

Agenda

Reliability Issues Steering Committee

August 6, 2020 | 11:00 a.m.-12:00 p.m.
Conference Call

Attendee Webex [Link](#)

Introduction and Chair's Remarks

NERC Antitrust Compliance Guidelines*

Agenda Items

1. RISC Charter Proposed Amendments* – Approve
2. RISC Annual Process Manual* – Review
3. Framework to Address Known and Emerging Reliability and Security Risks* – Review
4. Other Matters and 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.

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Reliability Issues Steering Committee Charter

Approved by the NERC Board of Trustees
May 7, 2015

RELIABILITY | ACCOUNTABILITY



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RISC Charter

Purpose

The Reliability Issues Steering Committee (RISC or Committee) is an advisory committee that triages and provides front-end, high-level leadership for issues of strategic importance to bulk power system (BPS) reliability and offers high-level stakeholder leadership engagement and input on issues that impact bulk-power system reliability. The RISC advises the North American Electric Reliability Corporation (NERC) Board of Trustees (Board), NERC standing committees ([including the Standards Committee, Compliance and Certification Committee, and Reliability and Security Technical Committee](#)), 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 of the BPS.

Reporting

The RISC reports directly to the Board. The Board shall approve this Charter and any amendments to this Charter pursuant to Section 1300 of the NERC Rules of Procedure.

Overview and Functions

The RISC performs two primary functions for the Board.

The first function of the RISC is evaluating ~~bulk power system~~[BPS](#) reliability issues and risks. The RISC provides strategic leadership and advice to the NERC Board of Trustees and others to triage key reliability risks and propose solutions to manage those risks.

Second, the RISC provides an annual analysis of risks to the ~~bulk power system~~[BPS](#), and produces a relative prioritization of the risks. The prioritization is designed to advise:

- ~~annual~~[Annual](#) ERO action planning, resource allocation, budgeting and strategic planning processes; and
- ~~standing~~[Standing](#) committee planning, including the development of the Reliability Standards Development Plan [and coordination with the Reliability and Security Technical Committee](#).

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

Membership

The RISC shall be comprised of the following allocation of members:

1. At least six (6) stakeholder-based— four (4) from the MRC and at least two (2) At-Large members (not members of the MRC);
2. ~~Five-Three~~ [\(5\)](#) committee-based—one (1) from each of the standing committees: Standards (SC), ~~Operating (OC), Planning (PC), Critical Infrastructure Protection (CIPC)~~, [Reliability and Security Technical Committee](#) and Compliance and Certification (CCC). The Board will be responsible for appointing the committee-based members to the RISC. These members will be the chair or vice chair unless otherwise recommended by the standing committee and be subject to NERC Board approval.

In advance of the annual February Board meeting, ~~a the~~ RISC Nominating Committee (RISCNC) chaired by the Member Representatives Committee (MRC) vice chair and including the Board vice chair, the NERC President and CEO, and the Committee chair and vice chair will ~~be formed to~~ solicit a pool of candidates, with the goal of meeting the following general criteria:

1. Geographic and International diversity, including international, such that Eastern, Western, and Texas Interconnections, along with Canada are represented on the RISC;
2. Sector, size, and asset (transmission, distribution, load, generation, etc.) diversity;
3. High-level understanding and perspective on reliability risks;
4. Experience in a leadership role or background in an executive-level position is strongly preferred; and
5. Balanced consideration of these criteria, across the entire membership of the RISC.

The Board is responsible for appointing the committee-based, MRC and At-Large members to the RISC. At the February Board meeting each year (or as needed), the RISCNC shall present to the Board a recommended slate of all RISC member candidates as appropriate for consideration and approval.

All MRC and At-Large members will be appointed by the Board to serve for two-year terms. Membership terms will be staggered to ensure continuity.

Officers

1. **Selection of the Chair** - The Board shall appoint a chair of the RISC to serve a two-year term and direct the activities of the RISC, and work toward reaching consensus on all recommendations and actions.
2. **Selection and Duties of the Secretary** - NERC will appoint one senior staff person to serve as a secretary with the responsibility to:
 - a. Prepare, distribute and post notices of Committee meetings, record meeting proceedings, and prepare, distribute and post meeting minutes.
 - b. Maintain a record of all Committee proceedings, including responses, and correspondence.
 - c. Maintain Committee membership records.

Meetings

1. **Open Meetings** - Meetings shall occur at least once every quarter and can be in person or by conference call as determined by the chair. All meetings of the RISC will be open to all interested parties (except as noted in the paragraph below for confidential sessions). Only members may act on items before the Committee. Meeting notices shall be publicly posted on the NERC website on the same day they are distributed to Committee members. Final minutes of Committee meetings shall be publicly posted on the NERC website. Notices shall describe the purpose of meetings and shall identify a readily available source for further information about the meeting.
2. **General Requirements** - The Committee shall hold meetings as needed and may use conference calls or email to conduct its business.
3. **Notice** - The RISC secretary shall announce its regularly scheduled meetings with a written notice (letter or e-mail) to all Committee members not less than ten and no more than sixty calendar days prior to the date of the meeting.
4. **Agenda** - The RISC secretary shall provide an agenda with a written notice (letter, facsimile, or e-mail) for Committee meetings no less than five business days before a proposed meeting.
 - a. The agenda shall include, as necessary, background material for agenda items requiring a decision.

- b. The agenda shall be posted on the NERC website the same day it is distributed to Committee members.
 - c. Items not in the agenda that require a decision cannot be added at a meeting without the consensus of the members present. If such a matter comes up, it may also be deferred to the next meeting so that Committee members have time to consult with others.
5. **Quorum.** The quorum necessary for the transaction of business (*i.e.*, formal actions) at meetings of the committee is a majority of the members currently on the committee roster (*i.e.*, not including vacancies). The committee may engage in discussions without a quorum present.
 6. **Proxies.** Proxies are not permitted.
 7. **Observers.** Non-members may observe RISC meetings, either in person or via conference call.
 8. **Confidential Sessions.** The chair of the RISC may limit attendance at a meeting or portion of a meeting, based on confidentiality of the information to be disclosed at the meeting. Such limitations will be applied sparingly and on a nondiscriminatory basis as needed to protect critical energy infrastructure information and other information that is sensitive to one or more parties. [Confidential Information will only be disclosed as provided by Section 1500 of the NERC Rules of Procedure. Confidentiality agreements may also be applied, as necessary, to protect Confidential Information.](#)

RISC Annual Process Manual

Risk Identification and Mitigation Framework

Proposed August 2020

Annual Process

Every two years the NERC RISC committee develops a report that identifies key risks to bulk power system (BPS) reliability as well as a framework for mitigating those risks. The report is published in November of odd-numbered years. The recommended production timeline of that report is shown below:

- Fourth Quarter 2020
 - Develop the risk template/industry survey
 - Send out industry survey, schedule webinar to review survey tool and intent
 - Finalize summit topics/recommended speakers; begin summit preparations
 - **Determine timing of a RISC meeting**
- December
 - Receive/analyze survey results
 - **Schedule a RISC meeting**
- January
 - Reliability Leadership Summit (in-person/virtual to be determined)
 - **Schedule a RISC meeting within a couple days of the Summit**
- February
 - RISC subcommittees convene for report writing
- March
 - RISC subcommittees convene for report writing
 - **Schedule a RISC meeting**
- April
 - RISC subcommittees convene for report writing
- May
 - Report completed
 - **Schedule a RISC meeting**
- June
 - Publication/editing

- July
 - Publication/editing
 - **Schedule a RISC meeting**
- August
 - Report approval by NERC Board of Trustees

Key Milestones

I. Risk Template

The risk template is put together at the beginning of the fourth quarter prior to report publication. Each cycle the RISC committee will review the previous risk template and update based on potential emerging risks and potential new challenges introduced to the BPS since the last template was compiled. The updated and refined template will be used to compile the comprehensive survey, which will be distributed to industry leaders.

II. Industry Survey

The comprehensive industry survey serves as a vehicle to prioritize identified risks as well as to potentially identify new and emerging risks. In order to ensure the greatest accuracy and integrity of the survey NERC will conduct an industry webinar for training around proper completion of the survey. As part of the training NERC will define key terms. For example, one of the key objectives is to determine if a particular risk category should be managed versus monitored. If a risk should be managed, it means that active management is required and industry does not have a clear and precise solution or action plan to solve. If a risk should be monitored it means that the risk has been well defined with well-documented industry procedures for addressing or resolving. Additionally, the rankings for risk items will be adequately defined during the survey training webinars. The survey and training will be scheduled early in the fourth quarter.

Proposed Key Terms

Baseline Impact – The Baseline Impact is the relative scale ranking of the impact of an identified risk without the implementation of any mitigating efforts.

Baseline Likelihood – the Baseline Likelihood is the relative scale ranking of how likely an identified risk will occur or have a potential effect on the Bulk Power System.

Baseline Risk – the Baseline Risk is the risk itself prior to the implementation of any mitigating activities. For example the Changing Resource Mix is a stand-alone risk. Prior to the implementation of any mitigating activities around this risk it would be considered to be a baseline risk.

Mitigation Actions – Mitigation Actions are any type of action employed with the intent to address and reduce a risk. The effect of mitigating actions should be to lower the impact or the likelihood of a risk.

Reduced Impact – Reduced Impact is the amount of reduction in the relative scale ranking of a risk as a result of implementation of a mitigating action. For example if the Changing Resource Mix risk to the grid has a Baseline Impact of 3.0 and a mitigating activity would reduce the impact to 2.5, the Reduced Impact as a result of that mitigating activity is .5.

Reduced Likelihood – Reduced Likelihood is the amount of reduction in the relative scale ranking of a risk as a result of implementation of a mitigating action. For example if the Changing Resource Mix risk to the grid has a Baseline Likelihood of 3.0 and a mitigating activity would reduce the likelihood to 2.5, the Reduced Likelihood as a result of that mitigating activity is .5.

Remaining Risk Impact – Remaining Risk Impact is equivalent to Baseline Impact minus Reduced Impact

Remaining Risk Likelihood – Remaining Risk Likelihood is equivalent to Baseline Likelihood minus Reduced Likelihood.

Risk – A risk is an event, condition, trend, or situation which if realized would have a negative impact on BPS reliability.

Risk Control – for purposes of the survey Risk Control is defined as the collective elements and mitigating activities and their associated reductions in risk likelihood and impact.

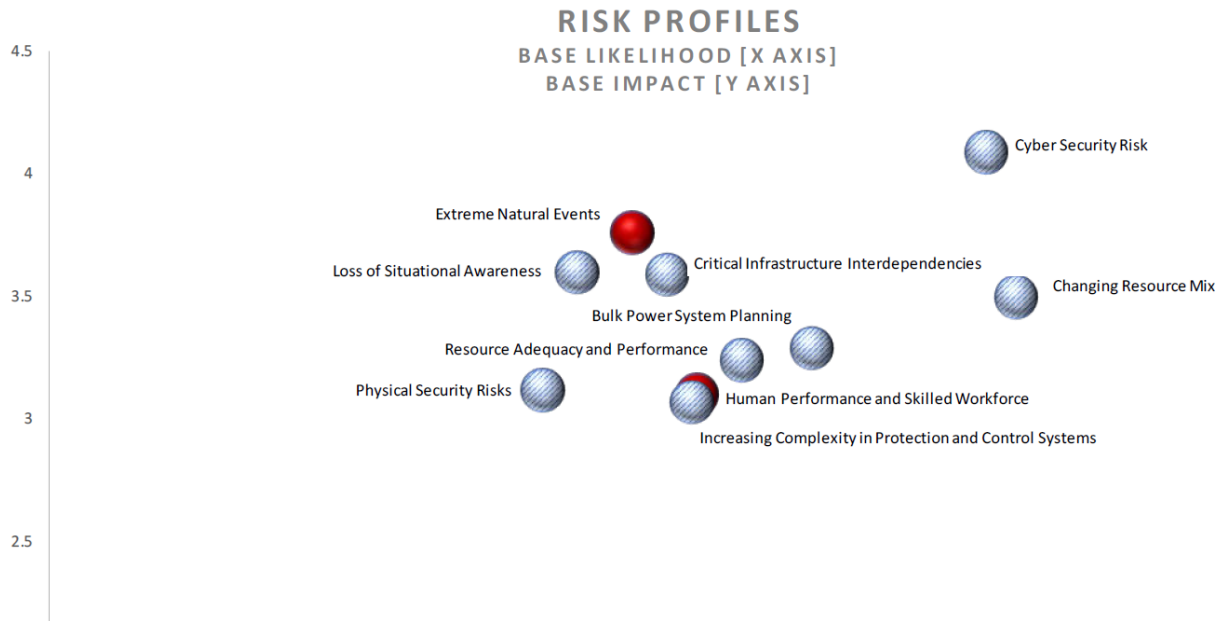
Risk Profile – A Risk Profile is a definition of a given risk along with the description of that risk.

III. Reliability Leadership Summit

The purpose of the Reliability Leadership Summit is to gather industry leaders to engage in constructive dialogue using the survey results as a framework. Keynote speakers and other speakers provide unique perspective into the key drivers of existing and emerging risks and help to identify areas that were potentially overlooked in the survey. Panel sessions are put together to collaborate around key risks and mitigating strategies as well as to engage in meaningful debate about their relative importance and significance. The Reliability Leadership Summit serves as a key building block to the ultimate RISC report.

