical, regardless of the outcome for "CIPC" as an organizational element.
- The Compliance Input Working Group (CIWG) is continuing its efforts to develop implementation guidance for certain cloud computing services. CIWG is working with ERO compliance staff as well as governmental and industry representatives in its efforts to describe the appropriate security controls.
- The CIPC Executive Committee voted to disband the Physical Security Guideline Task Force, instead deciding to appoint individual task forces as issues to address are identified.
- The Security Metrics Working Group (SMWG) made its final report; subsequently, CIPC members approved a motion to disband the group. E-ISAC and NERC are now fulfilling responsibilities and expectations that were previously supported by the SMWG.

- Approximately 60 attendees participated in security training that was offered adjacent to the CIPC meeting. The session focused on firewall configuration as well as hands-on application of machine learning models for making risk-aware decisions in vulnerability and patch management.
- The day before the meeting, OATI hosted a tour of its nearby “Microgrid Technology Center.” The technologies that were demonstrated included Combined Cooling, Heat, and Power (CCHP), Solar Photovoltaic (PV) and wind generation, energy storage, and sophisticated microgrid control and optimization software.

Personnel Certification Governance Committee Report

Action

Information

Background

This report summarizes the key activities of the Personnel Certification Governance Committee (PCGC) during 2019. The PCGC meets four times per year. Standing Task Force meetings via conference call and/or Web Ex are held as needed between meetings. The August 2019 meeting minutes are under review and pending approval.

Exam Development Activities Scheduled for 2019

Write New Items

Mar-Dec 2019

One Credential Implementation Plan

May-Dec 2019

One Credential and Strategic Planning

One Credential Whitepaper comments with responses were posted to the PCGC committee page in July. The PCGC completed SAR for required modifications to PER-003-2 was posted in August for a 30-day informal comment period. The Project 2019-05 comment period and nominations for SAR drafting team members concluded on August 30, 2019. In addition to the ongoing SAR process the committee is working with the appropriate System Operator Certification program vendors to prepare for the transition to one credential.

The PCGC will continue to review and analyze the One Credential Whitepaper survey results, along with recent comments from Project 2019-05 for required modifications to PER-003-2. Formulated data points will establish any further appropriate white paper topics to present to the industry, as determined necessary by the committee. The foreseen expectation is a broad range of topics; including credential maintenance, recertification requirements, and length of certification period. Required changes to the System Operator Certification Program Manual are being identified.

System Operator Certification Continuing Education Database (SOCCED) Update

The PCGC continues to work with the SOCCED vendor to enhance the stakeholder experience. No enhancements were deployed during Q3 2019.

2019 Completed Tasks

- One Credential White Paper Published
- Respond to Industry Whitepaper Comments
- 2019 Item Writing Workshop
- SOCCED Enhancements:
 - Course Functionality Updates:
 - Course Tab Displays
 - Download button for Course Data Table

- Ability to filter courses by status
 - Course Upload Validation: Checks for duplicate course upload on transcripts.
- In preparation for One Credential, completed SAR for PER-003 posted for informal comment period

Standards Committee Report

Action

Information

Background

This report highlights some of the key activities of the Standards Committee (SC) during the third quarter of 2019. The SC held a special election for Segment 9 in accordance with Appendix 3B of the Rules of Procedure. Since no nominations were received for Segment 9, a vote did not take place, and the vacancy will remain open until the 2020 SC member term election. At the September 18 SC meeting, Amy Casuscelli of Xcel Energy, was elected as chair and Todd Bennett from Associated Electric Cooperative, Inc. was elected as vice chair.

At its July 24 meeting, the SC:

1. Authorized initial posting for a 45-day formal comment period of proposed Reliability Standard TPL-007-4 - Transmission System Planned Performance for Geomagnetic Disturbance Events;
2. Accepted the revised BES Cyber System Information Access Management Standards Authorization Request (SAR); authorized drafting revisions to the Reliability Standards identified in the SAR;
3. Accepted the SAR to modify PER-003-2, developed by the Personnel Certification Governance Committee (PCGC); authorized posting the SAR for a 30-day informal comment period; and authorized solicitation of SAR Drafting Team (DT) members; and
4. Rejected the Request for Interpretation of INT-006-4 – Evaluation of Interchange Transactions as submitted by Powerex.

At its August 21 meeting, the SC:

1. Authorized solicitation of additional nominees for the BES Cyber System Information Access standard drafting team (SDT);
2. Appointed members to the SAR drafting team for the Cyber Security Supply Chain project; and
3. Rejected a SAR to modify BAL-002-3, submitted by Arizona Public Service.

At its September 18 meeting, the SC:

1. Remanded the SAR for Cold Weather back to the requestor, Southwest Power Pool, Inc., or to NERC Reliability Standards Staff for additional work; and
2. Endorsed the 2020-2022 Reliability Standards Development Plan (RSDP).

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Appendix F
Board of Trustees Meeting
November 5, 2019

Reliability Standards

Quarterly Report

November 5, 2019

RELIABILITY | RESILIENCE | SECURITY



3353 Peachtree Road NE
Suite 600, North Tower
Atlanta, GA 30326
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Table of Contents

