SCHEDULING NOTE

Title: **JOINT MEETING OF THE FEDERAL ENERGY REGULATORY COMMISSION (FERC) AND THE NUCLEAR REGULATORY COMMISSION (NRC)**
(Public)

Scheduled: **June 7, 2018**
9:00 am – 11:15 am

Duration: Approx. 2.25 hours

Location: FERC Headquarters
888 First St. NE
Washington, DC 20426

Participants:

FERC Chairman and Commissioners:
Chairman Kevin J. McIntyre
Commissioner Cheryl A. LaFleur
Commissioner Neil Chatterjee
Commissioner Robert F. Powelson
Commissioner Richard Glick

NRC Chairman and Commissioners:
Chairman Kristine L. Svinicki
Commissioner Jeff Baran
Commissioner Stephen G. Burns
Commissioner Annie Caputo
Commissioner David A. Wright

FERC Staff
Christopher MacFarlane, Attorney-Adviser, Office of General Counsel, Office of General and Administrative Law
Raymond Orocco-John, Electrical Engineer, Office of Electric Reliability
Eddy Lim, Electrical Engineer, Office of Electric Reliability
Patricia Eke, Energy Industry Analyst, Office of Electric Reliability
Deepak Ramlatchan, Office of Energy Market Regulation

North American Electric Reliability Corporation (NERC) Staff
Mark Lauby, Senior Vice President and Chief Reliability Officer

NRC Staff
Brian Holian, Acting Director, Office of Nuclear Reactor Regulation
Shana Helton, Deputy Director, Division of Engineering, Office of Nuclear Reactor Regulation
James Andersen, Director, Division of Physical and Cyber Security Policy, Office of Nuclear Security and Incident Response
Anna Bradford, Deputy Director, Division of Licensing, Siting and Environmental Analysis, Office of New Reactors

Topics

- **Introductions and Opening Statements**

- **Grid Reliability, Nuclear Power Plants & Other Topics**

NERC

Mark Lauby, NERC, Senior Vice President and Chief Reliability Officer
- State of Reliability
- Update on the NERC Essential Reliability Services Working Group (ERSWG) and Distributed Energy Resources Task Force (DERTF)

Q&A

FERC

Christopher MacFarlane, Attorney-Adviser, Office of General Counsel, Office of General and Administrative Law
- FAST ACT – Critical Energy/Electric Infrastructure Information (CEII)

Deepak Ramlatchan, Office of Energy Market Regulation (OEMR)
- Update on Grid Resilience in Regional Transmission Organizations and Independent System Operators (FERC Docket AD18-7-000)

Eddy Lim, Office of Electric Reliability (OER)
- Summary of the Lawrence Berkeley National Laboratory Study on Primary Frequency Control

Raymond Orocco-John, OER
- FERC-NERC Regional Entity Joint Review of Restoration and Recovery Plans – Follow-Up Activities

Q&A

NRC

Brian Holian, Acting Director, Office of Nuclear Reactor Regulation
- NRC Regulatory Overview
- Nuclear Power Plant Operations

Shana Helton, Deputy Director, Division of Engineering, Office of Nuclear Reactor Regulation
- NRC/FERC/NERC Interactions
- License Renewal
- Decommissioning

Anna Bradford, Deputy Director, Division of Licensing, Siting and Environmental Analysis
- New Reactors
  - Licensing and Construction Oversight
  - Small Modular Reactors (SMRs)

- Advanced Reactors

Q&A

Cyber Security Activities

FERC

Patricia Eke, Energy Industry Analyst, OER

- Cybersecurity Updates
  - Cyber Security Supply Chain Standard Notice of Proposed Rulemaking (NOPR)
  - Cyber Security Incident Reporting Standard NOPR

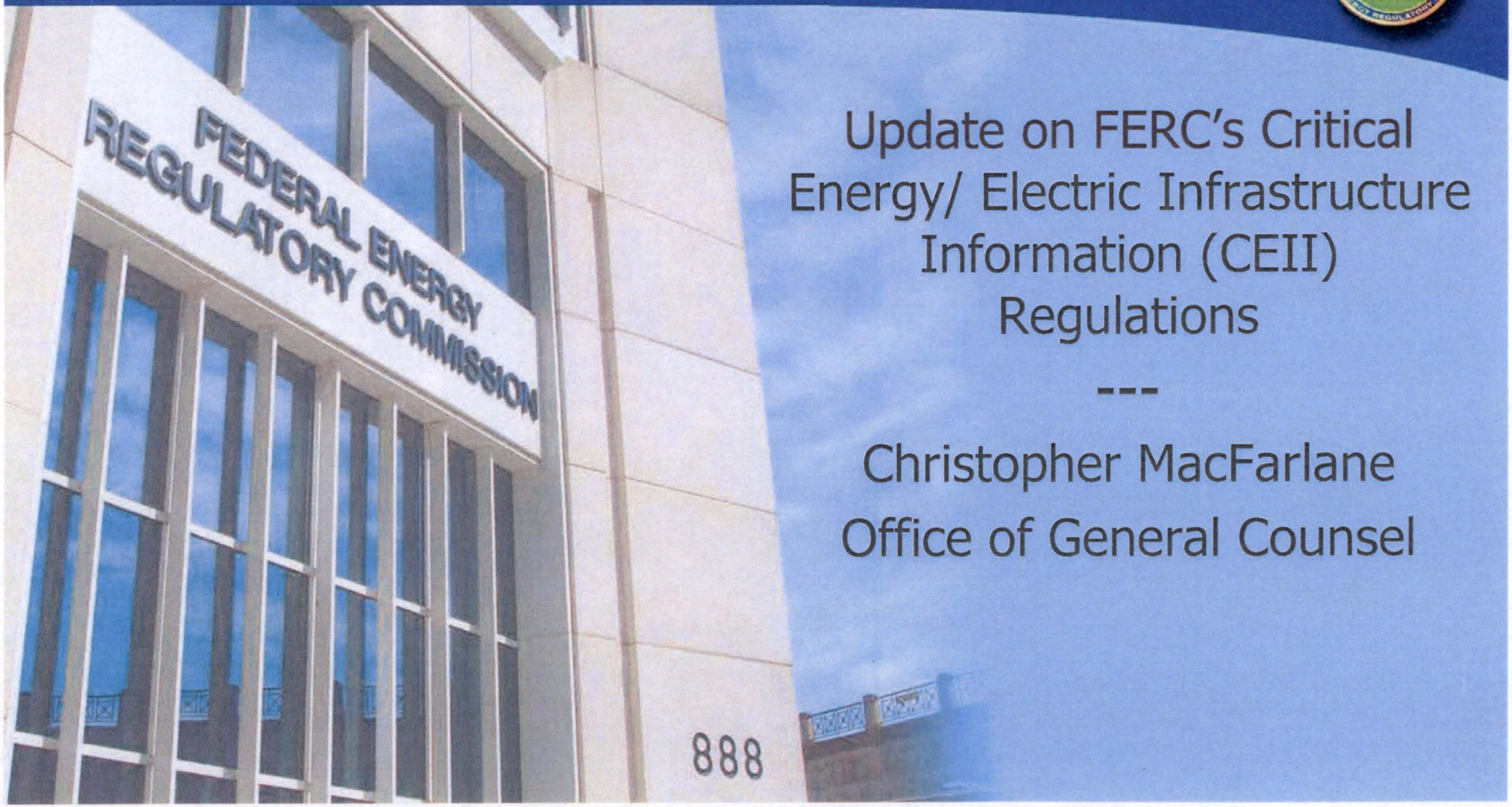
NRC

James Andersen, Director, Division of Physical and Cyber Security Policy, Office of Nuclear Security and Incident Response

- Cybersecurity Activities
  - NRC Inspection Results of Licensee's Overall Cyber Programs

Q&A – Wrap-Up

Federal Energy Regulatory Commission | Washington D.C.