IV. Heat Map/Risk Matrix

A visual depiction of the key risks and mitigating activities as well as those affects is a valuable tool in discerning what risks are potentially the most critical or where industry attention can have the most impact. Decision makers can have a better visual of the potential impacts of investment and attention. The heat map is an important derivative of the collected results from the survey and the Reliability Leadership Summit.



V. Report Compilation

The RISC Priorities Report is published every two years and is intended to inform regulators, policy makers and industry on existing and emerging risks as well as proposed and implemented mitigating strategies. The report builds off the initial risk identification and mitigation framework, the risk survey, the Reliability Leadership Summit, as well as additional input from the RISC committee and individual industry leaders. The RISC Committee works diligently to leverage all information to build a cogent report. It is also incumbent on the RISC Committee to measure the effectiveness and progress toward resolution of identified risks and the efficacy of mitigating activities.

Agenda

2021 Reliability Leadership Summit

January XX, 2021 | 8:30 a.m. – 4:30 p.m. Eastern

(Determine in-person or virtual and if virtual one full day or split over two)

Dial-in information with pre-registered participants

Welcome Remarks

8:30–8:45 a.m.

Nelson Peeler, Senior Vice President, Transmission and Fuels Strategy and Policy, Duke Energy, and RISC Chair

Mark Lauby, Senior Vice President and Chief Engineer, NERC

Morning Keynote

8:45–9:15 a.m.

One or two regulators such as FERC Commissioner and/or State Regulator to discuss “Regulatory and Policymaking during Unprecedented Change?”

Conduct real-time poll on risks, relative rankings, any risks not accounted for.

Panel 1 – Grid Transformation

9:15–10:30 a.m.

Panelists

A **diverse** bunch of cool people

Moderator

RISC Member

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. The transformation of generating resources and fuel sources along with changes in load characteristics are creating new reliability risks from long and short-term planning to real-time operations. Impacts and considerations include: 1) Bulk Power System planning; 2) Resource adequacy and performance; 3) Increased complexity in protection and control systems; 4) Situational Awareness challenges; 5) Human performance and skilled workforce; and 6) Changing resource mix.

This panel will discuss the transformation of the grid, the challenges that they pose for their integration, and reliability and security impacts and considerations.

Conduct real-time poll on potential mitigations.

Break

10:30–10:45 a.m.

Panel 2 – Extreme Natural Events

10:45 a.m.–12:00 p.m.

Would Extreme natural events be a good place holder for providing further emphasis on the pandemic?

Panelists

A ***diverse*** bunch of cool people

Moderator

RISC Member

Some extreme natural events (e.g., storms, wildfire) cause a significant proportion of major Bulk Power System impacts. Other extreme events (e.g. pandemics) are “people” events where staff availability can impact essential functions of system operations, maintenance, testing and construction, while at the same time creating uncertainty in load patterns and generation requirements. 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 have widespread impacts. 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.

This panel will discuss any lessons learned and unique challenges posed by extreme natural events, and ways to prepare for them.

Conduct real-time poll on potential mitigations.

Lunch

12:00–1:00 p.m.

Afternoon Keynote

1:00–1:30 p.m.

A potential speaker: She started life as a Stanford grad pushing forth a 100% renewables agenda but later learned the value of fossil fuels for grid reliability and also global economic development. She ran the Colorado Fossil Fuel Association and has a very balanced approach to incorporating renewables while not discounting the value of synchronous resources.

Panel 3 – Security Risks

1:30–2:45 p.m.

Panelists

A ***diverse*** bunch of cool people

Moderator

RISC Member

Operational security is an essential component of a highly reliable Bulk Power System. 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 Bulk Power System. Exploitation could occur directly against equipment used to monitor, protect, and control the Bulk Power System 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 Bulk Power System may impact operations and result in damaged equipment that may require an extended period of time to replace.

This panel will focus on these risks, its evolution, and potential mitigations.

Conduct real-time poll on potential mitigations.

Break **2:45–3:00 p.m.**

Panel 4 – Critical Infrastructure Interdependencies **3:00–4:15 p.m.**

Panelists

A ***diverse*** bunch of cool people

Moderator

RISC Member

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 Bulk Power System response to disruptions originating from or impacting other sectors or subsectors and resultant reliability and security implications.

This panel will explore the implications of the increased interdependencies, and how best to address the jurisdictional issues that need to be tackled to address the risks they present.

Conduct real-time poll on potential mitigations.

Panel 5 – Open Discussion **3:00–4:15 p.m.**

Moderators

Two RISC Members

Conduct real-time poll on any missing links, any reprioritization based on discussion from the Summit..

In this open-format discussion, Summit attendees will share thoughts and ideas on the priority and significance of BPS reliability risks. This discussion will concentrate on distilling the observations and themes discussed in the earlier panels, identifying potential blind spots or risks not revealed during the Summit panels or from general industry experience, and outlining strategic approaches for consideration by the ERO Enterprise, industry, policy makers, regulators, and other stakeholders in addressing significant emerging reliability risks. Discussion items can be, but are not limited to, practical BPS operations and planning, policy development at the FERC, NERC, or Regional Entity level (e.g., standards

and requirements), critical infrastructure protection, etc. See reference material: [2019 ERO Reliability Risk Priorities Report](#).

Closing Remarks

Jim Robb, President and CEO, NERC

4:15–4:30 p.m.

Framework to Address Known and Emerging Reliability and Security Risks

August 2020

This document outlines a risk framework for the ERO and details how such a framework provides an important extension of the ERO's core activities. The ERO mission¹ requires establishing a consistent framework to identify, prioritize and address known and emerging reliability and security risks. To support its mission the ERO has developed policies, procedures and programs which are identified and briefly described in Section I. These policies, procedures and programs have been incorporated into an iterative six-step risk management framework outlined in Section II. Mitigation of risks to Bulk Electric System (BES) reliability can be classified according to the likelihood of the risk occurring and the severity of its impact. Section III addresses how the ERO's policies, procedures and programs identified in Section II map into the risk likelihood and severity space. Resilience is an important component of reliability risk management and is discussed in Section IV.

I. ERO Policies, Procedures and Programs

The ERO's mission ultimately exists to serve the public interest, and it must serve that interest by developing and using the ERO Policies, Procedures and Programs to monitor and mitigate risks to the BES, balancing their use by considering what is possible against what is reasonable and necessary. Further, ensuring reliability and security also require improving the resilience of the BES by building the robustness to withstand unexpected events, supporting graceful degradation when an event is beyond design basis (providing an [Adequate Level of Reliability](#)), and supporting restoration following an events.

Five of NERC's most significant reliability risk mitigation activities are Reliability Standards, Assurance and Enforcement activities; Reliability Guidelines; Technical Engagement; Reliability Assessments; and Alerts:

1. **Reliability Standards, Assurance, and Enforcement** processes are the common way to address reliability and security risks when addressing sustained risks with moderate impacts which are likely (e.g., inaccurate planning models), and high impacts, whether likely or unlikely (e.g., vegetation management and geomagnetic disturbances). Standards provide the greatest degree of certainty for risk mitigation. Following NERC and Regional Reliability Standards should not be seen as a burden but rather an outcome of good reliability performance, with that desired outcome on each individual system contributing to the reliability of the entire interconnection, and ultimately, the North American BES.