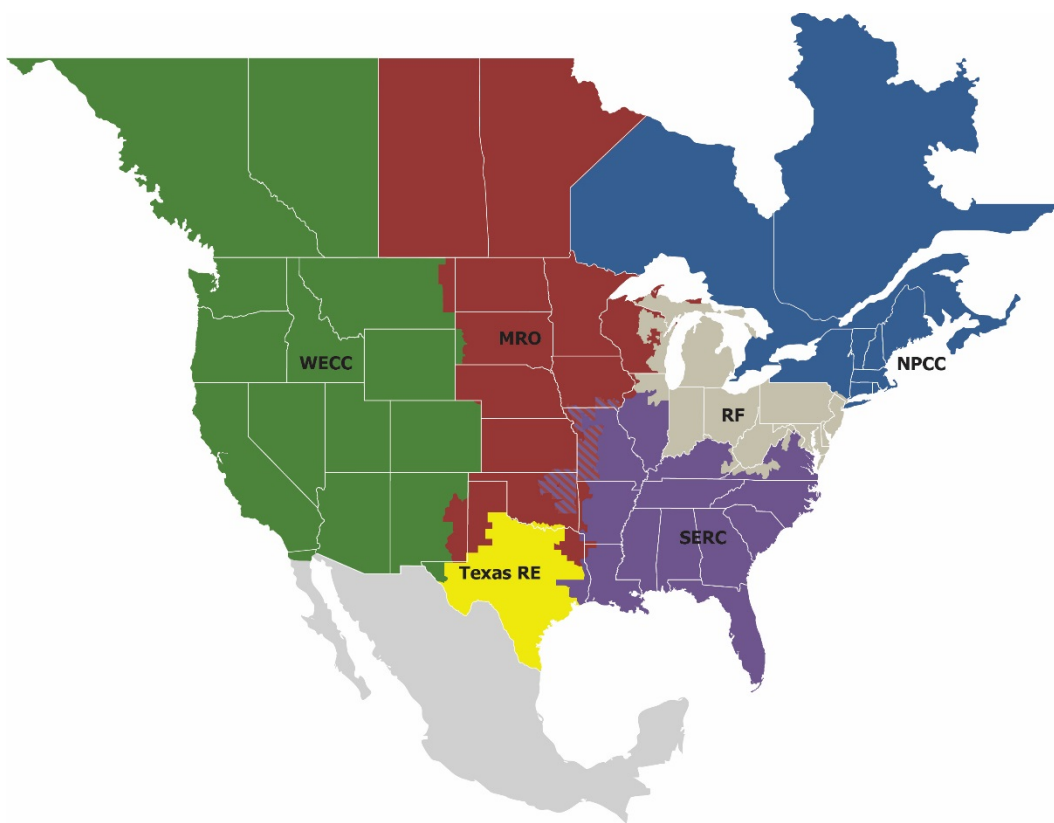
Preface	iii
Chapter 1 : Standards Development Forecast (Continent wide)	4
Board Forecast for Standard Projects in Active Development.....	4
ANSI Reaccreditation	4
Projects with Regulatory Directives	4
Trend in Number of Reliability Requirements.....	5
Chapter 2 : Regulatory Update	7
Chapter 3 : Standards Committee Report.....	9

Preface

Electricity is a key component of the fabric of modern society and the Electric Reliability Organization (ERO) Enterprise serves to strengthen that fabric. The vision for the ERO Enterprise, which is comprised of the North American Electric Reliability Corporation (NERC) and the six Regional Entities (REs), is a highly reliable and secure North American bulk power system (BPS). Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.

Reliability | Resilience | Security
Because nearly 400 million citizens in North America are counting on us

The North American BPS is divided into six RE boundaries as shown in the map and corresponding table below. The multicolored area denotes overlap as some load-serving entities participate in one Region while associated Transmission Owners/Operators participate in another.



MRO	Midwest Reliability Organization
NPCC	Northeast Power Coordinating Council
RF	ReliabilityFirst
SERC	SERC Reliability Corporation
Texas RE	Texas Reliability Entity
WECC	Western Electricity Coordinating Council

Chapter 1: Standards Development Forecast (Continent wide)

Board Forecast for Standard Projects in Active Development

November 2019

- Project 2017-01: Modifications to BAL-003-1.1 (phase 1)

February 2020

- Project 2017-07: Standards Alignment with Registration
- Project 2018-04: Modifications to PRC-024-2
- Project 2016-02: Modifications to CIP Standards (CIP-002-6)
- Project 2019-01: Modifications to TPL-007-3

May 2020

- Project 2015-09: Establish and Communicate System Operating Limits

August 2020 or after

- Project 2017-01: Modifications to BAL-003-1.1 (phase 2)
- Project 2019-02: BES Cyber System Information Access Management
- Project 2019-03: Cyber Security Supply Chain Risks
- Project 2019-04: Modifications to PRC-005-6
- Project 2019-05: Modifications to PER-003-2
- Project 2019-06: Cold Weather Preparedness

ANSI Reaccreditation

NERC filed for reaccreditation as a Standards Developer in accordance with the accreditation processes of the American National Standards Institute (ANSI) on July 1, 2019.

Projects with Regulatory Directives

Table 1 below, lists the current projects with regulatory directives. As of July 31, 2019, there are 4¹ standards-related directives to be resolved through standards development activities (not including non-standards related directives).

Project	Regulatory Directives	Regulatory Deadline
Project 2015-09 Establish and Communicate System Operating Limits	1	N/A
Project 2019-01: Modifications to TPL-007-3	2	7/1/2020
Project 2019-03: Cyber Security Supply Chain Risks	1	12/26/2020