Update on FERC's Critical Energy/ Electric Infrastructure Information (CEII) Regulations

---

Christopher MacFarlane

Office of General Counsel

Disclaimer

The views expressed herein are mine, and do not necessarily reflect the views of the Commission, individual Commissioners, Commission staff, or individual Commission staff members.

Critical Energy Infrastructure Information Regulations

- Shortly after September 11, 2001, the Commission took steps to protect information that it considered Critical Energy Infrastructure Information.
- On February 21, 2003, FERC issued a final rule amending its regulations to establish a procedures for protecting and accessing Critical Energy Infrastructure Information.

Critical Energy Infrastructure Information

- Critical Energy Infrastructure Information is defined, by Commission regulation, as specific engineering, vulnerability, or detailed design information about critical infrastructure that:

  (i) Relates details about the production, generation, transportation, transmission, or distribution of energy;

  (ii) Could be useful to a person in planning an attack on critical infrastructure;

  (iii) Is exempt from mandatory disclosure under the Freedom of Information Act, 5 U.S.C. 552; and

  (iv) Does not simply give the general location of the critical infrastructure.

The FAST Act

- On December 4, 2015, the President signed the Fixing America's Surface Transportation (FAST) Act into law. The FAST Act added section 215A to the Federal Power Act (FPA) to improve the security and resilience of energy infrastructure in the face of emergencies.

- FPA section 215A(d)(2) required the Commission to promulgate such regulations as necessary to:

  - Establish criteria and procedures to designate information as CEII;

  - Prohibit unauthorized disclosure of CEII;

  - Establish sanctions for employees and certain other individuals who knowingly and willfully make unauthorized disclosures; and

  - Facilitate voluntary sharing of CEII among federal, state, political subdivision and tribal authorities; the ERO; regional entities; owners, operators and users of critical electric infrastructure; and other entities deemed appropriate by the Commission.

Critical Electric Infrastructure Information

- Section 215A(a)(3) of the FAST Act defines Critical Electric Infrastructure Information to mean:

> [I]nformation related to critical electric infrastructure, or proposed critical electrical infrastructure, generated by or provided to the Commission or other Federal agency other than classified national security information, that is designated as critical electric infrastructure information by the Commission or the Secretary of the Department of Energy pursuant to subsection (d). Such term includes information that qualifies as critical energy infrastructure information under the Commission's regulations.

- Pursuant to section 215A(d)(1) of the FPA: Critical Electric Infrastructure Information is: Exempt from mandatory disclosure under the Freedom of Information Act, 5 U.S.C. 552 and exempt from State Sunshine Laws.

Order No. 833

- On November 17, 2016, FERC issued Order No. 833, which amends its CEII Regulations to:
  - Implement the provisions of the FAST Act that pertain to the designation, protection and sharing of CEII; and
  - Integrate the existing Critical Energy Infrastructure Information program with the new requirements of the FAST Act.
- The rule became effective on February 21, 2017.

Revised CEII Regulations

- Designation of CEII- The regulations provided procedures for the public to request CEII treatment of a submission and for the designation of Commission generated documents.
- Sharing of CEII – The Commission revised the process for the public to request access to CEII, clarified the process for sharing CEII with other agencies, and established procedures for voluntary sharing of CEII with certain entities.
- Protection of CEII - The revised CEII regulations confirmed the duty to protect CEII, and created sanctions for personnel that knowingly and willfully disclose CEII in an unauthorized manner.

Rehearing of Order 833

- Rehearing Request – Edison Electric Institute asserted that the Commission either erred or should reconsider five aspects of Order No. 833
- Order 833-A - The Commission denied rehearing, but clarified, in part, certain aspects of the CEII rules related to the criteria for responding to CEII requests, the designation of FERC generated CEII, and FERC's non-disclosure agreement.

CEII & Other Agencies

- Department of Energy (DOE) - FAST Act specifically authorizes FERC and the DOE to designate information as CEII.

- Other Federal agencies - In Order 833, the Commission recognized that other Federal agencies may possess critical energy infrastructure information. As such, section 388.113(a), states that:

> Nothing in this section limits the ability of any other Federal agency to take all necessary steps to protect information within its custody or control that is necessary to ensure the safety and security of the electric grid. To the extent necessary, such agency may consult with the CEII Coordinator regarding the treatment or designation of such information.

- Federal Agency Request Process - FERC staff also revised the procedures for processing Federal agency requests for CEII.

CEII & State Agencies

- State Agencies – The FAST Act provides that CEII:
  - "shall not be made available by any Federal, State, political subdivision or tribal authority pursuant to any Federal, State, political subdivision or tribal law requiring public disclosure of information or records."

Federal Energy Regulatory Commission | Washington D.C.

Report on the FERC-NERC-Regional Entity Joint Review of Restoration and Recovery Plans: Status Update

---

Ray Orocco-John
Electrical Engineer
Office of Electric Reliability

June, 2018

06/06/2018

Disclaimer

The reports discussed in this presentation were prepared by staff from the Federal Energy Regulatory Commission in consultation with staff from the North American Electric Reliability Corporation and its Regional Entities. The reports do not necessarily reflect the views of the Commission.

Background

Initial joint review of Restoration and Recovery Plans - *(Report completed in January 2016)*

- Report recommended further joint studies:
  - Staff has completed two studies
  - Other studies - in progress

Blackstart Resources Availability *(BRAv)* Study Objective

- To assess current state of blackstart resource availability and registered entities' strategies for replacement of these resources
- To verify whether and how registered entities conduct testing of blackstart resources under anticipated blackstart conditions

BRAv Joint Staff Team Review Process

- Review blackstart plans from representative sample of registered entities:
  1. Gain an understanding of plans, strategies, processes and practices
  2. Identify strengths and shortcomings
  3. Develop recommendations to improve reliability

BRAv Findings

- Participants' system restoration plans contain sufficient blackstart resources and comprehensive strategies for mitigating against loss of these resources.
- Participants who performed expanded testing of blackstart capability used the knowledge gained to update and improve their system restoration plans.