¹ Electric Reliability Organization (ERO) consists of NERC and the 6 Regional Reliability Organizations. The ERO's mission is to assure the reliability and security of the North American bulk electric system (BES). The ERO is supported by subject matter expertise from the owners and operators of the bulk electric system. In the United States the ERO is authorized the Energy Policy Act of 2003 and overseen by FERC.

As a matter of public policy, Reliability Standards should credibly address primary risks that are sustained, high impact and likely. Establishing a baseline of Reliability Standards assures accountability for the public's benefit when minimum expectations of performance or behavior are not met. The public expects a regulator to enforce accountability on at least those actions related to sustained, high impact, and likely risks within its scope of oversight.

A key factor in the success of compliance monitoring and enforcement of mandatory standards rests on a common understanding among industry and the ERO as set forth in the ERO's Compliance Monitoring and Enforcement Program (CMEP) which details how compliance will be monitored and enforced. Implementation Guidance is developed by industry and vetted through pre-qualified organizations to show examples of compliant implementations. These vetted examples can then be submitted to the ERO for endorsement, and, if endorsed, the ERO would give the example deference during CMEP activities with consideration of facts and circumstances.

Annual risk elements associated with the Reliability Standards are documented annually in the ERO CMEP Implementation Plan, which provides guidance to industry on North American-wide and regional risks that the ERO's Reliability Assurance and Enforcement staff will be focusing on addressing in the coming year.

2. **Reliability Guidelines** are the common approach to use when addressing moderate impact sustained risks that are unlikely, and low impact sustained risks that are unlikely or likely (such as reduced or lack of equipment maintenance resulting in the loss of an individual element which is a low impact to BPS reliability, while the probability of failure increases over time). Reliability Guidelines are also used for those issues that are or are not in the ERO's jurisdiction, but are practices that improve reliability. Guidelines provide three advantages:
 - Together with a strong minimum baseline fabric of standards, guidelines can be a strong and timely way to address risk.
 - Reliability Guidelines enable the ERO to highlight expectations or priorities on appropriate practices for a given subject area.
 - Reliability Guidelines may also be used to establish performance expectations for emerging risks prior to codifying those expectations into Reliability Standards.
3. **Technical Engagement** can be used to address sustained risks or one-and-done activities with low impacts, whether likely or unlikely. Activities here include webinars, site visits, presentation and reports, workshops, conferences and technical meetings. This includes not only activities of the ERO, but also amplifying engagement through the reliability ecosystem, such as the North American Transmission and Generation Forums, professional organizations, researchers, and government. Technical engagement also serves to promote future sustained risk mitigation and support for using Reliability Guidelines, industry notices, newsletters, bulletins, or Reliability Standards.
4. **Reliability Assessments** can be used to address longer-term risks, whether likely or unlikely. Generally, reliability assessments are used to inform and influence policymakers, industry leaders, and the general public about important public and energy policy issues impacting BPS reliability.

5. **Alerts** are used for sharing information, especially time-sensitive information, to request action or direct action. They can also serve as a more nimble, foundational activity for other ERO Policies, Procedures and Programs. As part of its normal course of business, NERC often either discovers, identifies, or is provided with information that is critical to ensuring the reliability of the bulk power system in North America. In order to effectively disseminate this information, NERC utilizes email-based “alerts” designed to provide concise, actionable information to the electricity industry. As defined in its Rules of Procedure, NERC alerts are divided into three distinct levels, as follows:
- **Level 1 Industry Advisory:** Purely informational, intended to alert registered entities to issues or potential problems. A response to NERC is not necessary.
 - **Level 2 Recommendation to Industry:** Recommends specific action be taken by registered entities. A response from recipients, as defined in the alert, is required.
 - **Level 3 Essential Action:** Identifies actions deemed to be “essential” to bulk power system reliability and requires NERC Board of Trustees' approval prior to issuance. Like recommendations, essential actions also require recipients to respond as defined in the alert.

Since Level 2 and Level 3 alerts require acknowledgement of receipt and response to the alerts, they are used in higher risk impact situations than Level 1 alerts, which are purely informational.

II. ERO Iterative Risk Management Framework

During the last ten years, the ERO has expanded its implementation of risk-based approaches across its program areas. During this transition, the ERO has continued to lead industry in reliability, resilience, and security initiatives to identify known and emerging risks, and to engage industry in a collaborative approach to mitigating that risk. The primary reliability, resilience, and security activity for risk mitigation the ERO currently deploys includes, but is not limited to: outreach events such as webinars and conferences, Reliability Guidelines, Alerts, Reliability Standard development, registration and certification, and compliance monitoring and enforcement. In addition, the ERO can engage Forums such as the North American Transmission Forum (NATF) and the North American Generator Forum (NAGF), as well as the industry trade associations, industry groups such as the Energy Systems Integration Group (ESIG), and research organizations such as the Electric Power Research Institute and the Power Systems Engineering Research Center (PSERC) to assist with development of best practices, increased awareness, Implementation Guidance, and other solutions used to address identified risks.

Additionally, a set of industry indicators has been developed to measure reliability and security. These indicators need further refinement, maturation and linkage to industry performance as they are key to evaluating the effectiveness of mitigation efforts, identifying the residual risk that remains, and considering whether the remaining risk is at acceptable levels.

This framework is meant to guide the ERO in the prioritization of risks and provide guidance on the application of ERO Policies, Procedures, and Programs, to inform resource allocation and project prioritization in the mitigation of those risks. Additionally, the framework accommodates measuring residual risk after mitigation is in place, enabling the ERO to evaluate the success of its efforts in

mitigating risk, which provides a necessary feedback for future prioritization, mitigation efforts, and program improvements.

The successful reduction of risk is a collaborative process between the ERO, industry, and the technical committees including the Reliability and Security Technical Committee (RSTC). The framework provides a transparent process using industry experts in parallel with ERO experts throughout the process, from risk identification, deployment of mitigation strategies, to monitoring the success of these mitigations.

Six specific steps have been identified, consistent with risk management frameworks used by other organizations and industries: 1) Risk Identification; 2) Risk Prioritization; 3) Mitigation Identification and Evaluation; 4) Deployment; 5) Measurement of Success; and 6) Monitoring.