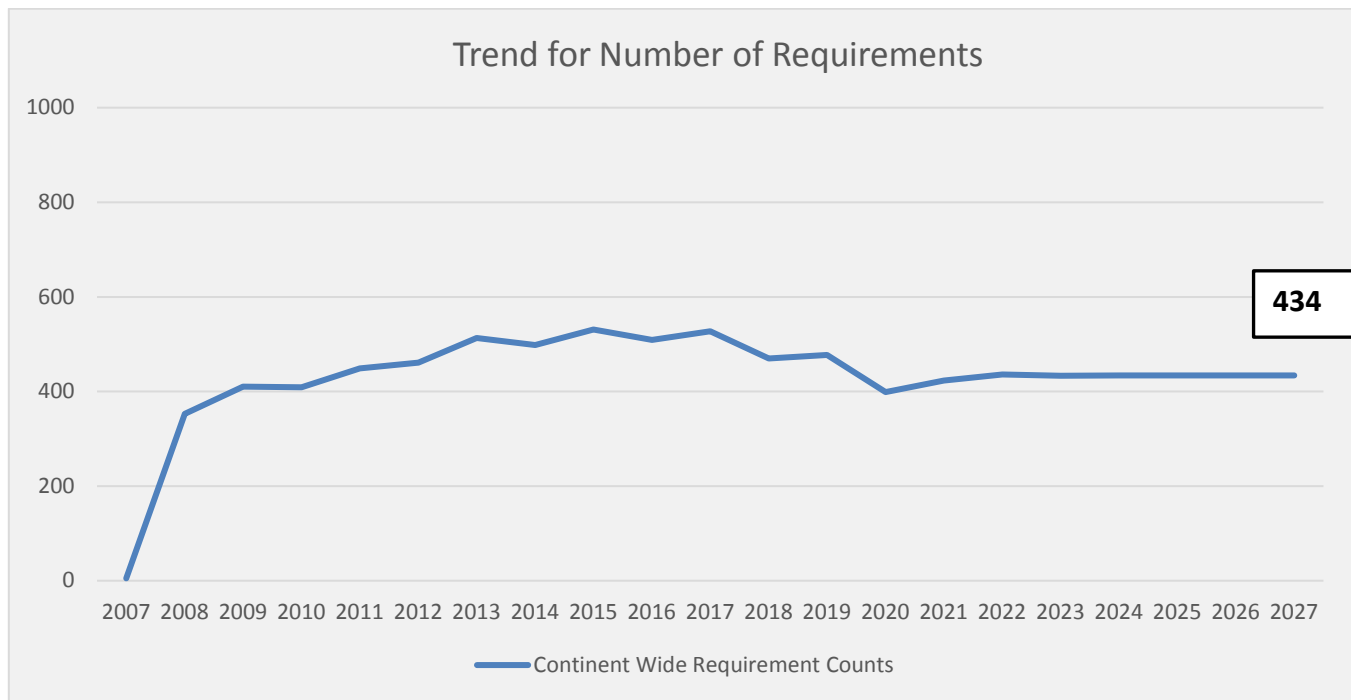
¹ In addition to the projects listed in Table 1, there are two directives for GMD event vulnerabilities and one directive for Supply Chain that will be addressed in upcoming projects.

Trend in Number of Reliability Requirements

As NERC Reliability Standards continue to mature, NERC analyzes the trend in the total number of requirements in the United States since 2007 when Reliability Standards became enforceable.

The *US Effective Date Status/Functional Applicability*² spreadsheet was used to analyze the number of requirements based on the U.S. Effective Date for each requirement shown in the charts below. Figure 1 displays the Trend in Number of Requirements for Continent-Wide standards, while Figure 2 displays Regional Reliability Standards.³ Standards with variances were not included in the requirement count. Projections from projects that include standards currently under development, and board adopted standards are also included in the total number of requirements based on their projected effective date.⁴

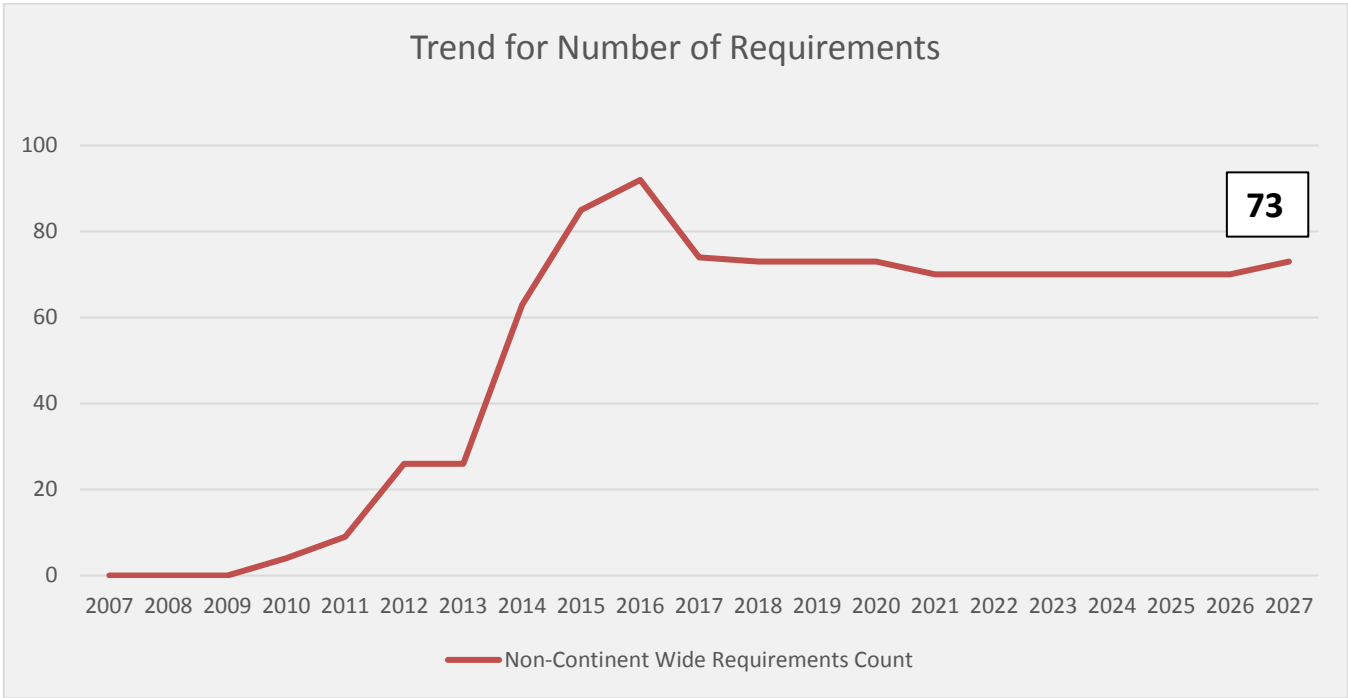
The trend for total number of requirements indicates a moderate reduction of continent-wide standards, in part due to the Standards Efficiency Review, and a significant decline in total number of requirements from 2016 to 2017 for Regional Reliability Standards. Figure 1 indicates a total of 434 continent-wide requirements; Figure 2 indicates a total of 73 Regional Reliability standards forecast for 2027.



