MRC Self-Assessment and Effectiveness Survey Results and Next Steps

Greg Ford, MRC Chair
Member Representatives Committee Meeting
May 8, 2019
• MRC self-assessment completed in January 2019
• MRC effectiveness survey completed in February 2019
• Areas of focus identified:
  ▪ MRC Business Plan and Budget Input Group roles and responsibilities
  ▪ MRC members internal communication
  ▪ Frequency and length of MRC meetings
  ▪ Preparation for MRC members for meetings
  ▪ Balanced participation of members at MRC meetings
  ▪ Awareness of outside influences on NERC
  ▪ Communication between the Board and MRC
  ▪ Timing of MRC input to the Board
Questions and Answers
• Support effective and efficient implementation (e.g. CIP V5 transition)
• Supply chain risk study
• Communicate supply chain risks to industry
• Forum and Association white papers
• Plan to evaluate effectiveness of supply chain standards
NERC used the Electric Power Research Institute (EPRI) to conduct risk study

- Assessment of product/manufacturer types used on the Bulk Electric System (BES)
- Analysis and applicability to BES Cyber Assets
- Analysis of best practices and standards in other industries to mitigate supply chain risks
- Analysis of generalized vendor practices and approaches used to mitigate supply chain risks
• Risks
  ▪ Allow remote access through backdoor
  ▪ Impact ability to respond
  ▪ Single platform vulnerabilities

• Mitigation factors
  ▪ Existing Critical Infrastructure Protection (CIP) access controls
  ▪ Testing, verification, and validation of architecture, configuration, and management controls

• Staff recommendations
  ▪ Include electronic access controls in Supply Chain Standards
  ▪ In interim, entities should identify and assess supply chain vulnerabilities
• Risks
  ▪ Allow physical access to assets
  ▪ Adverse action without detection
  ▪ Impact ability to respond

• Mitigation factors
  ▪ Existing CIP access controls
  ▪ Requires physical presence

• Staff recommendations
  ▪ Include physical access controls in Supply Chain Standards
  ▪ In interim, entities should identify and assess supply chain vulnerabilities
Low Impact BES Cyber Systems

- **Risks**
  - Malicious code
  - Vendor access
  - Common mode vulnerabilities

- **Mitigation factors**
  - Basic cyber hygiene
  - Overall market impact
  - Common procurement methods

- **Staff recommendations**
  - Develop 1600 data request for further analysis
  - Develop guideline with CIPC Supply Chain Working Group (WG) to apply plans to lows
  - Monitor practices through pre-audit surveys
- Risks
  - Vary with the asset
  - By definition, do not represent an immediate 15-minute adverse impact to the reliability of the BES
  - Typically Information Technology assets
- Staff recommendations
  - Develop guideline with CIPC Supply Chain WG to evaluate Protected Cyber Assets
• Include in Supply Chain Standards
  ▪ Electronic access controls for medium and high BES Cyber Systems
  ▪ Physical access controls for medium and high BES Cyber Systems

• Do not include in Supply Chain Standards
  ▪ Electronic access monitoring and logging
  ▪ Physical access monitoring and logging
  ▪ Protected Cyber Assets

• Collect more data on low impact BES Cyber Systems

• Develop guidelines with CIPC Supply Chain WG
  ▪ Application to lows
  ▪ Evaluation of Protected Cyber Assets
• Broad support for the report
• Most agree that low impact BES Cyber Assets remain out
  ▪ Agreement that more data is needed
  ▪ Concerns about 1600 mechanism, scope, timing and method
• Concern about PCAs, Transient Cyber Assets, and Removable Media
  ▪ Work with advisory group to add to data request
• 3rd party certification would be helpful
• Analysis of data collected to industry
• Consider cost along with risk
• Concern with “pre-audit surveys”
• Augment advisory group
• Any guidelines developed should follow CIPC established process
Questions and Answers
ERO Enterprise Effectiveness Survey
Kristin Iwanechko, Associate Director of Regional and Stakeholder Relations
Member Representatives Committee Meeting
May 8, 2019
• Survey issued July 2018
  ▪ 76 survey questions across 12 topic areas

• Ratings on a 5-point scale
  ▪ 1 – Strongly Disagree
  ▪ 2 – Disagree
  ▪ 3 – Neither Disagree nor Agree
  ▪ 4 – Agree
  ▪ 5 – Strongly Agree

• Ability to provide open-ended comments for each survey question
• 576 survey respondents (116% increase from previous survey)
  ▪ 509 represented 730 NCR numbers
  ▪ 67 did not represent an NCR number
• Over 5,000 open-ended comments received
• Average ratings from 3.12 to 4.14
• Favorable percentages ranged from 33% to 88%
• Unfavorable percentages ranged from 1% to 21%
• Year-over-year analysis for subset of 58 questions
## Five Highest and Lowest Rated Items