BRAv Voluntary Recommendations for Entities

- Mitigate risks associated with reliance on single fuel;
- Verify model data to ensure accuracy of blackstart simulations;
- Perform expanded testing, where feasible, to confirm viability of blackstart capability;
- Reach out to other registered entities that have experience with expanded testing;
- Study the adequacy of compensation for blackstart resources.

FERC-NERC-Regional Entity Joint Review of Restoration and Recovery Plans:

http://www.ferc.gov/legal/staff-reports/2016/01-29-16-FERC-NERC-Report.pdf

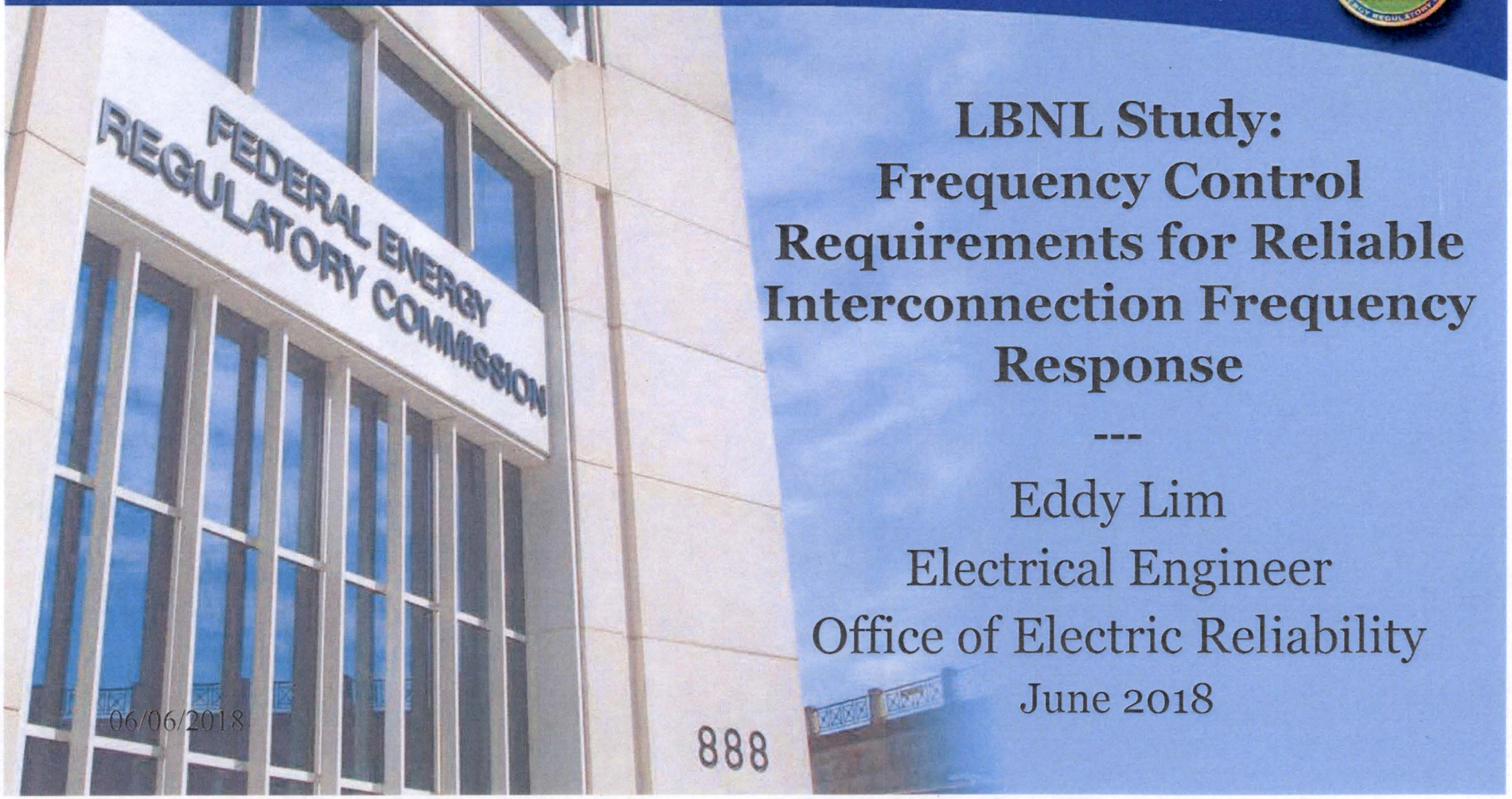
Follow-up Reports:

https://www.ferc.gov/legal/staff-reports/2017/06-09-17-FERC-NERC-Report.pdf

http://www.ferc.gov/legal/staff-reports/2018/bsr-report.pdf

Contact: Ray Orocco-John
FERC - Office of Electric Reliability
Division of Compliance
202-502-6593
raymond.orocco-john@ferc.gov

Federal Energy Regulatory Commission | Washington D.C.



LBNL Study: Frequency Control Requirements for Reliable Interconnection Frequency Response

---

Eddy Lim
Electrical Engineer
Office of Electric Reliability

June 2018

Disclaimer

This report was prepared by Lawrence Berkeley National Laboratory for the Office of Electric Reliability. This report does not necessarily reflect the views of the Commission.