² Available from the Standards section of the NERC website: <http://www.nerc.com/pa/Stand/Pages/default.aspx>

³ Charts were developed using end of Q3 2019 data.

⁴ These projects include the following: Project 2015-09 (FAC-010-4, FAC-011-4, FAC-014-3), Project 2017-01 (BAL-003-2), Project 2015-10 (TPL-001-5), Project 2016-02 (CIP-003-7(i))



Chapter 2: Regulatory Update

FERC Docket No.	Filing Description	FERC Submittal Date
RM15-11-003	<p>First Informational Filing of NERC Regarding Work Performed Under the Geomagnetic Disturbance Research Work Plan</p> <p>NERC submitted the First Informational Filing regarding the results of research performed to date under the NERC Geomagnetic Disturbance Research Work Plan.</p>	7/26/2019
RM19-10-000	<p>Comments in Response to Notice of Proposed Rulemaking Regarding Proposed Reliability Standard TPL-001-5</p> <p>NERC submitted comments on the Notice of Proposed Rulemaking regarding proposed Reliability Standard TPL-001-5 -- Transmission System Planning Performance Requirements issued by the Federal Energy Regulatory Commission on June 20, 2019.</p>	8/26/2019
RM19-20-000	<p>Petition for Regional Reliability Standard BAL-002-WECC-3</p> <p>NERC and WECC submitted a joint petition for the approval of proposed Regional Reliability Standard BAL-002-WECC-3. Proposed Regional Reliability Standard BAL-002-WECC-3 reflects the retirement of Requirement 2.</p>	9/6/2019

FERC ISSUANCES

FERC Docket No.	Issuance Description	FERC Issuance Date
RD19-6-000	<p>Letter Order Approving Proposed Reliability Standard IRO-002-6</p> <p>FERC issued a letter order approving the joint petition of NERC and WECC for approval of proposed Reliability Standard IRO-002-6. This version of the standard adds a regional variance for the Western Interconnection to promote coordination among Reliability Coordinators. The continent-wide requirements are unchanged.</p>	7/11/2019
RD19-5-000	<p>Letter Order Approving Proposed Reliability Standard CIP-003-8</p> <p>FERC issued a letter order approving NERC's request for approval of proposed Reliability Standard CIP-003-8 (Cyber Security — Security Management Controls), the associated implementation plan, violation risk factors and violation severity levels, and the retirement of Reliability Standard CIP-003-7.</p>	7/31/2019

Chapter 3: Standards Committee Report

Summary

This report highlights some of the key activities of the Standards Committee (SC) during the third quarter of 2019. The SC held a special election for Segment 9 in accordance with Appendix 3B of the Rules of Procedure. Since no nominations were received for Segment 9, a vote did not take place, and the vacancy will remain open until the 2020 SC member term election. At the September 18 SC meeting, Amy Casuscelli of Xcel Energy, was elected as chair and Todd Bennett from Associated Electric Cooperative, Inc. was elected as vice chair.

At its July 24 meeting, the SC:

- (1) Authorized initial posting for a 45-day formal comment period of proposed Reliability Standard TPL-007-4 - Transmission System Planned Performance for Geomagnetic Disturbance;
- (2) Accepted the revised BES Cyber System Information Access Management Standard Authorization Request (SAR); authorized drafting revisions to the Reliability Standards identified in the SAR;
- (3) Accepted the SAR to modify PER-003-2, developed by the Personnel Certification Governance Committee (PCGC); authorized posting the SAR for a 30-day informal comment period; and authorized solicitation of SAR Drafting Team (DT) members; and
- (4) Rejected the Request for Interpretation of INT-006-4 – Evaluation of Interchange Transactions as submitted by Powerex.

At its August 21 meeting, the SC:

- (1) Authorized solicitation of additional nominees for the BES Cyber System Information Access standard drafting team (SDT);
- (2) Appointed members to the SAR drafting team for the Cyber Security Supply Chain project; and
- (3) Rejected a SAR to modify BAL-002-3, submitted by Arizona Public Service.

At its September 18 meeting, the SC:

- (1) Remanded the SAR for Cold Weather back to the requestor, Southwest Power Pool, Inc., or to NERC Reliability Standards Staff for additional work; and
- (2) Endorsed the 2020-2022 Reliability Standards Development Plan (RSDP).

At its October 2 Special Call, the SC:

- (1) Accepted the SAR for Extreme Cold Weather Preparedness, authorized posting the SAR for a 30-day formal comment period; and authorized solicitation of SAR Drafting Team (DT) members.

At its October 2 Special Call, the SC:

1. Accepted the SAR for Extreme Cold Weather Preparedness, authorized posting the SAR for a 30-day formal comment period; and authorized solicitation of SAR Drafting Team (DT) members.

Reliability Issues Steering Committee Report

Action

Information

Summary

In finalizing the 2019 ERO Risk Priorities Report (RISC Report), the Reliability Issues Steering Committee (RISC) met on September 6 via conference call to review the second draft and approve distribution of the RISC Report on September 13 for a 21-day stakeholder comment period. Comments were received and considered in the final report which was approved and recommended for Board of Trustees acceptance by the RISC via conference call on October 22.

In addition, the RISC formed a sub-committee of members to work with NERC staff to review and provide input into enhancements, changes, and/or additions to the existing dashboard metrics that NERC provides quarterly updates and to enhance those for 2020. The sub-committee conducted their first meeting in Minneapolis on October 9.

