Resilience Framework and NERC Enterprise Risk Assessments

Peter Brandien, Reliability Issues Steering Committee Chair
Member Representatives Committee Meeting
August 15, 2018
• Status of Reliability Issues Steering Committee’s (RISC) resilience activities
  ▪ Work to date
  ▪ Report outline and schedule
• Development of risk template for industry input into emerging and evolving risks
  ▪ Identify baseline risk
  ▪ Project residual risk
• Develop common framework, understanding, and definition of the key elements of bulk power system (BPS) resilience
  ▪ National Infrastructure Advisory Council’s (NIAC’s) resilience framework
    o Robustness, Resourcefulness, Rapid Recovery, Adaptability
  ▪ Adequate Level of Reliability definition and technical report
• Understand how key elements of BPS resilience fit in the existing ERO framework
  ▪ Identified current activities within the four framework constructs
• Evaluate whether additional steps are needed to address key elements of BPS resilience within the ERO framework
• Discussion at February and May 2018 MRC meetings
• Industry’s reply comments on FERC’s Resilience Proceeding
• RTO/ISO FERC filing
• ERO Enterprise staff

• Standing Committees
  ▪ Compliance and Certification Committee
  ▪ Critical Infrastructure Protection Committee
  ▪ Operating Committee
  ▪ Personnel Certification and Governance Committee
  ▪ Planning Committee
  ▪ Standards Committee
• Recommended report outline:
  ▪ Board Assignment to RISC
  ▪ RISC commitment to evaluate resilience
  ▪ RISC resilience framework
  ▪ FERC resilience proceeding
  ▪ Recommendations from NERC’s Workshop on Gas Infrastructure Risk
  ▪ Suggestions for additional NERC activities supporting resilience
  ▪ Conclusions

• Present recommendations to Board of Trustees in November
• Provide a repeatable and consistent process for identifying, analyzing, prioritizing, and evaluating bulk power system risks
• Template developed to collect data from industry as input to the heat map for RISC’s 2019 ERO Reliability Risk Priorities Report
• Next steps
  ▪ Identify risks for measurement
  ▪ Agree upon activities to mitigate each risk and measure residual risk
  ▪ Determine initial audience
  ▪ Distribute in early Winter
  ▪ Analysis in mid-2019
<table>
<thead>
<tr>
<th>Risk ID</th>
<th>Risk Name</th>
<th>Description of Risk</th>
<th>Impact</th>
<th>Likelihood</th>
<th>Internal Control Description (Include any shared internal controls)</th>
<th>Internal Control Effectiveness Impact (Scale 1-10 See Risk Criteria)</th>
<th>Internal Control Effectiveness Likelihood (Scale 1-10 See Risk Criteria)</th>
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</thead>
<tbody>
<tr>
<td>a.</td>
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<td>Near-term (1–2 year time frame):</td>
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</table>
Questions and Answers
Reliability Assessments
Plan to Address Recommendations from 2017 Reports

John Moura, Director Reliability Assessment and System Analysis
Brian Evans-Mongeon, Planning Committee Chair
Member Representatives Committee Meeting
August 15, 2018
• Key Assessments from 2017
  ▪ 2017 Long-Term Reliability Assessment
  ▪ Special Reliability Assessment: Potential Bulk Power System Impacts Due to Severe Disruptions on the Natural Gas System

• Recommendations aligned with Reliability Issues Steering Committee (RISC) priorities
**Recommendations from 2017 Long-Term Reliability Assessment**

- **Significant activity in progress**
  - Revisions planned for MOD-032 to address data sharing
  - Inverter-Based Resources Task Force (Reliability Guideline and Alert)
  - Standard Authorization Request (SAR) related to inverter performance currently being processed by the Standards Committee
  - Standard Drafting Team in place to address frequency control and balancing (BAL-003)
  - Planning Committee (PC) assessment of the Bulk Electric System (BES)-connected dynamic reactive devices