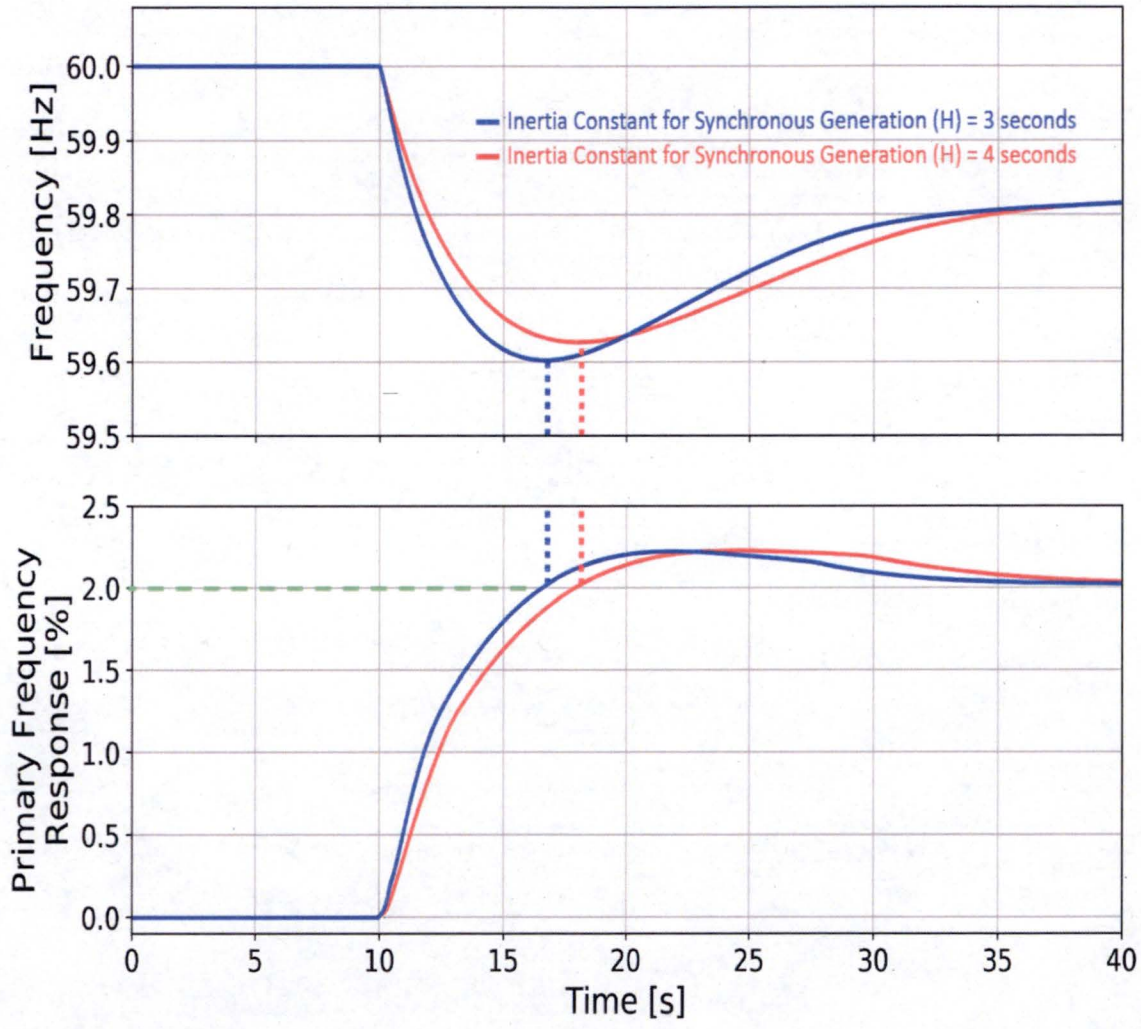
Objective

- To assess and identify the key parameters of frequency control in response to a sudden loss of generation or load on the bulk power system.
  - Head Room, speed of response, sustained response, inertia, dead band, load response, frequency bias of plant controllers, size of the interconnection, size of the generation loss
  - Rate of change of frequency, nadir and settling frequency

Physical Requirements for Arresting Frequency

Frequency is arrested when the amount of primary frequency response delivered equals the amount of generation lost

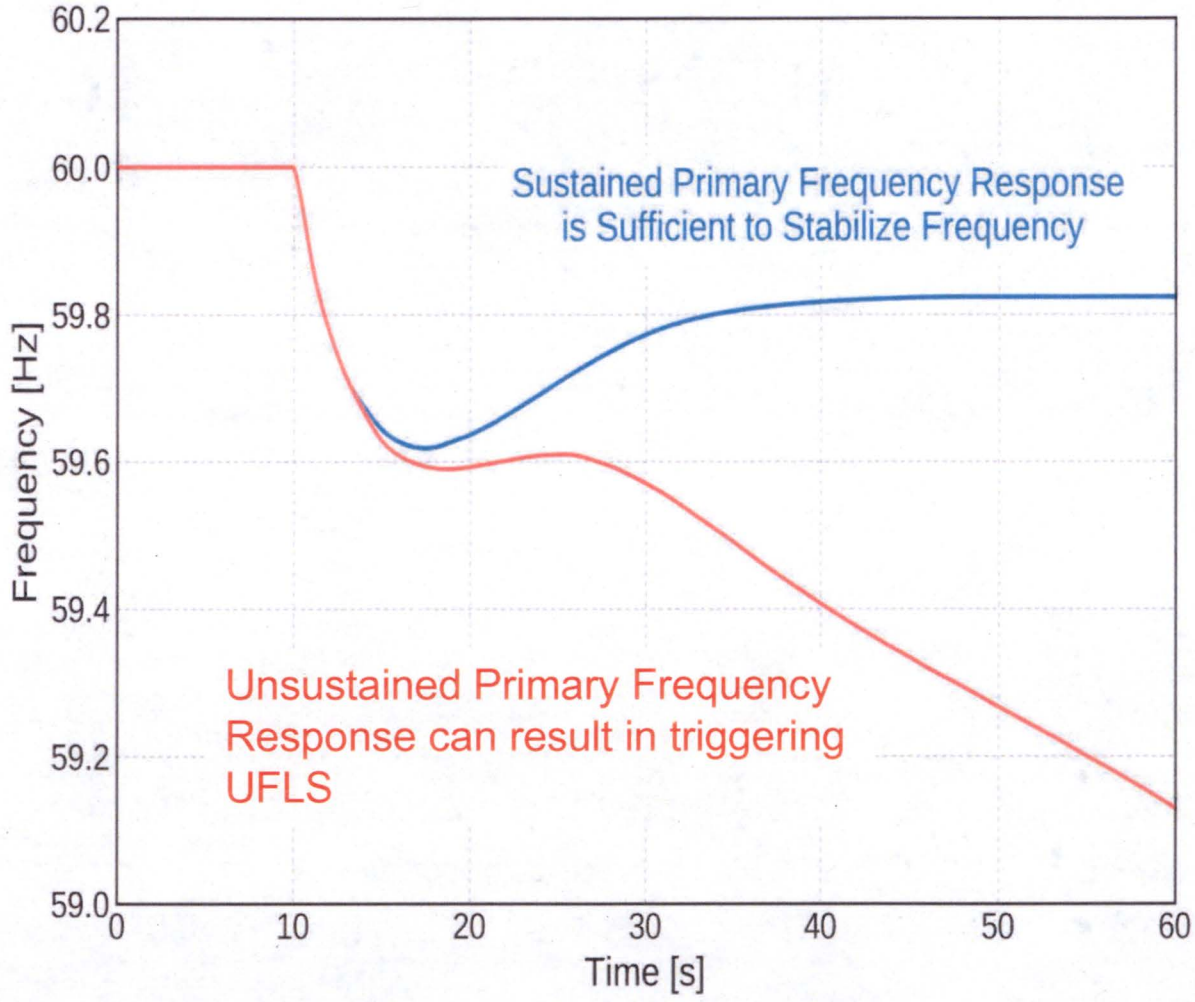
Reserves held to provide primary frequency control must exceed the expected loss of generation



The Importance of Sustained Primary Frequency Response

Failure to sustain sufficient primary frequency response will trigger UFLS

Primary frequency response must be sustained until secondary frequency response can replace it



Key Study Findings

Rapidly deployed and then sustained primary control action in response to the sudden loss of generation is a fundamental reliability requirement.

This requirement is met by the action of turbine governors and, in some cases, by fast demand response.