Compliance and Certification Committee (CCC) Report

Action

Information

Highlights

The CCC conducted its third quarter meeting on September 17-18, 2019 at the Evergy offices in Kansas City, MO. The following key activities were accomplished:

- The third quarter meetings were conducted with the NERC Standards Committee to allow for additional collaboration and discussion on shared interest topics. Those included the work of the Standards Efficiency Review (SER) Phase II team, CIP SER efforts and Functional Model retirement consideration.
- The CCC's ERO Monitoring Subcommittee (EROMS) initiated work revising the CCC contribution to the ERO Stakeholder Survey. The project seeks to promote targeted feedback to highlight opportunities for improvement. The previous survey results showed statistically insignificant movement, thus promoting a project to adjust approach.
- EROMS presented the procedure for the Criteria for Annual Regional Entity Program Evaluation (CCCPP-010). The document was approved unanimously by the Committee and will be presented to the NERC Board of Trustees for approval in February 2020.
- EROMS reviewed CCCPP-008 to clarify and identify enhancements relating to the Program for Monitoring Stakeholder's Perceptions. The procedure will be submitted to the CCC for consideration in November 2019 and for Board consideration in February 2020.
- The CCC's Organization and Registration Subcommittee (ORCS) is working with NERC Management on proposed revisions to the Rules of Procedure and provide feedback into potential changes to the Organization and Registration Certification Program (ORCP).
- The annual CCC Work plan process is underway with input from the CCC Subcommittees and NERC Management. The Work Plan will be submitted to the CCC for consideration in November 2019 and for Board consideration in February 2020.
- Conducted a CCC Alignment Working Group (AWG) meeting for the AWG to review ongoing activities, discuss potential approaches to evidence gathering, receive an overview of the upcoming proposed changes to the NERC Rules of Procedure, and review one newly received Program Alignment submittal. In addition, AWG members will be providing feedback to the ERO on four proposed Compliance Monitoring and Enforcement Program (CMEP) Practice Guides under consideration to enhance the clarity of communication to industry, as well as participating with NERC staff in a series of upcoming webinars addressing improvements to the NERC CMEP pages on the NERC website.
- CCC member volunteers, in collaboration with NERC's Internal Audit, concluded the observation of the audit of the CMEP and the Organization and Registration Certification

Program (ORCP). Results are expected to be communicated to the Enterprise Wide Risk Committee (EWRC) in the fourth quarter meeting.

- Due to an upcoming CCC retirement, Chair Flandermeyer appointed John Allen from City Utilities of Springfield as the Chair of the Nominating Subcommittee, fulfilling the current annual role previously held by Daniela Cismaru of Alberta Electric System Operator.
- The CCC Nominating Subcommittee is working on finalizing two documents for full Committee consideration – CCC Membership Procedures and a CCC Member Onboarding package. Both will be posted on the CCC Web page to provide additional process transparency for industry.

The next CCC meeting will be November 19-20, 2019 in Rosemead, CA at the SCE offices.



NORTH AMERICAN ENERGY STANDARDS BOARD

801 Travis, Suite 1675 • Houston, Texas 77002 • Phone: (713) 356-0060 • Fax: (713) 356-0067
email: naesb@naesb.org • Web Site Address: www.naesb.org

TO: NERC Board of Trustees
FROM: Michael Desselle, Chairman, NAESB Board of Directors and Jonathan Booe, Executive Vice President and CAO, NAESB
DATE: October 18, 2019
RE: NAESB & NERC Coordination Report

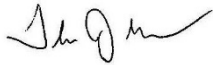
NAESB and NERC continue to coordinate on a number of ongoing projects and hold monthly conference calls to discuss the various standards efforts that have both reliability and commercial impacts on the wholesale electric market. Major topics of discussion have recently included the NERC Standards Efficiency Review, cybersecurity, the development of the 2020 – 2022 NERC Reliability Standards Development Plan, and Parallel Flow Visualization (PFV).

As a result of coordination discussions regarding Phase One of the NERC Standards Efficiency Review effort, NERC submitted Standards Requests R19007 and R19008 to NAESB on May 3, 2019. The requests officially communicated the retirement of certain NERC MOD and INT Reliability Standards as approved by the NERC Board of Trustees and requested that NAESB consider revisions to the Wholesale Electric Quadrant (WEQ) Business Practice Standards to support the development of NAESB standards to support any necessary commercial functions. In response to the request, NAESB made modifications to NAESB Business Practice Standards contained in the WEQ-001 (OASIS Business Practice Standards), WEQ-003 (OASIS Data Dictionary Standards), WEQ-004 (Coordinate Interchange Standards) and WEQ-023 (Modeling Standards) standards sets. These modifications were approved by the WEQ Executive Committee on October 15, 2019 and have been submitted for membership ratification. As these modifications impact standards which are the subject of the Federal Energy Regulatory Commission's open Notice of Proposed Rulemaking (NPR) on the NAESB WEQ Version 003.2 Standards, NAESB coordinated with NERC staff to file comments with the Commission on June 5, 2019 alerting it to this activity. A subsequent filing will be made with the Commission upon the final adoption of the standards by NAESB at the conclusion of the ratification period.

As part of ongoing cybersecurity coordination, the NAESB WEQ Cybersecurity Subcommittee has met several times this year to review the NERC CIP Reliability Standards adopted by the FERC as part of FERC Order No. 850 Supply Chain Risk Management Reliability Standards, the FERC Letter Order Approving CIP-008-6, and the FERC Letter Order Approving CIP-003-8 to determine if any action should be taken by NAESB to develop complementary standards or to modify existing standards. To date, such action has not been deemed necessary. Additionally, the subcommittee is following NERC standards development related to NERC Project 2016-02 Modifications to CIP Standards, NERC Project 2019-02 BES Cyber System Information Access Management, and NERC Project 2019-03 Cyber Security Supply Chain Risks. The next meeting of the subcommittee is scheduled for October 31, 2019.