<table>
<thead>
<tr>
<th>Item</th>
<th>AVG</th>
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<tbody>
<tr>
<td>The personnel certification program is valuable in promoting skilled, trained, and qualified BPS operators.</td>
<td>4.14</td>
</tr>
<tr>
<td>Regional Entity staff performing audits and internal controls evaluations are competent in those areas.</td>
<td>4.14</td>
</tr>
<tr>
<td>The audit report from the most recent audit of the organization(s) I represent identified clear, definitive, and actionable items to address.</td>
<td>4.12</td>
</tr>
<tr>
<td>The ERO Enterprise communicates information about Reliability Standards, their development, and opportunities for stakeholder participation in an efficient and effective manner.</td>
<td>4.10</td>
</tr>
<tr>
<td>The ERO Enterprise has the requisite technical expertise to execute the ERO’s statutory functions.</td>
<td>4.09</td>
</tr>
<tr>
<td>The ERO Enterprise ensures efficiencies and minimizes duplication and activities not affecting reliability outcomes.</td>
<td>3.41</td>
</tr>
<tr>
<td>The E-ISAC is a primary resource for threat information and analysis.</td>
<td>3.39</td>
</tr>
<tr>
<td>NERC: Reliability Standards are practical to implement.</td>
<td>3.27</td>
</tr>
<tr>
<td>Regional Entity Reliability Standards address risk to reliability in a cost-effective manner.</td>
<td>3.25</td>
</tr>
<tr>
<td>NERC Reliability Standards address risk to reliability in a cost-effective manner.</td>
<td>3.12</td>
</tr>
</tbody>
</table>
Five Most Favorable Items

The ERO Enterprise communicates information about Reliability Standards, their development, and opportunities for stakeholder participation in an efficient and effective manner.

The personnel certification program is valuable in promoting skilled, trained, and qualified BPS operators.

The self-certification process is well defined, organized, and followed established procedures.

Regional: The audit process (including pre- and post-audit activities) for my entity’s most recent audit was well-defined, organized, and followed established procedures.

NERC effectively reports on bulk power generation and transmission reliability, including emerging and long-term reliability issues of specific regional and North American concern.

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Favorable Neutral Unfavorable
NERC Reliability Standards address risk to reliability in a cost-effective manner.

The E-ISAC is my primary resource for threat information and analysis.

NERC Reliability Standards are practical to implement.

The NERC Reliability Standard requirements are clearly stated.

ERO Enterprise compliance activities are efficient and effective.
Analysis to Determine Areas for Focus

- Five lowest-rated items
- Five most unfavorable items
- Items with higher than 6% unfavorable ratings and also lower than 60% favorable ratings
- Themes from anonymized comments
- Grouped into four broad categories:
  - ERO Enterprise Principles
  - Reliability Standards Development
  - Compliance Monitoring and Enforcement
  - E-ISAC
• Increase communications with industry on ongoing activities ensuring efficiencies and minimizing duplication (e.g., Align, availability data systems, stakeholder engagement efforts)

• Leverage NERC and Regional Entity staff expertise and deploy centers of excellence around certain practice areas

• Build mutual trust through activities outlined in Compliance Monitoring and Enforcement action plans

• Continue small entity outreach (assist visits, workshops, one-on-one meetings)

• Work with trade organizations to develop more targeted outreach programs
• Address risk to reliability in a cost-effective manner
  ▪ Continue soliciting input through periodic reviews (PR), the standards grading metric, and public comment periods during standard drafting
  ▪ Engage the Standards Committee to evaluate ways to incorporate comprehensive compliance and enforcement cost-impact measures into the PR template or team analysis
  ▪ Continue Standards Efficiency Review

• Requirements are clearly stated
  ▪ Continue PRs and standards grading metric

• Practical to implement
  ▪ Continue outreach and training webinars
  ▪ Continue PRs
Compliance Monitoring

• Efficiency in data gathering, workflow, and analysis tools
  ▪ Align tool roll-out
  ▪ CIP Evidence Request tool version 3 release

• Implementation of risk-based compliance monitoring
  ▪ Continued evolution and alignment of Compliance Oversight Plan summaries and the CMEP Implementation Plan

• Outreach and education
  ▪ Outreach on Implementation Guidance process through a webinar and upcoming workshops
  ▪ Continue small group advisory sessions on Supply Chain standards
  ▪ Continue outreach and awareness on the program alignment process
Enforcement

- Further streamline minimal risk noncompliance
  - Evaluate the following program elements for potential modification:
    - Self-logging
    - Necessary information to support a minimal risk determination
    - Compliance Exceptions
  - Align tool release (streamline submitting mitigation activities)
• Provide more actionable information, recognizing different degrees of required details or assistance
• Continue external messaging regarding relationships and controls around information sharing to improve trust
• Continue to implement functionality improvements to the portal
• Conduct separate, E-ISAC member-only surveys in the off-years of the ERO Enterprise Effectiveness Survey
• Many activities underway
• Some primary initiatives and 2019 Work Plan priorities address these action plans
• Updates on most items will be reported through separate presentations at future MRC, Board, and Board Committee meetings
• Summary update on actions planned for November 2019 meetings
Questions and Answers
Effectiveness and Efficiency
Update

Mark Lauby, Senior Vice President and Chief Reliability Officer
Member Representatives Committee Meeting
May 8, 2019
Objectives and Approach

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

- Four-legged approach

[Diagram showing ERO Effectiveness & Efficiency with four legs: ERO Enterprise “Coordination Costs/Opportunities,” NERC Initiatives, Regional Entity Initiatives, and Stakeholder Engagement]
Three Focus Areas in 2019