1. Risk Identification and Validation: The ERO and industry subject matter experts continuously work together identifying and validate risks to the reliable and secure operation of the bulk power system based on analysis of ongoing performance of the system. In addition, the Reliability Issues Steering Committee (RISC) has successfully brought together industry experts to identify and prioritize emerging risks, as well as suggest mitigation activities. A partnership between ERO leadership and the RISC enables input from the ERO program areas, industry Forums and trade associations to provide additional context in risk identification. Validation of the magnitude and priority of the risk includes working with NERC Committees, and socializing it with Forums, government and research organizations. The ERO has a number of ways that it identifies risks:

- ERO stakeholder supported technical organizations, industry forums, and associated subject matter experts
- Focused Compliance monitoring activities
- Reliability Assessments
- Events Analysis
- Analysis of Availability Data Systems (BASS, TADS, GADS, DADS, MIDAS, etc.)
- Frequency Response, Inertia, and other essential reliability service measurements
- Interconnection simulation base case quality and fidelity metrics
- Reliability Issues Steering Committee (RISC) Biennial Risk Report
- Regional Risk Assessments
- Communication with external parties, such as DOE, DHS, Natural Resources Canada, CEA and EPRI
- Shared public and/or government intelligence with special emphasis on cyber security.

2. Risk Prioritization: Prioritizing risks is accomplished through an analysis of their exposure, scope, and duration as well as impact and likelihood. The primary sources of data used to support this analysis come from the Risk Identification step. Deciding if the risk requires near-term mitigation or continued monitoring is informed by technical expertise. Depending on the complexity of the risk, new models, algorithms and processes may need to be developed to

better understand the potential impacts of the risk, which is necessary to develop risk mitigation tactics. The process would be consistent with other risk management frameworks used by other industries, and was recently successfully tested in collaboration with industry through a survey issued by the RISC, based upon the risks that group prioritized in early 2019.

3. Remediation and Mitigation Identification and Evaluation: The right mix of mitigation activities is balanced against both the effective and efficient use of resources and the potential risk impact and likelihood. Determining the best mix depends on a number of factors, such as:

- What is the potential impact or severity of the risk?
- How probable is the risk? Is it sustained, decreasing or growing?
- Is the risk here today or anticipated in the next 3-5 years?
- How pervasive is the risk?
- Is mitigation expected to be a one-time action, or ongoing?
- Have we had experience with events being exacerbated by the risks, or there is no experience, but the probability is growing (i.e. cyber or physical security)?
- Have previous mitigation efforts been deployed? If so, were they effective? Why or why not?
- What is an acceptable residual risk level after mitigating activities have been deployed?
- Is the risk man-made or by natural causes?

Input from, and allocation of, subject matter expertise through multiple sources is part of this consideration, including resources within the ERO and its stakeholders (such as standing technical committees and their subgroups, or standard drafting teams), and external parties, such as the North American Transmission and Generation Forums (NATF and NAGF), North American Energy Standards Board (NAESB), the Institute of Electrical and Electronic Engineers (IEEE), and EPRI, to name a few. Coordination is key to avoid duplication and provide supportive, rather than conflicting actions.

Once a risk to the BES has been prioritized according to its impact and likelihood, the ERO, NERC Committees, Forums, and industry subject matter experts recommend potential mitigations and assess their anticipated effectiveness. Examples of mitigation activities include, but are not limited to:

- Reliability Standards, with Compliance and Enforcement for risks that are:
 - Sustained, moderate to severe impact, and likely
 - Sustained, severe impact, and unlikely
 - Focused monitoring based on risk, and in response to major events
- Reliability Guidelines for risks that are:
 - Sustained, low to moderate impact, and likely
- Lessons Learned for risks that are:

- Sustained, low impact, and likely
- Assist Visits for risks that are:
 - Focused on a very specific situation or configuration
 - Generally on specific industry or entity practices or conditions
- Analysis of Major Events for risks that are:
 - Identified after a Major Event (e.g., Category 3 or higher)
 - Discreet/one-time, severe impact, unlikely
 - identified through recommended reliability improvements or best practices and lessons learned
- Analysis of “Off-Normal” Events for risks that are
 - Identified after an unusual operational condition has occurred and likely not a categorized event.
 - Discreet/one-time, moderate impact, unlikely
 - Identified through recommended reliability improvements or best practices and lessons learned
- Advisories, Recommendations or Essential Actions²
- Alerts³
- Technical Conferences and Workshops

4. Mitigation Deployment: Mitigation projects will be deployed by the ERO and/or industry stakeholder groups, as determined by the “Mitigation Identification and Evaluation” step. A specific mitigation plan would involve a suitable mix of the ERO policies, procedures and programs discussed in Section I.

From time-to-time, the Federal Energy Regulatory Commission (FERC) may order the development of Reliability Standards, which can occur in this step.

5. Measurement of Success: Once a set of solutions has been deployed, the effectiveness of the mitigation must be measured to determine if the residual risk has achieved an acceptable level. Effectively, if the desired level of risk mitigation is not met, the risk is fed back to Step 1, enabling a new prioritization of risks, factoring in historic mitigation, ensuring resource allocation is adapted to the changing risk landscape. This step also informs future mitigation

² LEVEL 1 (Advisories) – purely informational, intended to advise certain segments of the owners, operators and users of the Bulk Power System of findings and lessons learned; LEVEL 2 (Recommendations) – specific actions that NERC is recommending be considered on a particular topic by certain segments of owners, operators, and users of the Bulk Power System according to each entity’s facts and circumstances; LEVEL 3 (Essential Actions) – specific actions that NERC has determined are essential for certain segments of owners, operators, or users of the Bulk Power System to take to ensure the reliability of the Bulk Power System. Such Essential Actions require NERC Board approval before issuance.

³ ALERT 1: Industry Action Requested: Fast moving or recently detected, impacts moderate, ALERT 2: Industry Action Required: Fast moving or recently detected, impacts moderate to severe, ALERT 3: Industry Action Mandatory: Fast moving or recently detected, impacts moderate to severe

efforts, as industry and the ERO learn from the effectiveness of mitigation mixes for reducing risk.

- 6. **Monitor Residual Risk:** Once the level of residual risk is at an acceptable level, the risk is monitored through ongoing performance measures to ensure that risk remains at acceptable risk levels. The residual risk should be monitored for progress and to ensure that the mitigations that are in place continue to address the risk (Step 5). At times, mitigations need to be deployed on a periodic basis (e.g. annual workshops, Reliability Guideline updates, etc.) to ensure continued success (Step 4). If the risk levels heighten, or increased mitigation efforts are necessary due to the changing nature of the bulk power system, the risk can be fed back (Step 1) for prioritization and the development of additional mitigation approaches.

Figure 1 provides a pictorial flow chart of the ERO’s risk management process.