Generation interconnection policies should determine:

- The extent to which the fleet is equipped to provide primary frequency response

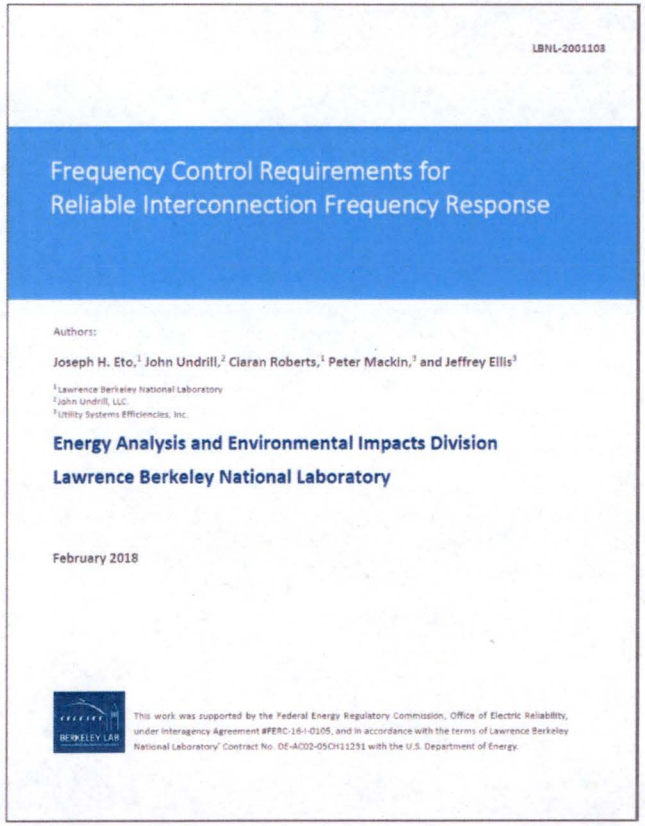
Generation dispatch policies should determine:

- The required amount of primary frequency response
  - ...which depends on the size of the generation loss event the interconnection is designed to withstand
- The required rate of delivery of primary frequency response
  - ...which depends on the inertia of the interconnection

Study Recommendations

- Focused attention needed on the collection, maintenance, and validation of operating data and study models
- International practices should be reviewed as options for U.S. grid operators to consider for adoption/adaptation
- All generators should have the capability to provide sustained primary frequency response
- Ensuring plant load controls don't withdraw frequency response
- The contributions of non-traditional resources for primary frequency control should be studied and incorporated, as appropriate, into future operations
- The changing composition of loads should be studied and addressed

LBNL Study: Frequency Control Requirements for Reliable Interconnection Frequency Response



LBNL-2001108

Frequency Control Requirements for
Reliable Interconnection Frequency Response

Authors:

Joseph H. Eto,[1] John Undrill,[2] Ciaran Roberts,[1] Peter Mackin,[3] and Jeffrey Ellis[3]

[1]Lawrence Berkeley National Laboratory
[2]John Undrill, LLC
[3]Utility Systems Efficiencies, Inc.

Energy Analysis and Environmental Impacts Division

Lawrence Berkeley National Laboratory

February 2018

This work was supported by the Federal Energy Regulatory Commission, Office of Electric Reliability, under Interagency Agreement #FERC-16-I-0105, and in accordance with the terms of Lawrence Berkeley National Laboratory' Contract No. DE-AC02-05CH11231 with the U.S. Department of Energy.

https://www.ferc.gov/industries/electric/indus-act/reliability.asp

Contact: Eddy Lim
FERC - Office of Electric Reliability
Division of Engineering Planning and Operations
202.502.6713
Eddy.Lim@ferc.gov

Federal Energy Regulatory Commission | Washington D.C.

Supply Chain Risk Management Reliability Standard and Cyber Security Incident Reporting Notice of Proposed Rulemaking Update

---

Patricia Eke
Energy Industry Analyst
Office of Electric Reliability

June 7, 2018

Disclaimer

The views expressed herein are mine, and do not necessarily reflect the views of the Commission, individual Commissioners, Commission staff, or individual Commission staff members

Supply Chain Risk Management Reliability Standard (Order No. 829)

- Issued by the Commission: July 21, 2016
- Directs NERC to develop Reliability Standard(s) for supply chain risk management for industrial control system hardware, software, and computing and networking services associated with the Bulk-Power System
- Mitigate risk of a cybersecurity incident associated with reliable operations of the Bulk-Power System

FERC Order No. 829

In FERC Order No. 829, the Commission directed NERC to develop a Reliability Standard(s) to address supply chain risk management. The new or modified Standard should address the following security objectives:

1. Software Integrity and Authenticity
2. Vendor Remote Access
3. Information System Planning
4. Vendor Risk Management & Procurement Controls

FERC Order No. 829

- On September 26, 2017, NERC proposed new and enhanced Reliability Standards to address supply chain cybersecurity risk management as directed in Order No. 829:
  - CIP-013-1 (Cybersecurity- Supply Chain Risk Management Reliability Standards)
  - CIP-005-6 (Electronic Security Perimeter) and;
  - CIP-010-3 (Configuration Change Management)
- NERC Board of Trustees issued resolutions directing NERC to further study supply chain risks

FERC Order No. 829

- On January 18, 2018, the Commission proposed to adopt enhanced Supply Chain Risk Management Reliability Standards (SCRM)
- The Commission proposed to find that a significant cyber security risk remains in the proposed SCRM Standards and proposed to direct NERC to:
  - Include Electronic Access Control or Monitoring Systems (EACMS) associated with medium and high impact bulk electric systems within the scope of the SCRM Standards and;
  - Evaluate the risks presented by Physical Access Control Systems (PACS) and Protected Cyber Assets (PCA) as part of the study proposed by the NERC Board of Trustees

FERC Order No. 829

- Deadline for Comments: March 26, 2018
- Comments currently under Commission staff review

Cyber Security Incident Reporting Notice of Proposed Rulemaking (NOPR)

- Issued by the Commission: December 21, 2017
- Proposes to direct NERC to develop and submit modifications to the Critical Infrastructure Protection (CIP) Reliability Standards to improve the reporting of Cyber Security Incidents, including incidents that might facilitate subsequent efforts to harm the reliable operation of the bulk electric system

Cyber Security Incident Reporting NOPR

- Current reporting thresholds may understate the true scope of cyber-related threats facing the Bulk-Power System.

- Lack of any NERC reportable cybersecurity incidents in 2015 and 2016, suggests a gap in the current reporting requirements
  - DOE Electric Disturbance Reporting Form OE-417 contained four cybersecurity incidents reported in 2016: two suspected cyber attacks and two actual cyber attacks in 2016.
  - ICS-CERT responded to fifty-nine (59) cybersecurity incidents within the Energy Sector in 2016.