• **Stakeholder Engagement**
  - Review existing Committee structure
  - Investigate and identify a more nimble structure
  - Set Plan in motion for 2020

• **Compliance Monitoring and Enforcement Program (including Align)**
  - Bring together process and procedures through the ERO Enterprise
  - Use single tool rather than one customized by region for reduced licensing costs

• **Standards Efficiency Review**
  - Review requirements for elimination, consolidation or improvement
  - Nearly 80 requirements reduced in Phase 1
  - Phase 2 has begun
Stakeholder Engagement

Mark Lauby, Senior Vice President and Chief Reliability Officer
Stakeholder Engagement / Committees

• The current model has been in place for over 10 years
  ▪ Model is expensive and time consuming for NERC members
  ▪ The ERO Enterprise has matured
  ▪ Several Regional Entities (REs) have had success enhancing their committee models

• Changing industry model
  ▪ Advances in new and unfamiliar technologies (e.g., inverters, batteries)
  ▪ Risk profiles changing (e.g., fuel assurance, ERS preservation with resource mix changes)

• Committee “silos” blurring
  ▪ Speed of change is accelerating
  ▪ Committee activities increasingly overlap
  ▪ New technology requires cross-cutting, rethinking of many utility paradigms
Current NERC Stakeholder Committees

**NERC Board of Trustees (Board)**

### Reliability
- Planning Committee
- Operating Committee

### Security
- Critical Infrastructure Protection Committee

### Standards, Compliance Monitoring, and Enforcement
- Compliance and Certification Committee
- Standards Committee
- Personnel Certification Committee

### Committee Coordination, Risk Identification, and Work Plan Development
- Reliability Issues Steering Committee
- Standing Committee Coordination Group
Focus on OC, PC, and CIPC

- Advisory Committees (CCC, SC, PCGC) are not part of this review
  - Each Advisory Committee is quite distinct with no overlap; specifically noted in NERC’s Rules of Procedure
  - Self-regulating over time to improve effectiveness and efficiency

- RISC has a unique charge and participation model
  - Produced biennial report on key risk identification and mitigation
  - Chartered to triage risk mitigation approaches

- Technical Committees (OC, PC, CIPC) identify and assess risk
  - Some activities are ongoing and provide annual/biennial deliverables
  - Other activities appear to be less focused and fragmented
  - Existing groups bypassed, using task forces to provide end-to-end solutions
• Is there a different structure?
  ▪ 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 committees
  ▪ Achieve a higher level of industry participation (effectiveness) and cost-effectively leverage subject matter expertise (efficiency)

Right people working on the right issues
Stakeholder Engagement Team

• Leadership:
  Jennifer Sterling (Exelon)       Mark Lauby (NERC)
  Ken DeFontes (Trustee)           Fred Gorbet (Trustee)

• Team Members:
  Scott Tomashefsky      Jeffrey Cook       Michael Desselle
  Brian Evans-Mongeon    Greg Ford           Lloyd Linke
  Jennifer Flandermeyer  Jason Marshall      Patti Metro
  David Short            Martin Sidor        Marc Child

• NERC Staff:
  Stephen Crutchfield      Nina Jenkins-Johnston   James Merlo
• 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
  ▪ How do we meet accelerated schedule for solving problems?
• We bring multi-disciplined teams together to develop “complete” solutions
  ▪ Complex issues facing the industry that don’t fit into one basket
  ▪ What is appropriate mix of knowledge/skills/abilities (participation model): Planning, Operations, CIP, Compliance/Policy, and Legal?
• We work collaboratively to solve problems
  ▪ Efficiently
  ▪ Eliminate silos and redundancies
  ▪ Committees need the ability to support standards and compliance
    o Ability to address risks that are inevitable
    o Standards or guidelines may be needed
    o Additional tools (potentially new) may be needed
• We leverage scarce talent to solve problems and maximize our return
  ▪ The old model may not survive
• Examine existing Regional Entity experiences
• Leverage NERC’s Strategic Plan, Operating Plan, and Reliability Issues Steering Committee (RISC) Report to facilitate the evaluation process
• List obligations of NERC per the NERC Rules of Procedure, Federal Power Act, etc. – identify and map tasks/responsibilities
• Survey industry on what committee activities they value
• Consider a NERC Oversight Committee for Technical Committees
• Analyze Committee (OC, PC, CIPC) work plans for common responsibilities, work flow, and coordination
Stakeholder Engagement Team – Technical Committee Review

- Reviewed CIPC, OC, PC organization and work plans
- Assessed deliverables of:
  - Committees
  - Subcommittees
  - Working Groups
  - Task Forces
- Majority of work output is from the Subcommittees, Working Groups and Task Forces
- Technical Committees primarily provide oversight, work plan coordination and review of results
- Critical need for work plan coordination
- Development of two options are now being considered
• Retain existing Technical Committee structure
• Create/formalize an Oversight Committee which coordinates and directs the work of the Technical Committees
Potential Committee Structures - Option 2