- **Next Steps**
  - Standing Committee Coordinating Group monitoring progress across technical committees
• PC Advisory Group developing industry consensus on next steps
  ▪ July 10 workshop in conjunction with natural gas industry representatives
• Next steps being considered
  ▪ Review current requirements (e.g., TPL-001-4)
  ▪ Identify the need and scope for a Reliability Guideline
  ▪ Determine approaches for ensuring energy limitations and potential fuel delivery disruptions are considered in planning
  ▪ PC seeking to present findings and recommended actions at November Board of Trustees Meeting
Questions and Answers
Overview

- Project background
- Drivers affecting the gas-electric interface in the Western Interconnection
- Potential disruptions to the gas supply
- Mitigation options
INTRODUCTION AND SUMMARY

Project Background & Context

Background

In 2017, WECC commissioned Wood Mackenzie, E3, and Argonne National Labs to undertake an evaluation of the reliability of the gas/electric interface in the Western Interconnection.

This study consisted of multiple work-streams:

1) Identifying and modelling the impact of potential power system vulnerabilities stemming from gas system disruptions
2) Evaluating potential mitigation options and their associated costs and capabilities for reducing such impacts
3) Identifying reliability risks associated with gas contracting strategies as well as existing market rules & protocols
4) Providing reasonable and actionable recommendations for WECC and key stakeholders

Context

- In the West, we have entered a period in which it is both possible and reasonable to aspire to low wholesale power costs and steady reductions in emissions
- However, the transition away from large, baseload nuclear and coal generation towards more intermittent resources places a considerable potential strain on overall system reliability
- In this context, natural gas generation will take on an increasingly important role due to its flexibility and ability to compensate for the variability of renewable resources
- Consequently, the ability of the gas/electric systems to handle both everyday variability as well as unforeseen disruptions becomes critical for ensuring energy security in the West
The configuration of the gas/electric system combined with the loss of Aliso Canyon will create region-wide reliability issues that need to be addressed.

INTRODUCTION AND SUMMARY

Baseload retirements and load growth will drive natural gas demand growth, creating constraints on the gas system.

- Prior to the 2015 gas leak, the 86 bcf of market-area gas storage available at Aliso Canyon played a key role in managing system volatility and reliability.
- Renewables additions help mitigate but do not replace the increased need for firm, dependable resources stemming from the 11 GW of coal and nuclear retirements.
- Pipeline flow analysis indicate concerns around volumetric constraints, which limits daily operational flexibility.

Absent key balancing with storage, Southern California and the Desert Southwest are at risk from disruptions of the gas system.

- The Desert Southwest (DSW) and Southern California regions are particularly at risk from disruptions of pipeline infrastructure or gas production.
- The Pacific Northwest (PNW) is more resilient to major gas system disruptions, largely owing to market area gas storage (in OR, WA and Northern CA) and electric transmission connectivity.

There is no silver bullet: a portfolio of mitigation solutions will be necessary to address the reliability risk.

- A combination of physical solutions will be required: investments in renewable generation, battery storage, demand response programs, gas infrastructure and storage as well as dual-fuel fired generation.
- Improved regional coordination, reserve adequacy accounting, curtailment priorities and forecasting would decrease market frictions and improve the ability of the system to respond to disruptions and day-to-day variability.
The Western grid is being transformed through retirements of baseload resources and additions of solar and wind generation.

**Cumulative West Coal/Nuclear Retirements to 2026**

- 9 GW of coal and 2.2 GW of nuclear generation is projected to be retired by 2026.
- Up to 20 GW of new solar (utility & distributed generation) is projected to be installed in California by 2026.
- Bulk electricity storage will play an increasing role, but there is little clarity on the scale and timing.

**Cumulative New CA Solar Capacity through 2026**

Source: WECC 2026 Common Case
Gas burn for power could increase by ~21%* or slightly more than 1.0 bcfd through 2021.

Western Interconnection gas power burn (bcfd)

Average CCGT capacity factors (%)

Planning to meet gas burn in 2021 is the immediate challenge.

Source: Wood Mackenzie, E3 based on 2026 WECC Common Case

*Purely on an energy, not capacity, basis keeping gas burn flat through 2021 would require 26 GW of solar power.
The Western Interconnection and other West Coast natural gas markets become increasingly dependent on 7 long-haul pipelines and 3 supply basins.