In August, the NAESB WEQ Standards Review Subcommittee met to review the draft 2020 – 2022 NERC Reliability Standards Development Plan. As part of the review, the subcommittee identified several NERC projects that NAESB should monitor in the future for potential complimentary business practice standards development, including the above noted projects being followed by the WEQ Cybersecurity Subcommittee. The comments of the subcommittee were reviewed by NAESB leadership and provided to NERC as part of the informal comment period that closed on September 5, 2019.

NAESB and NERC staffs have also been closely coordinating and working with the EIDSN, Inc. regarding the current Parallel Flow Visualization project and field test, which concluded on May 1, 2019. After evaluating a report developed by the EIDSN upon conclusion of the field test, a status update was filed with the Commission by NAESB in July with the support of NERC and the EIDSN, Inc. The status update provided a timeline for the completion of standards development by NAESB and described the coordination steps that NAESB, NERC, and the EIDSN, Inc. have undertaken to date. It is expected that NAESB will wrap up its related standards development by the end of the year and provide the resulting standards to the Commission in the first quarter of 2020.

To: NERC Board of Trustees (BOT)
From: Thomas J. Galloway, NATF President and CEO 
Date: October 11, 2019
Subject: NATF Periodic Report to the NERC BOT (November 2019)
Attachments: NATF External Newsletter (October 2019)

The NATF interfaces with the industry as well as regulatory agencies on key reliability and resiliency topics to promote collaboration and continuous improvement. Some examples are highlighted below and two key topics (grid security emergencies and supply chain cyber security) are included in the attached October NATF external newsletter, which is also available on our public website: www.natf.net/news/newsletters.

Risk Mitigation

As reported previously, the NATF and NERC executed an updated memorandum of understanding in April 2019 to further advance collaboration and leverage respective and collective strengths to identify existing and emerging risks, prioritize actions, and implement mitigation strategies to advance the reliability, resilience, and security of the Bulk Power System. Based on recent discussions among NATF, NERC, and Regional Entity leadership, the NATF is pursuing mitigations for some priority emerging risks identified by the ERO, including facility ratings issues and supply chain cyber security risks.

Compliance Guidance Inputs

The NATF is noted as a “Pre-Qualified Organization” for developing ERO Implementation Guidance and has submitted a number of documents for endorsement. We have worked closely with NERC staff during the review process and appreciate the support provided.

We commend NERC for its recently issued survey (“Effectiveness and Enhancement Survey – Pre-Qualified Organizations and Standard Drafting Teams”) to allow organizations such as ours to submit feedback on the compliance guidance process, as well as the survey to industry users on effectiveness and enhancement of the compliance guidance program. The NATF submitted inputs, and we look forward to continue working together on this important and beneficial initiative.

Open Distribution

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North American Transmission Forum External Newsletter

October 2019

NATF Grid Security Emergency Work

Section 215A of the Federal Power Act, added via amendment by section 61003 of Public Law 114-94 (the [Fixing America's Surface Transportation Act](#) or "FAST Act"), gives the Secretary of Energy certain authorities to issue an emergency order following the President's written declaration of a "grid security emergency" (GSE) as defined in the statute:

The term 'grid security emergency' means the occurrence or imminent danger of—(A) . . . a malicious act using electronic communication or an electromagnetic pulse, or a geomagnetic storm event . . . and . . . disruption of the operation of such devices or networks, with significant adverse effects on the reliability of critical electric infrastructure or of defense critical electric infrastructure, as a result of such act or event; or (B) . . . a direct physical attack on critical electric infrastructure or on defense critical electric infrastructure; and . . . significant adverse effects on the reliability of critical electric infrastructure or of defense critical electric infrastructure as a result of such physical attack.

The NATF Grid Security Emergency Team has been working on inputs to the Electricity Subsector Coordinating Council (ESSC) Steering Group and U.S. Department of Energy (DOE) related to GSEs. Topics include:

- Communication between the DOE and the electricity subsector after the declaration of a GSE
- Generation of a framework document detailing key GSE principles
- Families of prospective operational orders and pilot orders on specific topics
- Prospective waivers and other regulatory relief deemed beneficial during a GSE

In 2018, the team completed a document to address the geomagnetic disturbance (GMD) threat noted in the definition above. In 2019, the NATF team—supplemented by representatives of the DOE, National Security Council, NERC E-ISAC, and the Edison Electric Institute—completed an update to the report incorporating the other three threats (physical security, cyber security, and EMP) and recommending additional work on communications protocols.

The ESSC is leading a working group to develop form orders¹ to be used in the November 2019 GridEx V executive tabletop. This group will also work on an outline of the full set of form orders and associated decision-support tools to be developed in 2020. The NATF GSE team will serve as a key operational/technical resource in the development of these form orders. In addition, the team will be working with NERC and the DOE in 2020 on the implementation of communication protocols and capabilities, along with associated industry training.

¹ A form order would serve as a starting point for an actual order issued by the DOE secretary once the president declares a GSE

NATF Role in Mitigating Supply Chain Cyber Security Risks

Supply chain cyber security continues to receive much attention as a high-risk area, and NATF members are proactively developing solutions for entities in the industry to mitigate these risks. The NATF projects, both completed and in progress, as well as recommended products from other organizations, will assist members with tools for good cyber security practices as well as with compliance to the NERC supply chain reliability standards,² which become effective on July 1, 2020.

As the appropriate industry organization to develop leading practices for reliability, security, and resilience, the NATF has taken several actions to assist members with cyber security supply chain risk management, including implementation of the NERC Reliability Standards. The topic is complex, however, with many interrelated issues that affect entities, and is being addressed simultaneously by many organizations. To ensure NATF members have access to the most effective and efficient solutions, the NATF is developing solutions within the membership, determining which of those solutions provide maximum benefit to members by being shared openly, and collaborating with other industry segments that are also working to resolve security concerns.