- Unwind the CIPC, OC and PC; form a new Reliability Council
- Reliability Council reports to the Board, overseeing the work of Subcommittees, Working Groups, and Task Forces
- Evaluate existing Subcommittees: eliminate those with no recurring responsibilities and combine those with overlapping responsibilities
• **January – March 2019:** Data gathering and existing structure review based on work streams

• **March – April 2019:** Develop proposal for Committee structure

• **May 8, 2019:** Present draft proposal to NERC Member Representatives Committee (MRC) for feedback

• **May – July 2019:** Refine proposal based on MRC feedback and develop documentation for the Board of Trustees (Board)

• **July 18, 2019:** Webinar on refined proposal

• **August 15, 2019:** Present to MRC

• **November 6, 2019:** Present to Board for approval

• **January 1, 2020:** Implement effectiveness/efficiency changes
Compliance Monitoring and Enforcement Program

Mark Lauby, Senior Vice President and Chief Reliability Officer
Concentrating on the following critical areas:

- Efficiency in data gathering and analysis tools, especially through the implementation of the Align tool
- Continued implementation of risk-based compliance monitoring:
  - Compliance Oversight Plans tailored to registered entities
  - CMEP Implementation Plans focused on reliability and security risk levels
- Outreach and education describing how the ERO Enterprise executes its compliance monitoring responsibilities
- The ERO Enterprise is identifying ways to streamline the resolution of minimal risk noncompliance approaches
Multi-phase Approach

Project 2018-03 SER Retirements - Phase 1:

• Focused primarily on retirements
• Initial SAR proposed 107 Requirements for retirement
• Upon review, ~84 Requirements recommended for retirement
• Initial comment and ballot period closed April 12
  ▪ Ballot pools of 300+ voters with 97% approval average

Phase 2:

• Review modification recommendations from Phase 1
• Six efficiency concepts presented in February 22 webinar
• 75 participants in industry survey that ended March 22
• Evaluate and prioritize concepts

CIP SER: Define scope, approach, and timeline; form a team
Phase 2 Industry Survey

- Gauge level of support (1-10) of each concept from 75 participants, equally weighted
  - **Concept 1**: Evidence Retention (8.12)
  - **Concept 5**: Consolidate Information/Data Exchange Requirements (8.11)
  - **Concept 3**: Move Requirements to Guidance (7.85)
  - **Concept 2**: Prototype Standard (7.78)
  - **Concept 6**: Relocate Competency-based Requirements to the Certification Program/Controls Review Process (6.85)
  - **Concept 4**: Consolidate and Simplify Training Requirements (6.19)

- Review industry survey responses, comments, and concerns
- Evaluate and prioritize concepts based on potential benefit, feasibility and effort of implementation
Questions and Answers
Task Force to Address Resilience to Electromagnetic Pulses

Mark Lauby, Senior Vice President and Chief Reliability Officer
Member Representatives Committee Meeting
May 8, 2019
• Electric Power Research Institute (EPRI) has been performing Research and Development (R&D) on Electromagnetic Pulses (EMP) for a number of years
  ▪ First report dealt with impacts on transformers
  ▪ Results indicated little equipment damage would result

• EPRI issued a report in late April
  ▪ Report provided technical groundwork:
    o Defined EMP threat
    o Assessed vulnerabilities/risks
    o Recommended mitigation actions
  ▪ Results indicate impacts on certain types of control and protection systems
• EPRI effort complements Department of Energy action plan released in 2017
  ▪ Improve and share understanding of EMP threats, effects, and impacts
  ▪ Identify priority infrastructure
  ▪ Test and promote mitigation and protection approaches
  ▪ Enhance response and recovery capabilities
  ▪ Share best practices across government and industry
• March 26, 2019 Executive Order on EMP was issued
  ▪ Executive order called for collaboration and information sharing among government agencies
  ▪ Secretary of Energy tasked with performing initial research and development of pilot programs with regard to protecting the grid
Based on EPRI’s R&D results

- NERC launching a Task Force to identify and address EMP reliability concerns
  - Perform detailed review of the EPRI report
  - Identify key areas of concerns and improvement
  - Submit best practices and reliability guidelines, as needed
  - Develop, as needed, any Standards Authorization Requests SAR(s)

- Key Task Force milestones
  - Solicit Task Force participation (April 2019)
  - Initial Task Force meeting (May 2019)
  - Publish initial draft recommendations from the Task Force (Q3 2019)
  - Guidelines and best practices to NERC Technical Committees (Q3 2019)
  - Present SAR(s) to the Standards Committee, if applicable (Q4 2019)
Questions and Answers
Recent FERC Activity

Andy Dodge
Director, Office of Electric Reliability
Federal Energy Regulatory Commission
May 8, 2019

The views expressed in this presentation are my own and do not represent those of the Commission or any individual Commissioner
2018 CIP Audits Lessons Learned Report

- Staff report issued 3/29/2019
- Recommendations from lessons learned during Commission-led CIP audits
  - Report based on audits conducted in FY18
- OER-Led CIP Reliability Standards Audits
  - Office of Enforcement assisted in conducting the audits
  - Office of Energy Infrastructure Security assisted with analyzing the data for the report
- Second Annual Report
  - 2017 report covered audits from FY16 and FY17
- 13 Recommendations, examples:
  - Consider implementing valid security certificates within the boundaries of BES cyber systems
  - Consider implementing encryption for Interactive Remote Access that is sufficiently strong
  - Consider replacing or upgrading “end-of-life” system components of an applicable cyber asset
Reliability Standard CIP-012-1