**West US & Canada Gas Pipes & Producing Basins**

- **Key**
  - Northwest PL
  - GTN
  - Transwestern/El Paso

- **Source:** Wood Mackenzie

**The West is blessed with access to diverse and economic supply sources between Western Canada, Permian and Rockies plays**

- Combined reserves of 350 tcf available at less than $4/mmbtu for dry gas and $50/bbl for associated gas.

- However, several major interstate pipelines are already highly utilized (<75% on annual basis).

- Western Canada remains a critical supply source for the Western US demand centers.

- Greater reliance on Permian gas increases reliability risks in Desert Southwest and Southern California.

- Market area underground gas storage is a key resource.

**Aug. 2026 Gas flow in bcf/d (Aug. 2026 utilization %)**

- **West US & Canada Gas Pipes & Producing Basins**
  - Northwest PL: 4.0 (95%)
  - GTN: 0.8 (82%)
  - Transwestern/El Paso: 3.0 (80%)
  - Kern River: 2.2 (93%)
  - Northwest PL: 0.2 (30%)

- **West US & Canada Gas Pipes & Producing Basins**
  - Rockies & San Juan: 11 (2017), 12 (2026)
  - Permian: 7 (2017), 13 (2026)
  - WCSB: 15 (2017), 18 (2026)
The study evaluated 5 key base cases representing major disruptions to the Western Interconnection as well as 5 additional sensitivities.

<table>
<thead>
<tr>
<th>Regional focus</th>
<th>Base (N-1) Case</th>
<th>N-2 case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disruption on a PNW pipeline</td>
<td>Disruption at the US/Canada border (or upstream) receipt point on the system</td>
<td>Low hydro conditions</td>
</tr>
<tr>
<td>Seismic event disrupting Alberta supply</td>
<td>M6+ earthquake in the Rocky Mountain House area, that disrupts natural gas production in Alberta</td>
<td>Low hydro conditions</td>
</tr>
<tr>
<td>Disruption on a Basin pipeline</td>
<td>Disruption on the critical mainline section downstream of the supply basin and upstream of the demand centers</td>
<td>Low hydro conditions</td>
</tr>
<tr>
<td>Disruption on a DSW pipeline</td>
<td>Disruption on critical Southern NM section of DSW pipeline</td>
<td>NA</td>
</tr>
<tr>
<td>Winter supply freeze-off in the Permian &amp; San Juan</td>
<td>Week-long winter supply freeze-off in the Permian and San Juan basins reducing supply by 1.5 bcf/d, higher residential gas demand. 15% of generation in AZ/NM unavailable due to freezing conditions</td>
<td>Low hydro conditions / Transmission outage from CA wildfire</td>
</tr>
</tbody>
</table>
The Southwest disruptions constitute the primary vulnerabilities within the Western Interconnection that we have identified to date.

Unserved energy in the DSW scenarios results from the configuration of the gas network, which limits deliverability in isolated “islands” of power plants in Phoenix and Southern California.

**Unserved energy & unmet reserves (GWh)**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Unserved Energy</th>
<th>Unmet Spinning Reserves</th>
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</thead>
<tbody>
<tr>
<td>DSW Pipeline Rupture</td>
<td>428</td>
<td>236</td>
</tr>
<tr>
<td>Freeze Off - Low hydro stress</td>
<td>23</td>
<td>52</td>
</tr>
<tr>
<td>Canada - Low hydro</td>
<td>6</td>
<td>59</td>
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<tr>
<td>Other cases</td>
<td>4</td>
<td>0</td>
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</table>

**Unrisked Economic Impact \(^1\) (US bn)**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Unrisked Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSW</td>
<td>$27.4</td>
</tr>
<tr>
<td>Freeze Off - Low hydro stress</td>
<td>$2.2</td>
</tr>
<tr>
<td>Canada - Low hydro</td>
<td>$3.4</td>
</tr>
<tr>
<td>Canada - Avg hydro</td>
<td>$3.7</td>
</tr>
<tr>
<td>Freeze off- Path 26 out</td>
<td>$0.8</td>
</tr>
<tr>
<td>Freeze off - Base</td>
<td>$0.6</td>
</tr>
<tr>
<td>Other cases</td>
<td>$0</td>
</tr>
</tbody>
</table>