Cyber Security Incident Reporting NOPR Includes Five Proposals

1. Expanding the reporting threshold to include attempted compromise as well as actual compromise.
2. Specifying the content required in mandatory cyber security incident reporting.
3. Establishing a deadline for when the entity must file a cyber security incident report to E-ISAC.
4. Including DHS ICS-CERT as a mandatory recipient of these incident report.
5. Requiring that NERC file an annual, public, and anonymized summary of the cyber security incidents.

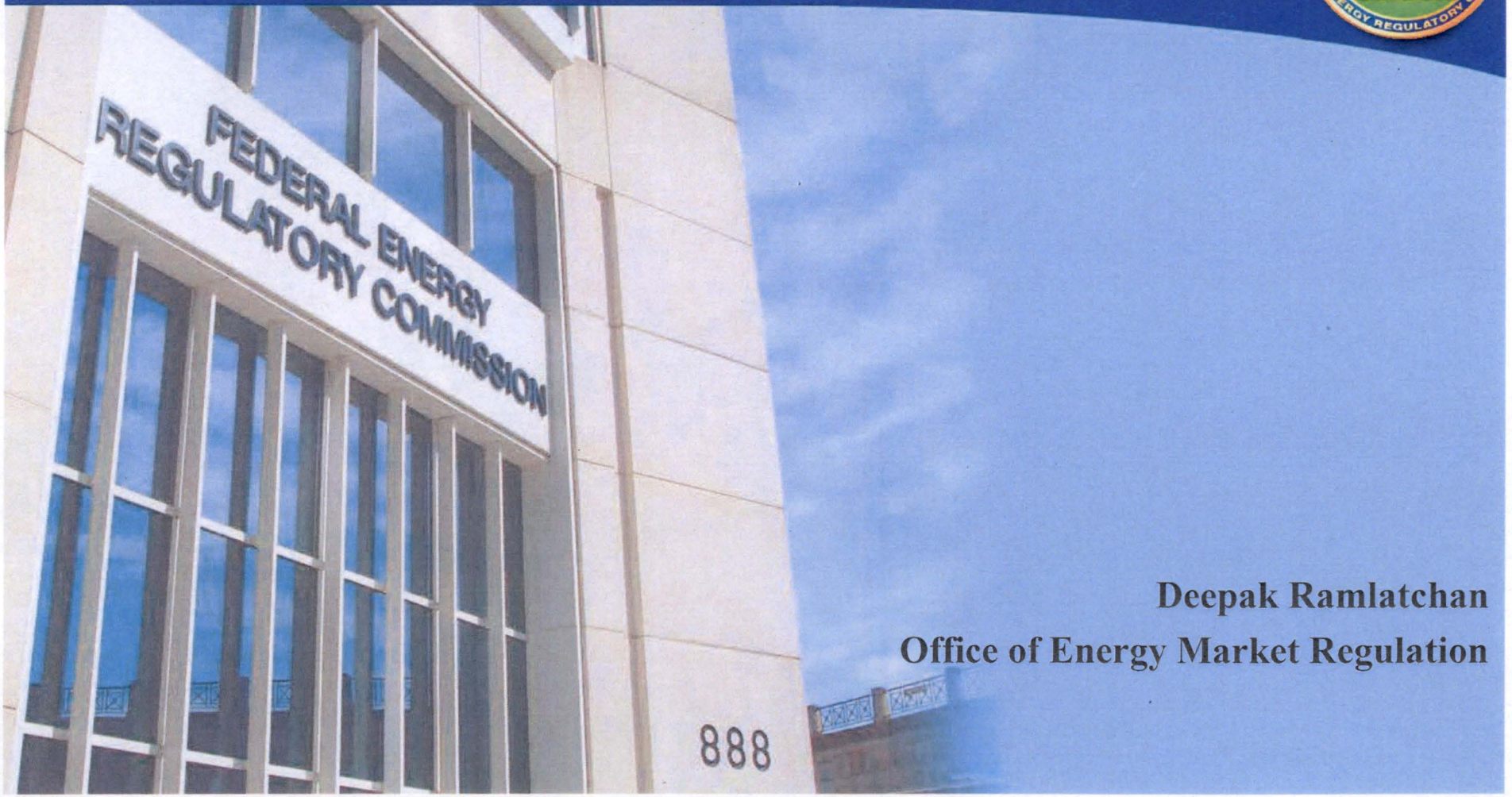
Cyber Security Incident Reporting NOPR

- Deadline for Comments: February 26, 2018
- Comments currently under Commission staff review

Questions?

Grid Resilience in RTOs/ISOs
AD18-7-000

Federal Energy Regulatory Commission | Washington D.C.



Deepak Ramlatchan
Office of Energy Market Regulation

DOE Notice of Proposed Rulemaking

- On September 29, 2017, the Secretary of Energy submitted a Notice of Proposed Rulemaking (NOPR) to FERC regarding grid resiliency and reliability pricing.
- Directed FERC to consider requiring certain RTOs and ISOs to establish a mechanism for: (1) the purchase of energy from an eligible "reliability and resilience resource;" and (2) the recovery of costs and a return on equity for such resources.
- On October 2, 2017, FERC opened Docket No. RM18-1 to consider the DOE proposal.

AD18-7
ORDER INITIATING NEW PROCEEDING, ESTABLISHING ADDITIONAL PROCEDURES

- On January 8, 2018, the Federal Energy Regulatory Commission (FERC) terminated the proceeding it initiated to consider the DOE NOPR.

- The Commission stated that it places a priority on resilience and issued an order initiating a new proceeding (Docket No. AD18-7-000) to holistically examine the resilience of the bulk power system.

AD18-7 Goals

The goals of the new proceeding are to:

1. Develop a common understanding of what resilience is

2. Understand how each region assesses resilience

3. Use this information to evaluate potential Commission action

Definition of Resilience

AD18-7:

The ability to withstand and reduce the magnitude and/or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, and/or rapidly recover from such an event.

(seeking comment)

Questions for the RTOs/ISOs

- Risks: impact, likelihood, planning, challenges
- High Impact, Low Frequency events
- Portfolio assessment, correlation/common mode failure
- Obstacles to obtaining helpful information
- Engineering and design requirements (system/components) that contribute to resilience
- Existing policies and procedures
- Existing market mechanisms

Broader Approach

- Wholesale Electric Market Rules
- Transmission Planning
- Reliability Standards
- Emergency Action Plan Development

RTO/ISO Responses

- Interplay of resilience/reliability
- Types of studies conducted
- Operations supporting resilience
- Fuel security (ISO-NE)
- Inter-regional and cross-sector issues (MISO, PJM)
- Market enhancements (PJM, NYISO, MISO)