• NOPR in RM18-20 issued 04/18/19
• Proposes to approve Reliability Standard CIP-012-1 (Cyber Security – Communications between Control Centers) submitted by NERC in response to a Commission directive in Order No. 822
• Proposes to direct NERC to modify the reliability standard to:
  • Require protections regarding the availability of communication links and data communicated between bulk electric system control centers
  • Clarify the types of data that must be protected
• Comments due 6/24/19
Cyber Security Incident Reporting

• Order No. 848 Final Rule in RM18-2-000 issued 7/19/18
• Directs NERC to develop or modify CIP Reliability Standards to:
  • Expand mandatory reporting of Cyber Security Incidents to include compromises of, or attempts to compromise, a Responsible Entity’s ESP and associated EACMS performing certain functions;
  • Require certain attributes in the incident reports;
  • Include timelines for submitting the incident reports based on the severity of the incident; and
  • Require incident reports be submitted to the ICS-CERT, or its successor, in addition to the E-ISAC
• Submit modifications within 6 months of effective date of the Final Rule
• NERC filed proposed Reliability Standard CIP-008-6 on 03/07/19
Security Investments Technical Conference

• Joint FERC-DOE technical conference in AD19-12 held 3/28/19
  • Included government officials from FERC, DOE, DOD, DHS, state PUCs, and TSA
  • Representatives from NERC, NATF and INGAA
  • Utilities, PMAs, and pipelines
• Panelists discussed current cyber and physical security practices used to protect energy infrastructure and explored how federal and state authorities can provide incentives and cost recovery for security investments in energy infrastructure
• Topics addressed included:
  • Cyber and physical security, best practices, and industry and government engagement
    • Threats to infrastructure
    • Mitigation strategies and best practices
  • Incentives and cost recovery for security investments
• Post technical conference comments due 5/24/19
Transmission Incentives NOI

- NOI in PL19-3-000 issued 3/21/19
- Seeks comment on possible improvements to FERC’s electric transmission incentives policy to encourage infrastructure needed to ensure grid reliability and reduce congestion
- Nearly 13 years have passed since issuance of Order No. 679 establishing incentive rate treatments, including:
  - Adders for: ROE, Transco, RTO membership
  - Risk reducing incentives: hypothetical capital structure and abandoned plant
- NOI examines whether incentives should:
  - Be based on measurable criteria for economic efficiency and reliability benefits
  - Provide incentives for improvements to existing transmission facilities
  - Consider costs and benefits of projects in awarding incentives
  - Determine whether to review incentives applications on a case-specific or standardized basis
- Initial comments due 6/26/19; reply comments due 7/26/19
FERC-NERC Joint Inquiry into Cold Weather Event

- FERC and NERC launched joint inquiry to assess extreme cold weather event that occurred in Midwest and South Central U.S. on 1/15/18
- Reports of multiple forced generation outages, voltage deviations and near-overloads during peak operations
- Inquiry is focusing on identifying:
  - Causes of event
  - Contributing factors
  - Appropriate recommendations for improving operations under similar conditions
- Inquiry is not an enforcement investigation but will allow FERC and NERC to identify lessons learned as we approach the coming winter season
- FERC and NERC are working with the Midwest Reliability Organization, ReliabilityFirst, SERC Reliability Corporation and relevant involved companies
Removing Barriers to Storage Participation

- Order No. 841 Final Rule in RM16-23 issued 2/15/18
  - Requires grid operators to remove barriers to participation of electric storage resources in capacity, energy and ancillary services markets
  - Requires each regional grid operators to revise tariffs to establish a participation model for electric storage resources
- All RTOs/ISOs completed compliance filings, which were due 12/3/18
- FERC sent letters to RTOs/ISOs on 4/8/19 asking for more information on how they will implement Order No. 841 and provide details on storage market participation:
  - Physical and operational characteristics of storage resources
  - Charging requirements and metering
  - How storage resources can participate as both buyers and sellers in wholesale markets
- FERC, grid operators and stakeholders have one year to review, revise and implement plans by 12/3/19
FRCC Dissolution

• Order in RR19-4 was filed with the Commission on 2/27/19
• Decision to dissolve FRCC follows review of governance structure in response to NERC’s determination that regional entities should be separate corporate entities from registered entities
• Filing requests the transfer of FRCC registered entities to SERC become effective 7/1/19
• FRCC would cease to be a Regional Entity and would complete wind-down activities on 8/31/19
• NERC, FRCC, and SERC requested Commission issuance by 5/1/19
Upcoming Activities

• ERO Self-Assessment
  • Every five years, NERC, as the ERO, must submit an assessment of its performance
  • To be filed 7/19
• West RC Transition
  • 7/1/19: CAISO Go-Live
  • 9/2/19: BCH Go-Live
  • 11/1/19: CAISO expansion Go-Live
  • 12/3/19: SPP Go-Live
  • 12/3/19: GridForce Go-Live
  • Q1 2020: Retirement of Peak RC
• FERC Reliability Technical Conference 6/27/19
• Thank you!