**Risked Economic Impact \(^2\) (US bn)**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Risked Impact</th>
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</thead>
<tbody>
<tr>
<td>DSW</td>
<td>$1.1</td>
</tr>
<tr>
<td>Freeze Off - Low hydro stress</td>
<td>$0.27</td>
</tr>
<tr>
<td>Canada - Low hydro</td>
<td>$0.002</td>
</tr>
<tr>
<td>Canada - Avg hydro</td>
<td>$0.02</td>
</tr>
<tr>
<td>Freeze off- Path 26 out</td>
<td>$0.6</td>
</tr>
<tr>
<td>Freeze off - Base</td>
<td>$0.6</td>
</tr>
<tr>
<td>Other cases</td>
<td>$0</td>
</tr>
</tbody>
</table>

Notes:
1. Economic impact estimated based on cost of unserved energy in each state for each type of demand sector
2. Risked Economic Impact estimated based on probability of each disruption
Source: Argonne National Labs, E3, Wood Mackenzie
Meeting the future needs of the Bulk Power System in the Western Interconnection reliably and at lowest cost will require a portfolio of options.
The availability of gas storage facilities located in key demand basins significantly decreases the impact of a DSW pipeline disruption.

The study modelled two alternative cases of the DSW pipeline disruption to examine the impact of the availability of gas storage in key locations:

- The first case keeps Aliso Canyon operating at the current limitations on its working capacity and withdrawal rate.
- The second case models an additional underground natural gas storage facility in the Phoenix, AZ area, based on the open season proposed by Kinder Morgan.

<table>
<thead>
<tr>
<th>Case</th>
<th>Working capacity (mmcf)</th>
<th>Max withdrawal rate (mmcfd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSW base case</td>
<td>Aliso Canyon decommissioned</td>
<td></td>
</tr>
<tr>
<td>Aliso Canyon operational</td>
<td>24,000</td>
<td>800</td>
</tr>
<tr>
<td>AZ Gas Storage</td>
<td>4,000</td>
<td>400</td>
</tr>
</tbody>
</table>

Source: Argonne National Labs, E3, Wood Mackenzie
It will be necessary to bridge the path to battery storage implementation with other mitigation options

Mitigation Capability of Battery & Solar Additions

- We estimate that ~14 – 15 GW of 4-hr battery storage would need to be installed to mitigate all unserved energy in the EPNG scenario
  - The associated capex of installing the battery storage needed to compensate for the DSW pipeline disruption scenario is estimated to be ~$12 – $18 bn

- The limitations of solar capacity to flex on peak hour demand yield diminishing returns
  - Consequently, solar capacity by itself is not able to completely compensate for impacts from the EPNG disruption

- A feasible, explicitly articulated path forward utilizing a combination of mitigation options is critical for bridging to proposed renewables targets in a safe and reliable manner

Source: E3

Graph showing unserved energy (GWh) vs. MW added for batteries and solar.
Reconciliation and improvement of natural gas/electric coordination will be key to maximizing ability to manage increased gas demand

### MITIGATION OPTIONS & RECOMMENDATIONS

#### Recommendations

<table>
<thead>
<tr>
<th>Improved Regional Coordination</th>
<th>Resource Adequacy Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct regional contingency planning exercises led by WECC to prepare for a number of disruption scenarios</td>
<td>Greater transparency of firm contracting and linkage to power plants served in firm reserve reports</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Curtailment Priorities</th>
<th>Forecasting &amp; Execution</th>
<th>Gas-Electric Day Mismatch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-visit classification of electric generation as “non-core” end-use</td>
<td>Require intra-day LDC core load balancing to ensure fair implementation of OFOs and penalties</td>
<td>Split weekend nomination period into daily blocks, resulting in a 7-day nomination cycle</td>
</tr>
<tr>
<td>Designation of plants critical to grid reliability as core end-use</td>
<td>Additional clarity around interstate pipeline curtailment protocol</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefits</th>
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<tbody>
<tr>
<td>Maximizes compensation ability for utilities across the Western Interconnection</td>
</tr>
<tr>
<td>Allows for more robust planning processes, especially as gas and power capacity dynamics tighten</td>
</tr>
<tr>
<td>Ensuring that critical power plants are not the first to be curtailed allows for additional flexibility for compensation via transmission</td>
</tr>
<tr>
<td>Higher accountability for prior-day forecasting allows easier utility operation</td>
</tr>
<tr>
<td>Explicit interstate curtailment protocols allow for better contingency planning</td>
</tr>
<tr>
<td>A feasible step for both gas and electric sides that would minimize response lead times over the weekend period</td>
</tr>
</tbody>
</table>