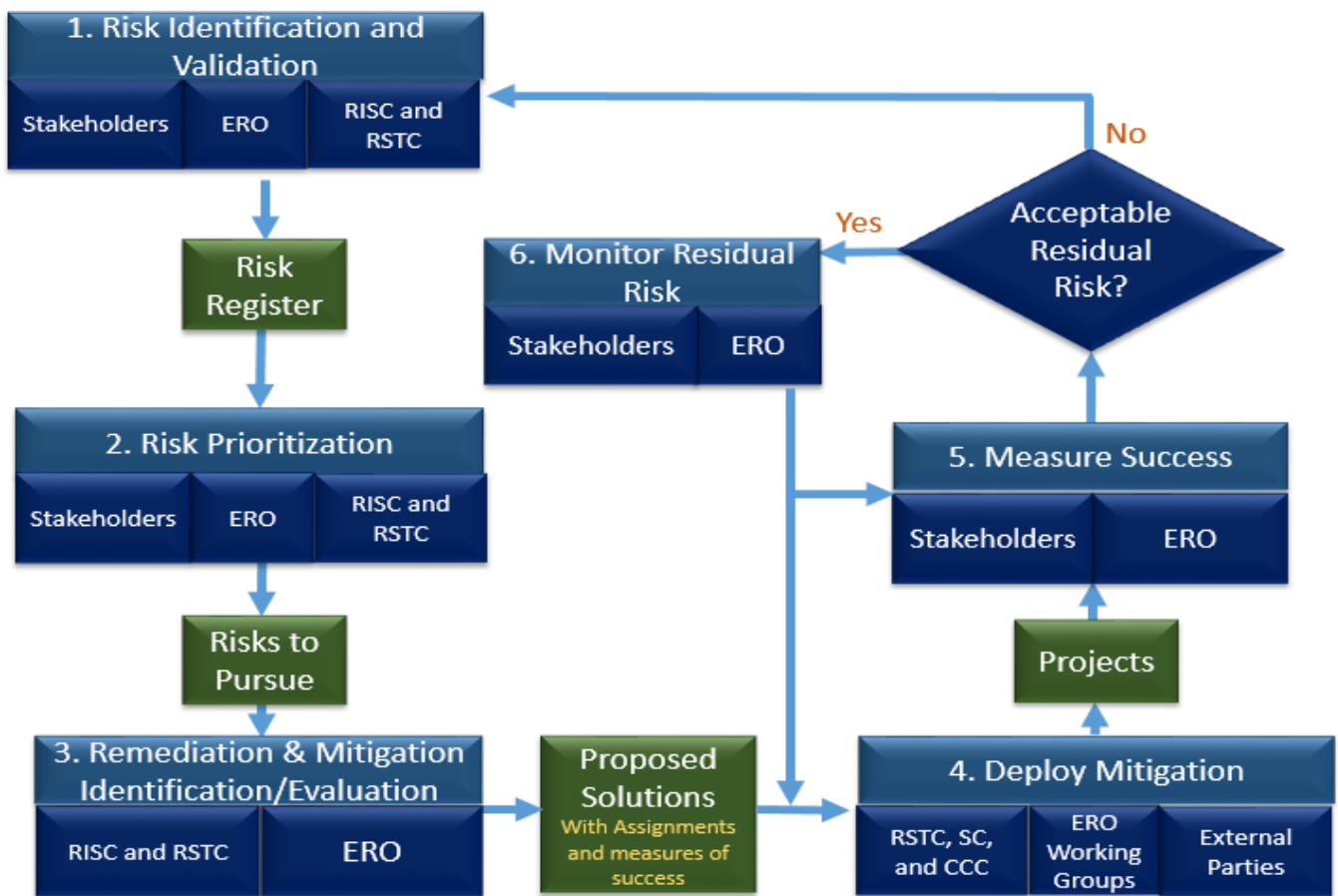


Figure 1: ERO Risk Management Process

In order to coordinate risk mitigation with the RISC and RSTC triage risks together mirroring the iterative RISC Framework process. The touch points are discussed in Figure 2.