• Questions?
• ERCOT anticipates Energy Emergency Alerts may be needed to address resource shortfalls during periods of peak demand
  ▪ Anticipated reserve margin change from 10.9% (2018) to 8.5% (2019)
  ▪ Caused by load growth, generator retirements, and delay in new generators

• All other assessment areas have adequate resources for the upcoming summer season

• Elevated risk for wildfires in western U.S. and parts of Canada poses localized risk to BPS reliability
  ▪ Utility pre-season planning includes expanded public safety power shut-off programs in addition to maintenance and operational preparations
Year-to-Year Change in Reserve Margins

Summer 2018 to Summer 2019 Anticipated Reserve Margins

- Indicates increase or decrease greater than 5 percentage points

2,100 MW load growth outpaces new generation
• NERC and the Reliability Assessments Subcommittee (RAS) enhanced the 2019 SRA with seasonal risk scenarios

• Scenarios provide more accurate view of summer reliability risks than planning reserve margins alone
  - Considers extreme summer peak loads
  - Accounts for resource derates and outages due to extreme summer conditions
  - Compares resources with expected operating reserve requirements provided by NERC assessment areas
Example Risk Scenario - ERCOT

- **2019 Summer Anticipated Resources**: 78.8 GW
- **Typical Maintenance Outages**: -0.4 GW
- **Typical Forced Outages**: -3.8 GW
- **Operational Mitigations (Resources)**: +1.2 GW
- **Resource Derates for Extreme Conditions**: -2.7 GW
- **Low Wind Scenario**: -4.0 GW
- **2019 Summer Net Internal Demand**: 72.6 GW
- **Extreme Summer Peak Load**: 75.9 GW

The figure illustrates the impact of various factors on the net internal demand, highlighting typical outages leading to emergency alert operating mitigations at peak. The expected operating reserve requirement is 2,300 MW.
• Government agencies predict above-normal wildfire risk for summer in parts of North America
• Utilities are enhancing wildfire prevention planning in California to address increased risk
  ▪ Expanding power shut-off programs including transmission line coverage in high-risk areas
  ▪ Implementing enhanced vegetation management, equipment inspections, system hardening, and added situational awareness measures

Source: North American Seasonal Fire Assessment produced by U.S., Canada, and Mexico Government Agencies
<table>
<thead>
<tr>
<th>Date</th>
<th>Milestone</th>
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<tbody>
<tr>
<td>May 14</td>
<td>Report sent to Planning Committee for Endorsement</td>
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<tr>
<td>May 21</td>
<td>Report sent to NERC Executive Management for approval</td>
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<tr>
<td>May 24</td>
<td>Final Report sent to NERC Board of Trustees and MRC</td>
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<td>May 30</td>
<td>Report Release</td>
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Questions and Answers
2019 State of Reliability Report Preview

John Moura, Director of Reliability Assessment
Member Representatives Committee Meeting
May 8, 2019
• Provide objective, credible, and concise information to policy makers, industry leaders, and the NERC Board of Trustees on issues affecting the reliability and resilience of the North American bulk power system (BPS)
  ▪ Identify system performance trends and emerging reliability risks
  ▪ Determine the relative health of the interconnected system
  ▪ Measure the success of mitigation activities deployed
Vision and Improvements

- Target audience
- Layout and graphics
- Succinct messaging
- Actionable metrics
- Relevance to priority risks
- From 200+ pages to less than 50!
<table>
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<th>Outline/Framework</th>
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<tr>
<td><strong>By the Numbers: The North American BPS</strong></td>
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<tr>
<td>Detailed statistics on peak demand, energy, generation capacity, fuel mix, transmission miles, and functional organizations</td>
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<tr>
<td><strong>Events Analysis Review</strong></td>
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<tr>
<td>A detailed review of qualified Events analyzed by the ERO over the year. Highlights of published lessons learned are also included.</td>
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<td><strong>Reliability Indicators</strong></td>
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<td>A set of reliability metrics that evaluate four core aspects of system performance: 1) resource adequacy, 2) transmission performance and availability, 3) generation performance and availability, and 4) system protection and disturbance performance.</td>
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<td><strong>Severity Risk Index and Component Analysis</strong></td>
</tr>
<tr>
<td>A performance measure of the BPS on a daily basis compared to prior years built from components of generation, transmission and load loss data.</td>
</tr>
<tr>
<td><strong>Trends in Priority Reliability Issues</strong></td>
</tr>
<tr>
<td>Data and analysis from various NERC data sources are compiled to provide clear insights on a variety of priority reliability issues.</td>
</tr>
</tbody>
</table>
• High Reliability in 2018, No Category 4 or 5 events
  ▪ Hurricane Michael and Florence may still be processed as a Category 3
• Extreme weather events continue to be leading contributor to the largest generation and distribution outages
• Better than expected performance from Texas generation fleet helped meet 2018 summer peak demand; reliability risk in 2019 due to continued capacity deficit
• Continued downward misoperation rate trend
• Improving or stable frequency response performance in all interconnections
• Emerging reliability challenges as more inverter-based generation is added
The North American BPS: By the Numbers