Source: Wood Mackenzie, E3
WECC’s Next Steps

• Outreach
  o Shine light
  o Discussion forum(s)

• Assess
  o WECC led
  o Entity specific

• Monitor
  o Regulatory trends
  o Industry trends and response
Disclaimer

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• The information upon which this report is based has either been supplied to us by WECC or comes from our own experience, knowledge and databases. The opinions expressed in this report are those of Wood Mackenzie. They have been arrived at following careful consideration and enquiry but we do not guarantee their fairness, completeness or accuracy. The opinions, as of this date, are subject to change. We do not accept any liability for your reliance upon them.
Branden Sudduth – WECC Director, Reliability Risk Management branden@wecc.biz
Gas-Electric Interface Public Report click here
Gas-Electric Interface Public Presentation click here
NERC Operating Committee

Lloyd Linke, Operating Committee Chair
Member Representatives Committee Meeting
August 15, 2018
• Provides subject matter expertise relating to operating reliability matters across all four Interconnections
• Publishes Reliability Guidelines and Reference Documents on subjects relevant to industry
• Monitors operating conditions or activities and addresses emerging issues as they arise
NERC Operating Committee

• Current membership consists of:
  ▪ 33 members from the U.S. and Canada representing 12 industry sectors and each Regional Entity
  ▪ Sectors include entities ranging from small end-users to large ISO/RTOs, as well as federal, provincial and state representation

• Maintains a work plan that prioritizes existing and future work of the committee and its subgroups consistent with the business and strategic plans of NERC
Since January 1, 2017, the Operating Committee (OC) has approved seven Reliability Guidelines:

- Situational Awareness for the System Operator
- Generating Unit Winter Weather Readiness
- Area Control Error (ACE) Diversity Interchange
- Inadvertent Interchange
- Operating Reserve Management
- Gas and Electrical Operational Coordination Considerations
- Cyber Intrusion Guide for System Operators
• Three additional Reliability Guidelines currently under review
  ▪ Generating Unit Operations During Complete Loss of Communications
  ▪ Loss of Real-Time Reliability Tools Capability/Loss of Equipment Significantly Affecting ICCP Data
  ▪ Primary Frequency Control

• Two additional Reliability Guidelines currently under initial development
  ▪ Methods for Establishing IROLs
  ▪ Inverter-based Resource Performance
• Three Reference Documents published since January 1, 2017
  ▪ Dynamic Tag Exclusion Reference Document
  ▪ Pseudo-Tie Coordination Reference Document
  ▪ Risks and Mitigations for Losing Energy Management Systems (EMS) Functions

• Two additional Reference Documents currently under initial development
  ▪ Reliability Coordinator Plan Reference Document
  ▪ Change in Balancing Authority (BA) Footprint Reference Document
NERC Operating Committee (OC)

Operating Committee Executive Committee (OC ExCom)

- Event Analysis Subcommittee (EAS)
  - Energy Management Systems Working Group (EMSWG)

- Operating Reliability Subcommittee (ORS)
  - Interchange Distribution Calculator Working Group (IDCWG)

- Personnel Subcommittee (PS)
  - Continuing Education Review Panel (CERP)

- Resources Subcommittee (RS)
  - Reserves Working Group (RWG)

Joint OC/PC Task Forces / Working Groups

- Inverter-Based Resource Performance Task Force (IRPTF)
- Methods for Establishing IROLs Task Force (MEITF)
- Essential Reliability Services Working Group (ERSWG)

- Frequency Working Group (FWG)
- Inadvertent Interchange Working Group (IIWG)
Event Analysis Subcommittee