Next Steps

- Over 150 "reply" comments filed May 9
- Analysis ongoing

NERC

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

State of Reliability

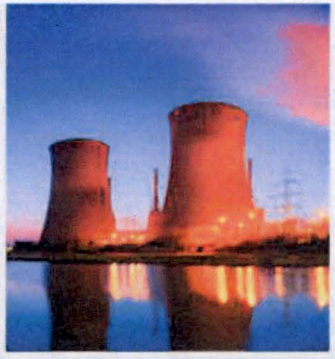
Summary of Findings

Mark Lauby, Senior Vice President and Chief Reliability Officer

FERC and NRC Joint Commission Meeting

June 7, 2018

RELIABILITY | ACCOUNTABILITY

Overview

- State of Reliability report measures past performance, identifies emerging risks, and success of mitigation activities
  - First report completed in 2012; 2018 report expected to be published June 24
- Essential Reliability Services
- Distributed Energy Resource integration and NERC activities

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Summary of 2017 Report

- Decreased instances of protection system misoperations
- Improved BPS resiliency to severe weather
- Decreased human error
- No Category 4 or 5 events in 2016
- Stability of frequency and voltage
- Maintained physical and cyber security under increasing threats

Overview of 2018 Report

- Previous trend findings continue with some new findings:
  - Improved BPS resiliency to severe weather
    - Two Category 5 events – Hurricanes Harvey and Irma
  - Maintained physical and cyber security reliability under increasing threats
    - No loss of load
  - Decreased instances of protection system misoperations
    - 7.1 percent vs. 8.3 percent last year; has trended down over past five years
  - Decreased human error
  - Frequency and voltage remained stable
    - However, results varied by interconnection
  - Inverter disconnects during transmission disturbances present an emerging risk

Two Category 5 Events

- Water and wind were key in Texas during Hurricane Harvey
  - 85 substations damaged
  - 225 transmission line outages
  - More than 850 transmission line structures downed/damaged
  - More than 6,000 distribution poles downed/damaged
- Hurricane Irma was the largest impact storm to ever hit Florida
  - 4.45 million customers out of service for Florida Power & Light
  - (Previous record was 3.24 million in 2005 during Hurricane Wilma)
  - Irma restoration took 10 days vs. 18 days during Wilma

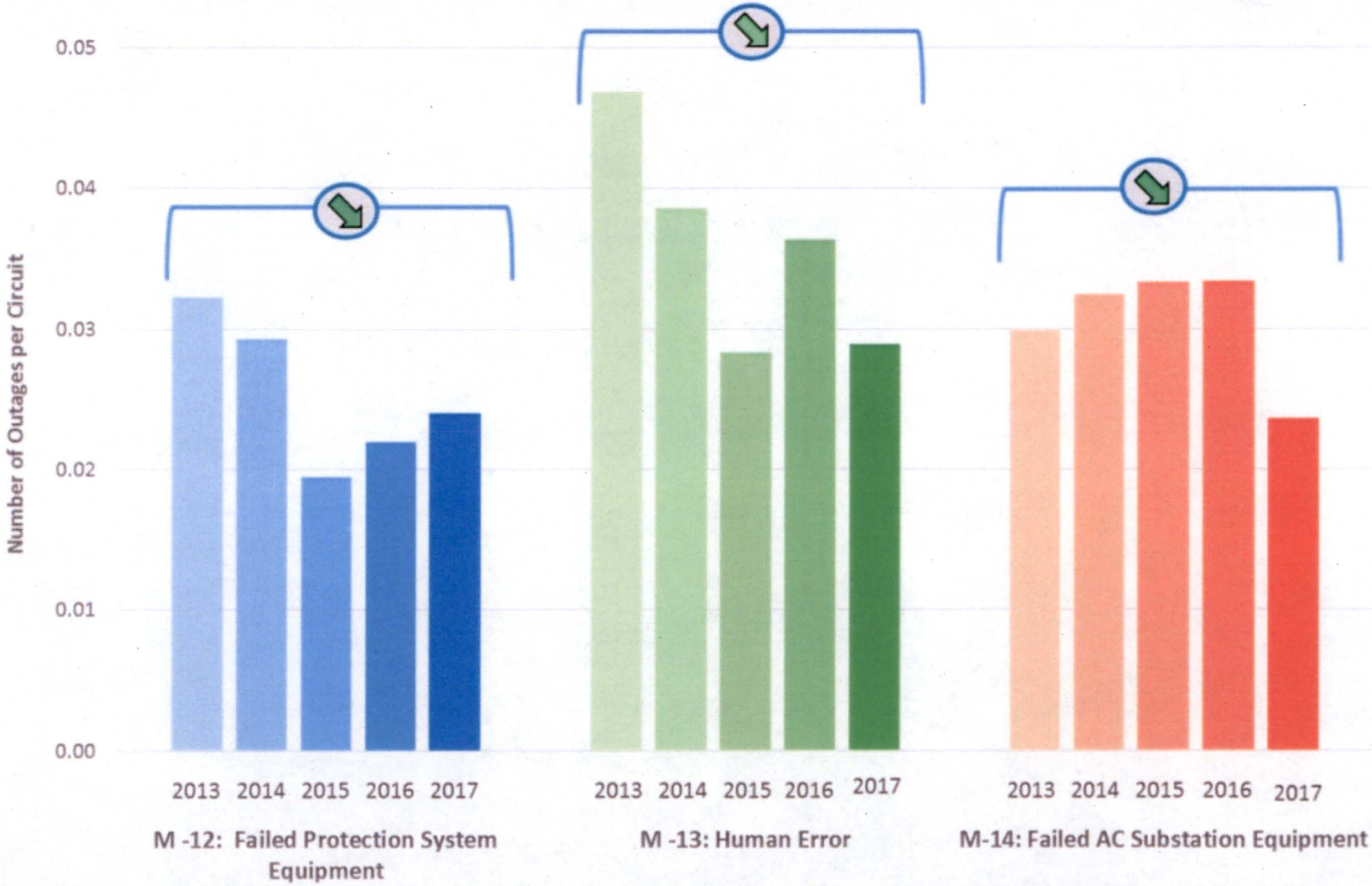
NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Event Analysis Key Findings

- Drones hastened restoration following both Harvey and Irma with unexpected versatility
- Mutual Assistance agreements provided essential equipment and material for both Harvey and Irma restorations
- Florida and its utilities shortened Irma restoration time with strong, prior investment in system hardening