- **4,353,740,908 MWh**
  - 2018 Actual Energy

- **1,028,629 MW**
  - 2018 Summer Peak Capacity

- **469,842 mi**
  - Total Transmission Circuit Miles > 100kV

- **21,531**
  - Number of Generating Units

- **99.9%**
  - Time firm load was served

- **0**
  - Category 3, 4, or 5 Events

---

The ERO Enterprise: NERC and 7 Regional Entities

- **23** Reliability Coordinators
- **70** Transmission Operators
- **94** Balancing Authorities
- **4** Interconnections
- **500** Generator Owners
- **294** Distribution Providers

---

**2018**

- **Nuclear** 43%
- **Coal** 24%
- **Natural Gas and Other Gases** 22%
- **Wind** 2%
- **Solar** 1%
- **Biomass** 1%
- **Pumped Storage** 1%
- **Hydro** 11%
- **Other** 1%
Event Analysis
Event Analysis and Situational Awareness

Situation Awareness

Event Analysis: Root Cause Assessment

Event Analysis: Wide-Area Forensics

Bulk Power System Situation Awareness Inputs and Products in 2018

- 3,403 Intelligent Alarms
- 4,238 FNet Notifications
- 2,121 RCIS Messages

- 339 DOE OE-417 Reports
- 325 EOP-004-2 Reports
- 2 EOP-002-3 Reports

- 229 Daily Reports
- 28 Special Reports
- 646 Event Notifications

- 1 Level 1 Alert
- 2 Level 2 Alerts
2019 Events and Trends

Number of Events, by Category

- **Category 1**: 167
  - 56 — 3 or more BPS facilities lost (1a)
  - 6 — BPS SPS/RAS Misoperation (1c)
  - 1 — Voltage reduction > 3% (1d)
  - 3 — Unintended loss 1,000-1,999MW in ERCOT (1g)
  - 101 — EMS (1h)

- **Category 2**: 4
  - 3 — Unintended loss of load (2f)
  - 1 — IROL Violation

- **Category 3**: 0

- **Category 4**: 0

- **Category 5**: 0

Event Root Causes, 2014-2018
(715 Events)

- 49.1% Information to determine cause LTA
- 15.0% Management/Organization
- 6.4% Design/Engineering
- 3.5% Equipment/Material
- 2.8% Other
- 2.0% Communication
- 0.7% Individual Human Performance
- 0.4% No Causes Found
- 0.4% Training
- 0.4% Overall Configuration
Reliability Indicators
• **Resource Adequacy** - Does the system have enough capacity, energy, and ancillary services?

• **Transmission Performance and Availability** - Is the transmission system adequate?

• **Generation Performance and Availability** - What are the energy limitations and outage performance of the generation fleet?

• **System Protection and Distribution Performance** - Can the system remain stable and withstand disturbances?
### Actionable Metrics for Reliability Indicators

#### Indicator Category
- **Resource Adequacy**
- **Transmission Performance and Availability**

#### Name
- **Energy Emergency Alerts**
- **Planning Reserve Margin**
- **Transmission-Related Events Resulting in Load Loss**
- **Transmission Outage Severity**
- **Automatic AC Transmission Circuit Outages**

#### Description
- **Energy Emergency Alerts**: This metric counts the number of times EEA Alerts are issued for Balancing Authorities and when actual capacity and/or energy deficiencies occur.
- **Planning Reserve Margin**: This metric counts the number of areas reporting “Marginal” or “Inadequate” reserve margins for NERC’s prior year Summer and Winter Reliability Assessment.
- **Transmission-Related Events Resulting in Load Loss**: This metric counts BPS transmission-related events resulting in the loss of load, excluding weather-related outages. Additional metrics measure the duration and magnitude of the load loss.
- **Transmission Outage Severity**: This metric determines the severity of a transmission line outage as a function of load loss.
- **Automatic AC Transmission Circuit Outages**: This series of metrics measure the impacts of Failed Protection System, Human Error, Failed AC Substation Equipment, and Failed AC Element Equipment as factors in the performance of the transmission system.

#### Performance Rating
- **Red** – Actionable, key finding
- **Yellow** – Declining, heightened monitoring
- **White** – Stable or no change
- **Green** – Improving
Individual Indicator Template

- Data Presentation
- Performance and trend
- Description
- Purpose

- Questions the indicators answer
- Calculations
- Rating
- Assumptions

EXAMPLE: NERC and Regional Misoperations Rate (2018)
Trends in Priority Reliability Issues
Based on an adapted set of priority issues identified in the most recent RISC Priorities Report:

- **Increasing Complexity in Protection and Control Systems**
  - Are relay misoperations happening more frequently?
  - Are protection System Equipment failures leading to more severe transmission outages?
  - Are these failures leading to larger events?
**Priority Issues Example: Protection and Control Systems**

This image presents a chart and graph data on protection and control systems. The chart shows misoperations rate (%) from different regions (FRCC, MRO, NPCC, RF, SERC, SPP, Texas RE, WECC) for various years, indicating statistically significant increases or decreases between connected years. The graph displays the number of non-EMS events, events with misoperations, number of breaker failure/bus differential misoperations, and percentage of misoperations in reportable events for the years 2015 to 2018.
Severity Risk Index
Initial Findings:
- 2018 is one of best years on record
- Generation and Transmission Outage Severity continues to decrease

**FOCUS:** Substantially impacted days can be further evaluated for reliability and electricity policy considerations.

**TREND:** The slope of the graph reveals year-to-year changes in fundamental resilience of the system to routine operating conditions.