- Coordinates the Event Analysis Process with industry stakeholders and examines events that occur on the bulk power system (BPS) and helps determine their causes
  - Analysis of some events results in the development of a Lessons Learned
- Supports development of Lessons Learned, promotes industry-wide sharing of event causal factors, and assists NERC in implementation of related initiatives to lessen reliability risks to the Bulk Electric System (BES)
- Produced 17 Lessons Learned for industry knowledge since January 1, 2017
Eight NERC Lessons Learned published to date in 2018

- 1 – Generation Facilities
- 2 – Communications
- 2 – Transmission Facilities
- 3 – Energy Management Systems (EMS)

Nine NERC Lessons Learned published in 2017

- 4 – Communications
- 1 – Facilities Design, Commission, and Maintenance
- 3 – Generation Facilities
- 1 – Transmission Facilities
• Analyzes events that affect EMS and the ability to monitor, control, and have situational awareness of the BES

• Holds an annual Monitoring and Situational Awareness Conference to highlight EMS related events, educate stakeholders, and promote industry awareness and knowledge

• Developed a Reference Document: *Risks and Mitigations for Losing EMS Functions*. The purpose of this document is to:
  - Identify and discuss the risk of losing EMS functions
  - Analyze the causes of EMS events
  - Share mitigation strategies to reduce these risks
• Provides operational guidance to industry

• Facilitates operating reliability coordination by fostering real-time communication among registered entities, especially Reliability Coordinators

• Promotes the exchange of operational data and modeling data among registered entities

• Reviews and approves Reliability Coordinator reliability plans
  ▪ This process is found in the *Reliability Coordinator Reliability Plan Reference Document* which is under development
• Responsible for implementing NERC’s IDC and other tools in support of the NERC Reliability Coordinators
  ▪ Provides ongoing base case modeling and maintains a distribution factor calculation methodology suitable for use with the NERC congestion management tools
  ▪ Acts as the owner and reviewer for all files related to the NERC congestion management tools and assists in technical issues relating to congestion management tools and their enhancements
• ORS is coordinated with the Critical Infrastructure Protection Committee (CIPC) to develop a Reliability Guideline: *Cyber Intrusion Guide for System Operators* to assist System Operators in detecting and responding to potential cyber security incidents.

• Was approved by the OC in June.
• Responsible for developing and maintaining NERC Continuing Education Program requirements for system operators
  ▪ This includes development and maintenance of a process to approve continuing education providers, as well as the performance of periodic audits of those providers
• Worked with NERC staff to roll out the System Operator Certification and Continuing Education Database (SOCCED).
• Developed a new Reliability Guideline: *Situational Awareness for the System Operator* to provide information on Situational Awareness (SA) and its applicability to real-time operation
• Responsible for addressing issues in the areas of balancing resources and demand, interconnection frequency, and control performance

• Performs the *Frequency Response Annual Analysis* which is an analysis of frequency response performance that contains the annual analysis, calculation, and recommendations for the Interconnection frequency response obligation (IFRO) for each of the four electrical Interconnections in North America

• Responsible for the determination and issuance of yearly CPS Bounds Report
• Contributes to the development of the balancing standards, addresses inadvertent interchange accounting and payback, and addresses technical issues with automatic generation control, time error correction, operating reserve and frequency response.

• Develops and revises Reliability Guidelines such as the *Primary Frequency Control Guideline* which was referenced in FERC Rule on Requirements for the Provision of Primary Frequency Response.
• The OC provides members to participate and/or lead joint OC/PC task forces and working groups

• Active joint OC/PC task forces and working groups
  ▪ Essential Reliability Services Working Group (ERSWG)
  ▪ Methods for Establishing IROLs Task Force (MEITF)
  ▪ Inverter-Based Resources Performance Task Force (IRPTF)
Inverter-Based Resources Performance Task Force

• Formed to build off of the experience and lessons learned from the ad hoc task force created to investigate the loss of solar photovoltaic (PV) resources during the Blue Cut Fire event

• Has performed studies and is developing a Reliability Guideline to address the issues identified in the Blue Cut Fire Disturbance Report

• **Loss of Solar Resources during Transmission Disturbances due to Inverter Settings Alert**