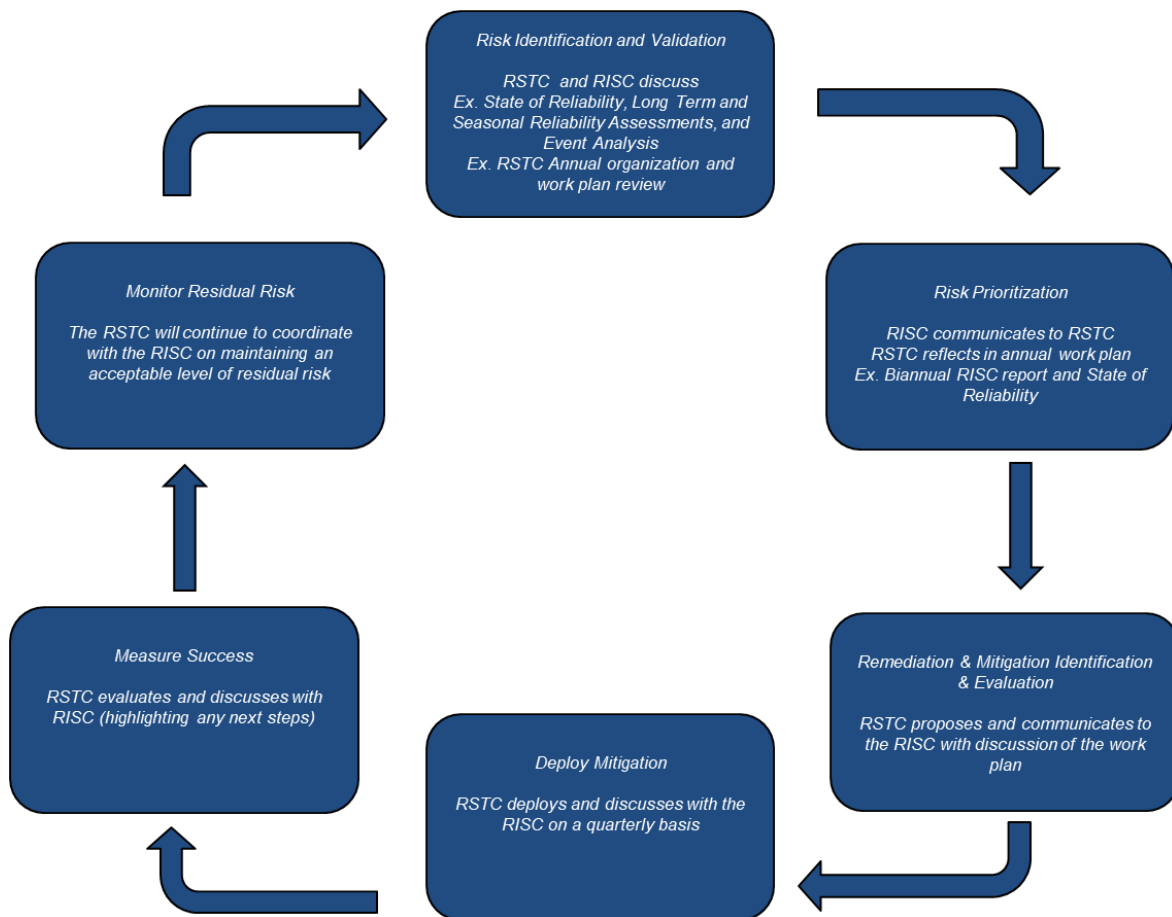


Figure 2: RSTC/RISC Coordination within the Risk Framework

1. **Risk Identification and Validation** is completed by the RSTC and RISC as they review the annual State of Reliability Report, Long-Term and Seasonal Reliability Assessments, Event Analysis records and with a joint review the biennial RISC Report incorporating prioritized risks into the RSTC's subgroup's work plans. Further, the RSTC coordinates with the RISC on long-term risks and mitigations:
2. **Reliability Risk Prioritization** is completed collaboratively between the RSTC and RISC on an annual basis. Ongoing activities are calibrated, and newly identified risks are prioritized
3. **Remediation & Mitigation Identification & Evaluation** activities to address the risks are assigned to the appropriate RSTC subgroups accounting for changing needs across the BPS. They create the ERO Policies, Procedures and Programs to address the risks. Frequent communications ensures coordination of ongoing risk prioritization. RSTC will provide updates to the RISC on the subgroup activities being taken on a quarterly basis.
4. **Deploy Mitigations** by putting ERO Policies, Procedures and Programs into effect.
5. **Measure Success** of the strategies/plans which are jointly evaluated for effectiveness, highlighting next steps. RSTC will provide updates to the RISC on the actions being taken on a quarterly basis.

- 6. **Residual Risk** is monitored in coordination between the RSTC coordinates and RISC towards maintaining an acceptable level of residual risk.

III. Risk Mitigation from Likelihood and Severity Perspective

From a likelihood and impact perspective, the ERO Policies, Procedures, and Programs above overlap based on the specifics of each risk being mitigated. In addition, there are a host of additional activities that work together to manage risks, such as engagement with the reliability ecosystem, (e.g. Forums, professional organizations (IEEE-PES, CIGRE, etc.), and government). A combination can be used towards gaining industry action, setting the stage for standards as well as addressing a risk while a standard is being developed. Likelihood and impact have a bearing when a Reliability Standard is required. Figure 2 provides an illustration that is representative of the principles:

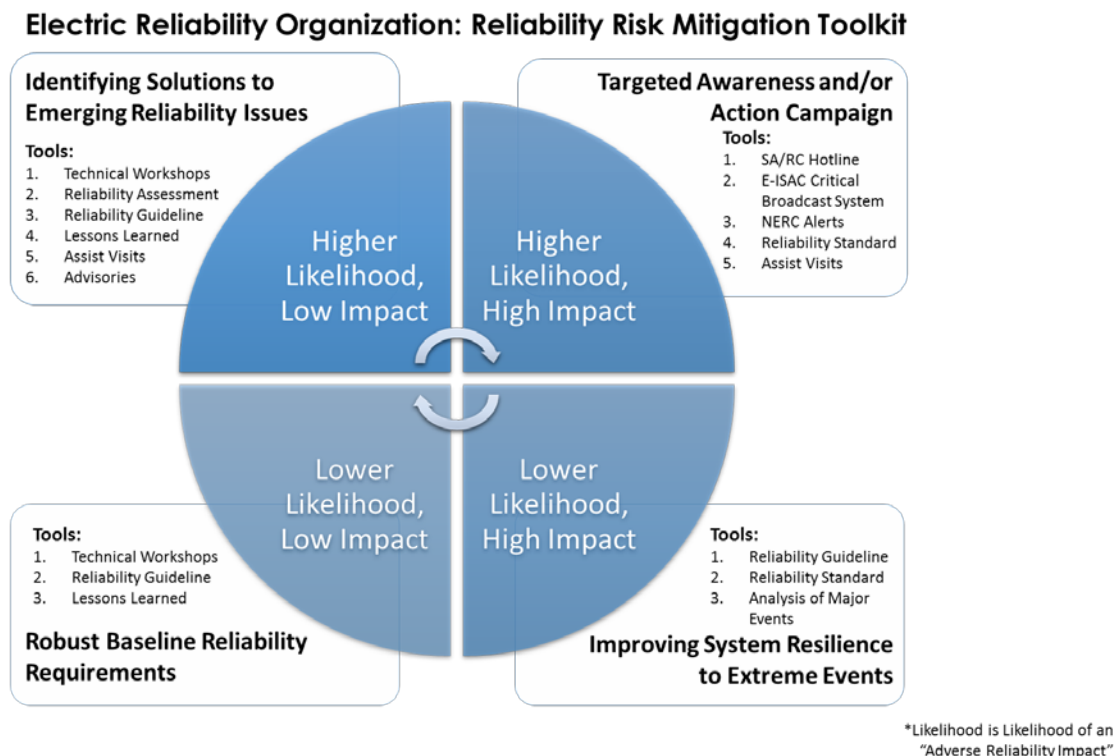


Figure 3: ERO Reliability Risk Mitigation Portfolio

IV. Resilience Impact on Risk Management

In August 2017, the Department of Energy (DOE) issued a Staff Report to the Secretary on Electricity Markets and Reliability ([DOE Grid Report](#)) regarding reliability and resilience in light of the changing energy environment. One recommendation in the DOE Grid Report stated that NERC should consider adding resilience to its mission and broadening its scope to address resilience. In response to the DOE report and NERC assessments, the NERC Board of Trustees (NERC Board) directed the Reliability Issues Steering Committee (RISC) to develop a model for resilience and examine resilience in today's environment.

In accordance with the NERC Board’s directive, the RISC worked with NERC stakeholders to reexamine the meaning of resilience in today’s changing environment and how resilience impacts NERC activities. Meanwhile, the DOE and FERC have continued evaluating the relationship of resilience and reliability.

NERC has developed, filed with FERC, and later updated a [definition of the adequate level of reliability](#) (ALR) along with a [technical report](#) to guide Reliability Standards development, Reliability Assessments, guideline development, data collection, system analysis and standing committee work. In particular, the ALR, or design basis of the system, is defined as the state that design, planning, and operation the BES will achieve when five ALR performance objectives are met.⁴ Each objective addresses Reliable Operation of the BES over four time frames:

1. **Steady state:** the period before a disturbance and after restoration has achieved normal operating conditions
2. **Transient:** the transitional period after a disturbance and during high-speed automatic actions in response
3. **Operations response:** the period after the disturbance where some automatic actions occur and operators act to respond
4. **Recovery and system restoration:** the time period after a widespread outage through initial restoration rebounding to a sustainable operating state and recovery to a new steady state

In November of 2018, the NERC Board accepted the RISC’s Report, titled [“Reliability Issues Steering Committee Resilience Report.”](#) This report summarizes the results of the RISC’s examination of resilience, including the RISC Resilience Model.