NATF Guidance

In 2018, the NATF produced the “NATF Cyber Security Supply Chain Risk Management Guidance” (Management Guidance) and the “NATF CIP-013 Implementation Guidance” (Implementation Guidance). The Management Guidance describes best and leading practices for establishing and implementing a cyber security supply chain risk management plan, including procurement, specification, vendor requirements, and managing existing equipment activities.³ The Implementation Guidance, which has been endorsed by the ERO as an acceptable example of how to meet compliance with the reliability standard, describes one way that a registered entity could comply with CIP-013-1 Requirement R1 and, subsequently, CIP-013-1 Requirement R2. These documents were approved for open distribution (i.e., publicly available) and are posted on the NATF and NERC websites:

- NATF Cyber Security Supply Chain Risk Management Guidance
 - Available on the [NATF website](#) and the [NERC website](#)
- NATF CIP-013-1 Implementation Guidance
 - Available on the [NATF website](#) and the [NERC website](#)

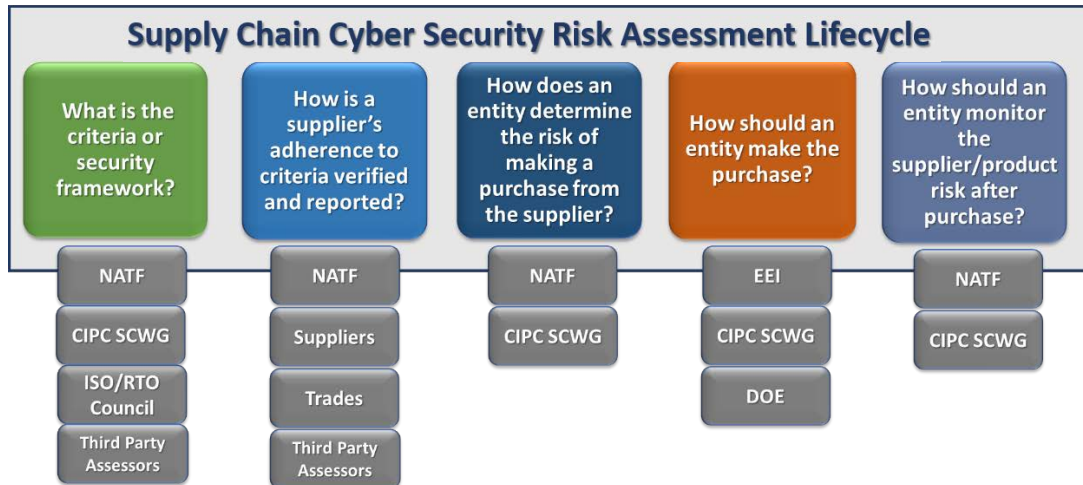
Products Mitigating Risk Throughout the Purchase Lifecycle

As the NATF began projects to support the concepts outlined in the Management Guidance document, members recognized projects being conducted by other organizations that addressed supply chain cyber security issues at various steps throughout the purchase lifecycle. As one example, the Edison Electric Institute (EEI) has developed (and posted publicly on its website) model procurement contract language that provides registered entities a consistent set of provisions to address CIP-013-1 security controls within their own respective

² In response to FERC’s 2016 directive, NERC Reliability Standards Project 2016-03 Cyber Security Supply Chain Risk Management resulted in the development of the new Reliability Standard CIP-013-1 and modifications to Reliability Standards CIP-005-6 and CIP-010-3, which collectively have become known as the “supply chain standards.” FERC approved the supply chain standards on October 18, 2018. Order No. 850, *Supply Chain Risk Management Reliability Standards*, 165 FERC ¶ 61,020, at P 30 (2018) (“Order No. 850”).

³ The Management Guidance document may be modified as more projects are completed related to cyber security supply chain risk management.

contractual forms. The model procurement contract language targets the processes required in CIP-013-1 Requirement R1.2 as well as supporting contract terms that address related information and data protection to strengthen cybersecurity overall. Legal, contracting, and compliance personnel from a number of NATF member companies contributed to the development of this product.



NATF members are also participating on the NERC Critical Infrastructure Protection Committee's (CIPC) Supply Chain Working Group teams to develop white papers that address various aspects of supply chain risks, and are continuing to work collaboratively with other organizations that are considering projects to address supply chain cyber security.

The NATF board and membership determined that NATF would be able to contribute to the industry's efforts by developing solutions in several areas throughout procurement lifecycle as shown in the illustration below.



NATF Supply Chain Cyber Security Criteria

Congruent with the overall NATF supply chain goals to achieve strong security assurance in an efficient and effective manner through convergence by industry on common approaches, NATF members approved NATF engagement and leadership in supply cyber security risk management through (1) the development and

implementation of cyber security criteria for suppliers and (2) a recommendation for NATF members to utilize the EEI procurement language as a basis for developing their own procurement language.

NATF member SMEs developed “NATF Cyber Security Supply Chain Criteria for Suppliers” (NATF Criteria) to assist entities in evaluating a supplier's cyber security supply chain risk. The NATF board determined that members have the potential to receive more benefit from sharing the NATF Criteria openly and voted to provide the criteria to industry, laying the foundation for streamlined cyber security solutions. The NATF Criteria are posted on the NATF's public website (www.natf.net/documents).

The NATF Criteria have also been provided to NERC and shared with the NERC CIPC. The NATF Criteria evaluates whether a supplier is conducting good cyber security practices for the industry, and many of the criteria are beyond what is required by the NERC supply chain standards. Most are included in existing frameworks, but may contain an action that is more specific to the industry than what is required by the framework. A suppliers' performance to the NATF Criteria is an indication of a supplier's cyber security practices for Bulk Power System (BPS) / Bulk Electric System (BES) products or services, and a data input to an entity's risk analysis for the supplier,⁴ which will support an entity's informed purchase decisions from a supply chain cyber security perspective.