• Second significant event occurred October 9, 2017 with a loss of 900 MW as a result of the Canyon 2 Fire
• OC web page
  ▪ [https://www.nerc.com/comm/OC/Pages/default.aspx](https://www.nerc.com/comm/OC/Pages/default.aspx)

• Reliability Guidelines web page

• Reference Documents web page
  ▪ [https://www.nerc.com/comm/OC/Pages/Reference-Documents.aspx](https://www.nerc.com/comm/OC/Pages/Reference-Documents.aspx)
Questions and Answers
Canadian Update

Laura Hussey, Director, International Relations
Member Representatives Committee Meeting
August 15, 2018
International ERO Guiding Principles

• **Principles for an Electric Reliability Organization That Can Function on an International Basis** *(August 2005 Bilateral Principles)*
  - Governance – independence, balance, fairness and due process
  - Ongoing operations – consistency, transparency

• **NERC Board-endorsed MOU Principles** *(August 2016 NERC Board of Trustees Meeting, Berardesco presentation on NB MOU)*
  - NERC, Regional Entity (RE), and international party(ies) will be signatories
  - Confidential information will be shared between NERC and the RE
  - Consistency with Regional Delegation Agreements (RDA) and recognition of NERC’s oversight role
• **Consistency**
  - Common body of standards
  - Risk-informed approach to compliance monitoring and enforcement (with regulatory authority and laws in each jurisdiction)

• **Transparency**
  - Processes for developing and modifying standards
  - Status of mitigation of non-compliance
  - ERO Enterprise budget development process
  - Most ERO processes

• **Independence**
  - Compliance monitoring
  - Reliability Assessment

• **Shared accountability for reliability and security**
  - Industry + ERO Enterprise + Regulators
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<th>Mandatory Standards</th>
<th>Compliance Monitoring</th>
<th>MOU Parties (year)</th>
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<td>NERC+WECC+BCUC (2018)</td>
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<td>NERC+WECC+AESO (2010); WECC+MSA</td>
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<td>yes</td>
<td>NERC+MRO+SPC (2015)</td>
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<td>Standards Adoption Status</td>
<td>No. of Standards As of 7/1/2018</td>
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<tr>
<td>BC</td>
<td>112</td>
<td>Yes (but not the norm)</td>
</tr>
<tr>
<td>AB</td>
<td>73</td>
<td>Yes (modified to conform to AB regs)</td>
</tr>
<tr>
<td>SK</td>
<td>87</td>
<td>No</td>
</tr>
<tr>
<td>MB</td>
<td>73</td>
<td>Yes (thus far only TPL standards)</td>
</tr>
<tr>
<td>ON</td>
<td>92</td>
<td>No</td>
</tr>
<tr>
<td>QC</td>
<td>74</td>
<td>Yes (translation; applicability)</td>
</tr>
<tr>
<td>NS</td>
<td>72</td>
<td>No</td>
</tr>
<tr>
<td>NB</td>
<td>100</td>
<td>Yes (typically only compliance elements)</td>
</tr>
<tr>
<td>US</td>
<td>97</td>
<td>N/A</td>
</tr>
</tbody>
</table>
• Constantly moving target
• Many Canadian jurisdictions initiate their standard adoption processes after FERC approves standard
  ▪ Avoids unnecessary administrative work in case FERC does not approve a standard or directs significant modifications
• Numbers as of July 1, 2018:
  ▪ **51**: Number of reliability standards enforceable in at least three quarters of jurisdictions (United States plus 8 provinces)
  ▪ **31**: Additional number that are being enforced by at least half of jurisdictions
Questions and Answers
Recent FERC Activity

David Ortiz, Acting Director
FERC Office of Electric Reliability
August 15, 2018

This is a staff briefing and does not necessarily represent the views of the Commission or any individual Commissioner
Commission Proposed to Approve Revised GMD Planning Standard

• FERC issued a NOPR in RM18-8 on 5/17/18

• Addresses proposed Reliability Standard TPL-007-2 (Transmission System Planned Performance for Geomagnetic Disturbance Events) submitted by NERC in response to Commission directives in Order No. 830

• NOPR proposed to direct NERC to modify standard to require applicable entities to develop and implement corrective action plans to mitigate supplemental GMD event vulnerabilities