V. Incorporating Risk Adds a Critical Dimension to the ERO’s Mission

Application of ERO Policies, Procedures and Programs provides a multi-dimensional approach to address risks. Namely, some these approaches can be put in place swiftly, while others require industry collaborative action which can take more time. Further, there are time considerations on the speed of the ERO Policies, Procedures and Programs deployment, as well as the speed at which a risk should be addressed. Figure 3 provides a risk time horizon perspective.

⁴ The ALR Performance Objectives are as follows:

1. The BES does not experience instability, uncontrolled separation, Cascading, or voltage collapse under normal operating conditions and when subject to predefined Disturbances.
2. BES frequency is maintained within defined parameters under normal operating conditions and when subject to predefined Disturbances.
3. BES voltage is maintained within defined parameters under normal operating conditions and when subject to predefined Disturbances.
4. Adverse Reliability Impacts on the BES following low probability Disturbances (e.g., multiple contingences, unplanned and uncontrolled equipment outages, cyber security events, and malicious acts) are managed.
5. Restoration of the BES after major system Disturbances that result in blackouts and widespread outages of BES elements is performed in a coordinated and controlled manner.

The ALR also lists two assessment objectives for purposes of assessing risks to reliability:

1. BES transmission capability is assessed to determine availability to meet anticipated BES demands during normal operating conditions and when subject to predefined Disturbances.
2. Resource capability is assessed to determine availability to the Bulk Electric System to meet anticipated BES demands during normal operating conditions and when subject to predefined Disturbances.

The ERO Policies, Procedures and Programs deployed are largely dependent on the likelihood that a given risk would impact reliability. For example, reliability issues that have occurred are generally more likely than those that have not occurred, and risks/issues that have occurred are generally more likely to occur again.

Therefore, the ERO Policies, Procedures and Programs used to mitigate risks that have occurred may be different than those used to mitigate longer-term issue that haven't impacted reliability yet. For instance, after analysis of major and/or off-normal events, depending on the potential impacts and reoccurrence likelihood, strong action can be taken by the ERO with nearly immediate response by issuing up to three levels of NERC Alerts, Assist Visits, followed by Reliability Guidelines, technical conferences, and enhancement of Reliability Standards.

Generally, industry action to address medium to high impact and likelihood risks employs Reliability Standards which provide the highest certainty of risk mitigation. Following Reliability Standards is mandatory and provides a high value by creating comfort and certainty for interconnected organizations of expectations and roles, ensuring that the adequate level of reliability will be maintained. In the end, following the Reliability Standards is an outcome of good industry reliability performance.

High-Impact, Low-Frequency-type risks generally do not have a historical record of technical information. Longer-term risks can be difficult to quantify—therefore, much of the work the ERO can do is to assemble industry experts and stakeholders to agree on and validate what the reliability risk is and how it should be considered and addressed within the ERO Policies, Procedures and Programs, including the full reliability ecosystem. These risks require more collaborative effort and more time towards developing technical references, convening industry stakeholders, and conducting independent reliability assessments to determine the best way to mitigate the risk.

The ERO's risk-based approach is fundamental to the success of its mission to ensure the reliability and security of the BES in North America.

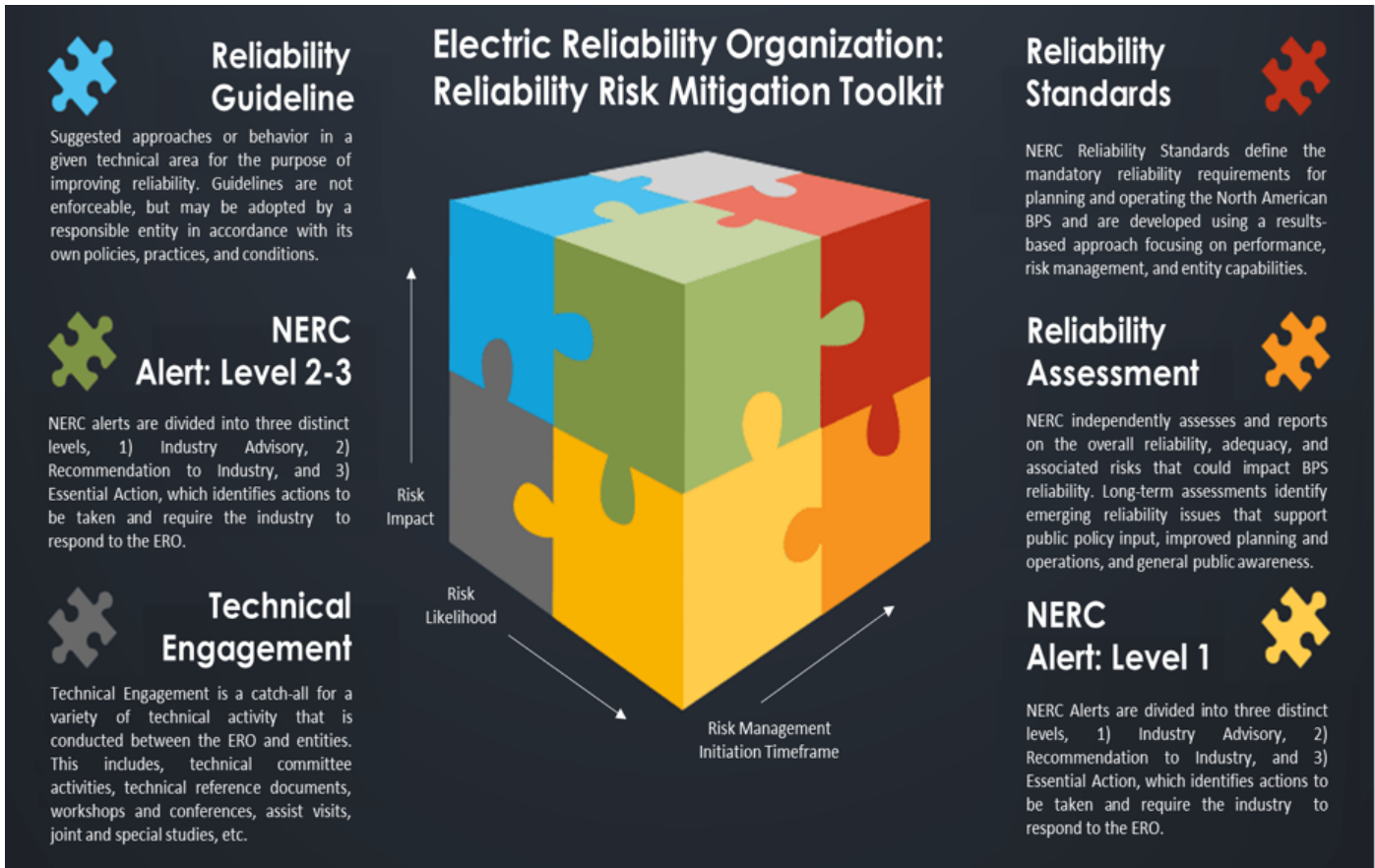


Figure 3: Risk Time Horizon