As the criteria is used, additional insight or comments may be generated. An NATF team will continue to meet to review comments and a process will be developed to determine whether the criteria should be modified.

Use of the NATF Criteria

As this is criteria that is directly pertinent to supply chain cyber security for the BPS/BES, it does not encompass all good general cyber security actions. It is important for an entity to understand if a supplier adheres to an existing cyber security framework or frameworks as a general practice. This consideration is included in the NATF Criteria.

Future NATF Supply Chain Projects

NATF members have approved the NATF to continue with several projects in a tiered approach:

Tier 1 – NATF Criteria and Proof of Concept Project

- Maintain criteria for supply chain products/services
- Conduct Proof of Concept project with EMS suppliers

Tier 2 – Common Reporting Format(s)

- Explore common format(s) to report a supplier's adherence to the NATF criteria
- Explore common response format(s) for initial supplier questionnaires

While the NATF cyber security supply chain projects have been developed to support supply chain cyber security, which is broader than what is required for NERC compliance, members (and the industry at large) have noted a need to have methods in place to determine supplier cyber security practices for supply chain prior to July 1, 2020, when the NERC supply chain Reliability Standards become enforceable. To meet that need, and to

⁴ NERC CIP-013 R1 supply chain cyber security risk management plan(s) and other entity cyber security supply chain risk management plans.

give entities time to incorporate methods into their operating practices, the NATF is working to have solutions identified in the future projects developed by the end of 2019.

Proof of Concept Project

The initial Proof of Concept project will lay the foundation for, and grow into, the verification and common reporting projects:

- The verification project will evaluate the methods of verifying a supplier's adherence to criteria and the impact of a supplier's adherence to an existing cyber security framework.
- The common reporting project will investigate common reporting form(s) and whether common forms can streamline processes for entities, suppliers, auditors, and regulators.

The objective of the Proof of Concept project is to work with suppliers, third-party assessors/verifiers, and industry participants to brainstorm solutions that would enable entities in the electric industry to efficiently assess suppliers' cyber security controls and practices.

Impact of Future Projects

The findings and determinations from future projects may have an impact on the previously developed solutions in the guidance document and other NATF documents. These solutions and documents will either be modified or archived, as appropriate, based on the findings.

Workshops and Meetings

In addition to regular web conferences, NATF groups conduct periodic workshops and in-person meetings. Recent and upcoming activities include:

- Security Workshop (July)
- Operator Training (Train-the-Trainer) Workshop (August)
- Board and Members Meeting (September)
- Vegetation Management Workshop (October)
- Human Performance Improvement Workshop (October)
- EPM Substation Equipment and Asset Management Workshop (October)
- System Operations and Operations Tools Workshop (October)

Redacted Operating Experience Reports

Since our last newsletter, we have posted four reports to our [public site](#) for members and other utilities to use internally and share with their contractors to help improve safety, reliability, and resiliency.

For more information about the NATF, please visit www.natf.net.



North American Generator Forum

**TO: NERC Board of Trustees
James B. Robb, President and CEO**

**FROM: Allen D. Schriver, Chief Operating Officer, North
American Generator Forum (NAGF)**

DATE: October 18, 2019

SUBJECT: NAGF 2019 Fall Report

The NAGF would like to thank Jim Robb and NERC for hosting the **NERC/NAGF/ESIG Battery Storage, Hybrid Resources, Frequency Response, and Grid Services Workshop** that was held on Tuesday, September 17th and Wednesday, September 18th at the NERC Offices in Washington, D.C. and Atlanta via teleconferencing between the two offices.

Panel discussions included:

- Technical capabilities of battery energy storage systems;
- Hybrid projects: motivations, drivers and challenges;
- Planning, interconnection and modeling with storage and hybrids;
- ISO/RTO market participation of storage and hybrids;
- PFR and grid services considerations - conventional and inverter based; and
- Policymaker viewpoints on grid services and grid transformation.

The primary takeaway from the workshop was the realization that Battery Energy Storage Systems (BESS) will be installed in much greater numbers as Hybrid systems – where BESS is tied in with a solar or wind site to store the excess energy that can be generated during peak irradiance or peak wind. In this type of configuration, the Hybrid system can mirror a synchronous generator by not only generating energy, but also Essential Reliability Services (ERS). The primary outcome from the workshop is the attendees representing FERC, NERC, ISO/RTOs, Transmission Planners, GO/GOPs, Developers and OEMs agreed there was much work to be done, including the development of hybrid models and discussions of market changes that may be required to allow the production of ERS from Hybrid resources.

The NAGF would also like to thank Jim Robb and NERC for hosting the **9th Annual NAGF Annual Meeting & Compliance Conference** held on October 15th -17th at NERC's Atlanta Office. Discussions included the following:

- Keynote presentation from Jason Blake, SERC President & CEO;
- DHS/Cybersecurity and Infrastructure Security Agency (CISA) update from Don Robinson, CISA;
- CIP Supply Chain;
- Primary Frequency Response and the 2019 GOP Survey of generator performance to frequency disturbance events;
- NAGF Cold Weather Preparedness Working Group coverage of the 2019 FERC and NERC Staff Report on the cold weather event in January 2018, the Extreme Cold Weather Preparedness SAR, and the NAGF Cold Weather Best Practices document;
- Update on the Inverter-Based Resources Performance Task Force;
- Battery Integration Issues and Successes; and
- EMP Update.

The Annual Meeting also included two very informative panel discussions with:

- Regional Entity personnel; and
- ISO/RTO personnel.

The NAGF also discussed the upcoming changes to the three Technical Committees – Operating, Planning and Critical Infrastructure Protection – to the Reliability and Security Technical Committee (RSTC). The NAGF leadership noted the importance of placing technical representatives on the RSTC, and the need to seek election to the Merchant Generator Sector seats.