**LEARN:** Lower SRI scores can be evaluated for lessons learned.
# Draft 2019 SOR Schedule

**Revision date: May 2, 2019**

<table>
<thead>
<tr>
<th>Date</th>
<th>Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 22</td>
<td>OC/PC Webinar: Update on Report</td>
</tr>
<tr>
<td>May 8</td>
<td>Report Sent to OC/PC for Comment</td>
</tr>
<tr>
<td>Week of May 13</td>
<td>Webinar presentation of draft report to OC/PC</td>
</tr>
<tr>
<td>May 20</td>
<td>Comments from OC/PC due to NERC</td>
</tr>
<tr>
<td>May 27</td>
<td>Final Report (non-publication version) to OC/PC for acceptance</td>
</tr>
<tr>
<td>May 31</td>
<td>Electronic Voting Deadline for Report Acceptance</td>
</tr>
<tr>
<td>June 3</td>
<td>NERC Board of Trustees Review</td>
</tr>
<tr>
<td>June 13</td>
<td>NERC Board of Trustees Approval</td>
</tr>
<tr>
<td>June 19</td>
<td>Target Release</td>
</tr>
<tr>
<td>June 27</td>
<td>FERC Reliability Conference</td>
</tr>
</tbody>
</table>
Questions and Answers
NERC Compliance and Certification Committee

Jennifer Flandermeyer, CCC Chair
Member Representatives Committee Meeting
May 8, 2019
NERC Standing Committees

Compliance and Certification Committee (CCC)
Advises NERC Board of Trustees and Senior Staff

Advisory Committees
- Compliance and Certification Committee
- Reliability Issues Steering Committee
- Standards Committee

Technical Committees
- Operating Committee
- Planning Committee
- Critical Infrastructure Protection Committee
| NERC Board-appointed stakeholder committee | Engages with, supports, and advises the NERC Board regarding the Compliance Monitoring and Enforcement Program (CMEP), Organization Registration and Certification program (ORCP) | Monitors NERC’s compliance with the Rules of Procedure for these programs | Monitors NERC’s compliance with the Rules of Procedure regarding the Reliability Standards development process  
• Exception of appeals |
Membership

- Investor-Owned Utility
- State/Municipal Utility
- Cooperative Utility
- Federal or Provincial Utility/Federal Power Marketing
- Administration
- Transmission Dependent
- Merchant Electricity Generator
- Electricity Marketer
- Large End-use Electricity Customer
- Small End-use Electricity Customer
- Independent System Operator/Regional Transmission Organization
- Regional Entity
- Government
Senior-level industry experts who have familiarity, knowledge, and experience in the areas of:

- **Compliance** (assurance, enforcement, administration, and management)
- **Registration and Certification**
- **NERC Standards and Regional Standards**
- **Involvement with their Internal Compliance Programs**
Qualifications for Appointment

Open nomination process

CCC annually appoints a Nominating Subcommittee

Subcommittee presents individuals to the CCC and recommends appointments to the NERC Board

NERC Board approval of membership appointments

Three-year terms for appointees
• Provide advice and support for CMEP as well as Registration and Certification processes
• Participate in development of ERO Stakeholder Effectiveness Survey
• Partner with ERO Enterprise related to review and comment of draft RSAWs
• Develop NERC criteria for Regional oversight
• Provide input on development of Implementation Guidance process
• Provide Stakeholder input on the ERO Enterprise Program Alignment Process
• Participate in discussions to identify emerging risks to reliability
• Enterprise Wide Risk Committee participation
• Key partnership in Program Alignment
• Partnership with Standards Committee on Standards Efficiency Review (SER) – SER Advisory Group member
• Stakeholder Survey (Program Focused)
• Collaboration with NERC on Technology Projects (Align, CORES)
• Stakeholder Feedback Loop on Guidance
• Feedback Loop for CMEP Implementation and Design Resources
COLLABORATION IS KEY

Key Collaboration Initiatives

- Industry Outreach
- Stakeholder Survey and Feedback
- Focus Discussion Topics
- ERO Program Alignment
- Compliance Guidance

Key Partners – Compliance Assurance, Enforcement and Internal Audit
Issue Raised by Registered Entity

NERC Initial Review

Input from CCC and Program Alignment Working Group

Resolution of Issue and Posting Results

- Aids in the screening of information, as appropriate
- Supports further investigation of a potential issue as requested by NERC
- Provides suggested resolutions, as appropriate
- Works directly with stakeholders to shape issue to be reviewed
• Workshop Participation
• Strategic messaging
• Industry Outreach
• Forward Looking Efforts
Members active involvement in compliance forums

Barometer for NERC on compliance and enforcement initiatives

Liaisons to trade organizations, membership forums, industry forums, and regional compliance committees
• Succession planning
• Onboarding procedures
• Continuous improvement

Photo Source: RTO Insider
Questions and Answers