• NOPR sought feedback on two options to address the provision that permits applicable entities to exceed deadlines of corrective action plans

• Comments closed 7/23/18 with 10 comments received
Commission Issued Final Rule on Cyber Incident Reporting

- FERC issued a Final Rule in RM18-2 on 7/19/18
- Directs NERC to develop modifications to the current CIP reliability standard, CIP-008-5 (Cyber Security – Incident Reporting and Response Planning) to improve mandatory reporting of cyber security incidents
  - Include incidents that compromise, or attempt to compromise, ESP or EACMS
  - Standardize incident reports to improve quality of reporting and facilitate analysis
  - Broaden distribution of reports to include EISAC and ICS-CERT
  - NERC must file an annual, public and anonymized summary of reports with FERC
- NERC to develop thresholds for reporting and timelines that correspond to the adverse or attempted adverse impact to the grid of loss, compromise or misuse of the BES cyber assets
- NERC to submit modifications six months after the effective date of the Final Rule (10/1/2018)
Commission Approved in Part Changes to NERC Rules of Procedure

• FERC issued an order in RR17-6 on 7/19/18
• Approves in part, and denies in part, changes to the NERC Rules of Procedure
  • Section 600 (Personnel Certification)
  • Section 900 (Training and Education)
• Order directs NERC to restore sections 603, 604, and 605 that NERC proposed for deletion, which pertain to:
  • Procedures for suspension of an operator’s certification (section 603)
  • Dispute resolution process (section 604)
  • Disciplinary action (section 605)
• The order determines that these provisions are substantive provisions that should remain in the NERC Rules of Procedure.
• Directs NERC to submit a compliance filing within 120 days
Status of Supply Chain Risk Management CIP Standard

• FERC issued a NOPR, RM17-13, 1/18/18
• Proposes to augment currently-effective CIP reliability standards by approving additional supply chain risk management CIP reliability standards:
  • Supply Chain Risk Management (CIP-013-1)
  • Electronic Security Perimeter(s) (CIP-005-6)
  • Configuration Change Management and Vulnerability Assessments (CIP-010-3)
• Proposes to direct NERC to include EACMS associated with high- and medium-impact BES cyber systems in the scope of the standard and to evaluate risks presented by PACs and PCAs
• Comments closed 3/26/18 and 15 comments were received
Commission Hosted the Reliability Technical Conference on July 31, 2018

• FERC held a Reliability Technical Conference, AD18-11, 7/31/18
• Commission-led technical conference gathered testimony and heard from a wide range of entities regarding key issues facing the reliability and security of the bulk power system and to offer ideas for how the Commission can address them
  • The Changing ERO Enterprise, Standards and Reliability
  • Advancing Reliability and Resilience of the Grid
  • Managing the “New” Grid
  • Addressing the Evolving Cybersecurity Threat
• Panelists included nearly 30 experts from the United States, Mexico and Canada, representing a wide range from of entities spanning the energy sector
• Special thanks to Jim Robb, Mark Lauby, John Moura and Bill Lawrence for their participation and to Fred Gorbet and Ken DeFontes for attending
• Look for a more detailed discussion tomorrow at the BOT meeting
Highlighted Energy Market Actions with a Bearing on Reliability

- SPP Resource Adequacy Requirement
  - 8/7/18 in ER18-1268
  - FERC accepted SPP’s tariff revisions implementing a Resource Adequacy requirement for the SPP footprint
- ISONE Mystic Cost of Service Agreement
  - 7/2/2018 in ER18-1509 and EL18-182
  - Required ISO-NE to make tariff adjustments allowing cost-of-service fuel security contracts
- PJM Capacity Market
  - 6/29/18 in ER18-1314
  - FERC rejected PJM’s two proposed methods for identifying and mitigating market impacts of resources receiving out of market capacity subsidies
  - Established 206 proceeding in EL18-178 to flesh out the details of a new plan
- ISO-NE Competitive Auctions with Subsidized Policy Resources (CASPR)
  - 3/9/18 in ER18-619
  - FERC approved tariff revisions to modify Forward Capacity Market to better accommodate actions taken by NE states to procure resources outside of ISO-NE’s wholesale markets