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

200 kV+ Outages by Cause Code



M -12: Failed Protection System Equipment

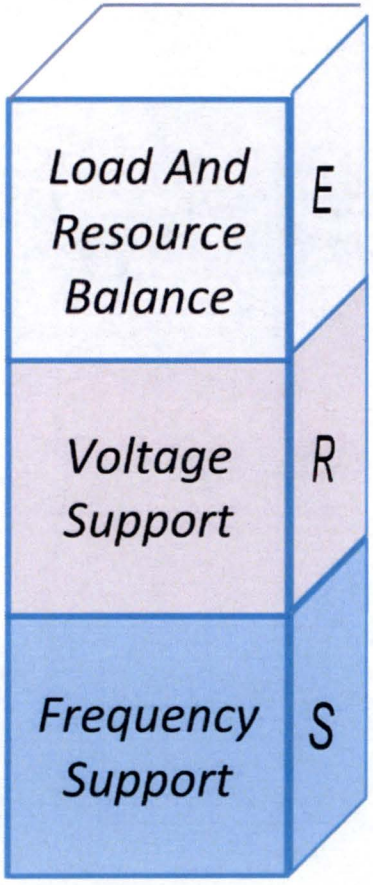
M -13: Human Error

M-14: Failed AC Substation Equipment

New Finding in 2018

- Inverter disconnects during transmission disturbances present an emerging risk
  - NERC 1,200 MW Fault Induced Solar Photovoltaic Resource Interruption Disturbance Report, Southern California August, 16, 2016 Event
    - Use of instantaneous frequency measurements can erroneous tripping during transients generated by faults on the power system
    - Cease current injection for voltages > 1.1 per unit or < 0.9 per unit, and return to pre-disturbance levels at a slow ramp rate
    - Two industry alerts issued providing guidance to reduce or eliminate impacts from these characteristics. Reviewing Standards.
  - CAISO Market Notice Effective Trade Day (TD) 6/14/17
    - The California ISO temporarily increased daily procurement of operating reserves to mitigate reliability risk against potential loss of solar resources

Essential Reliability Services



- Retirements of conventional generation and the rapid addition of inverter-based resources altering the operating characteristics of the grid
- In 2014, framework developed with building blocks of a reliable system: "Essential Reliability Services"
- NERC supports efforts to understand contributions to reliability from all forms of generation
- Change in planning and operations needed to manage future Transmission & Distribution systems

Link to: ERS Framework Report *Link to : Reliability Assessments*

DER Task Force

- Report published in February 2017

  DER Connection, Modeling, and Reliability Considerations

Working definition of DER:

- *Any resource on the distribution system that produces electricity and is not otherwise included in the formal NERC definition of the Bulk Electric System.*

Examples:

- *Residential rooftop solar*
- *Microgrids*
- *Cogeneration projects*
- *Any other distribution resource*

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Accommodating Large Amounts of DER

- **DERTF:**
  - 2018 Technical Brief: DER Data Collection for Transmission System Entities
  - 2018 DER Educational Video
- **Load Modeling Task Force**
  - 2016 Report: Dynamic Load Modeling Technical Reference Document
  - 2016 Reliability Guideline : Modeling DER in Dynamic Load Models
  - 2017 Reliability Guideline : Developing Load Model Composition Data
- **Industry and Research Partnerships**
  - IEEE Standards Participation and NERC - IEEE Joint Task Force (IEEE 1547)
  - Argonne National Laboratory : Impact of DERs on the Bulk Electric System – Combined Modeling of T&D Systems & Benchmark Case Studies

Assessing BPS Impacts

- DER impacts on UFLS or under frequency load shedding (PRC-006-3) and under voltage load shedding or UVLS (PRC-010-2)
  - NERC Planning Committee: Region Studies on DER Impacts to UFLS/UVLS Programs
    - Unexpected loss of DER can contribute to frequency and voltage instability for high penetrations (e.g. NPCC study).
- IEEE 1547-2018 implement and coordinate with System Operators reliability
  - Mod-032-1 : Data for Power System Modeling and Analysis
- In the future aggregate DER may be the most severe contingency. TPL-001-4 requires study and planning for the potential impacts

Questions and Answers

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

NRC Regulatory Overview, NPP Operations, NRC/FERC/NERC Interactions, License Renewal, Decommissioning, New Reactors

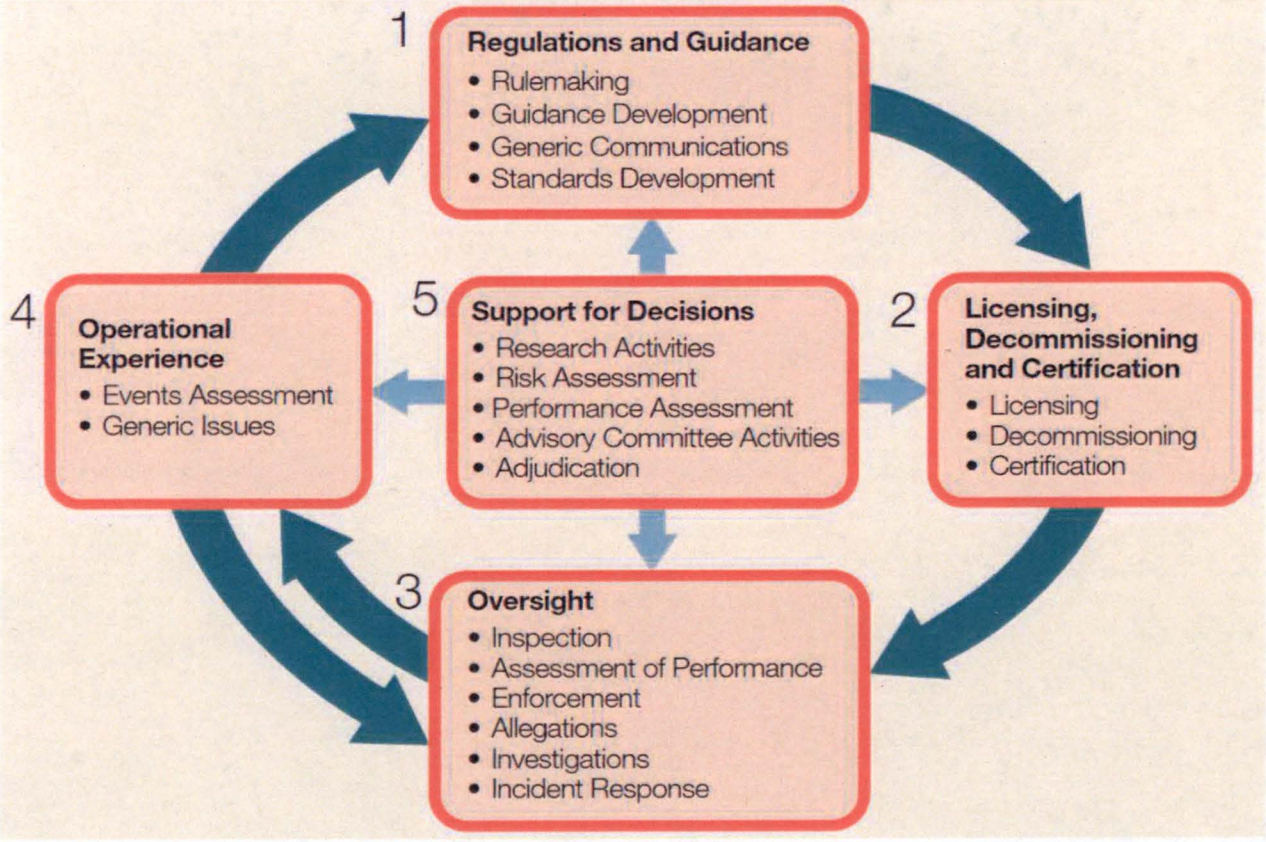
NRC/FERC Joint Commission Meeting

June 7, 2018

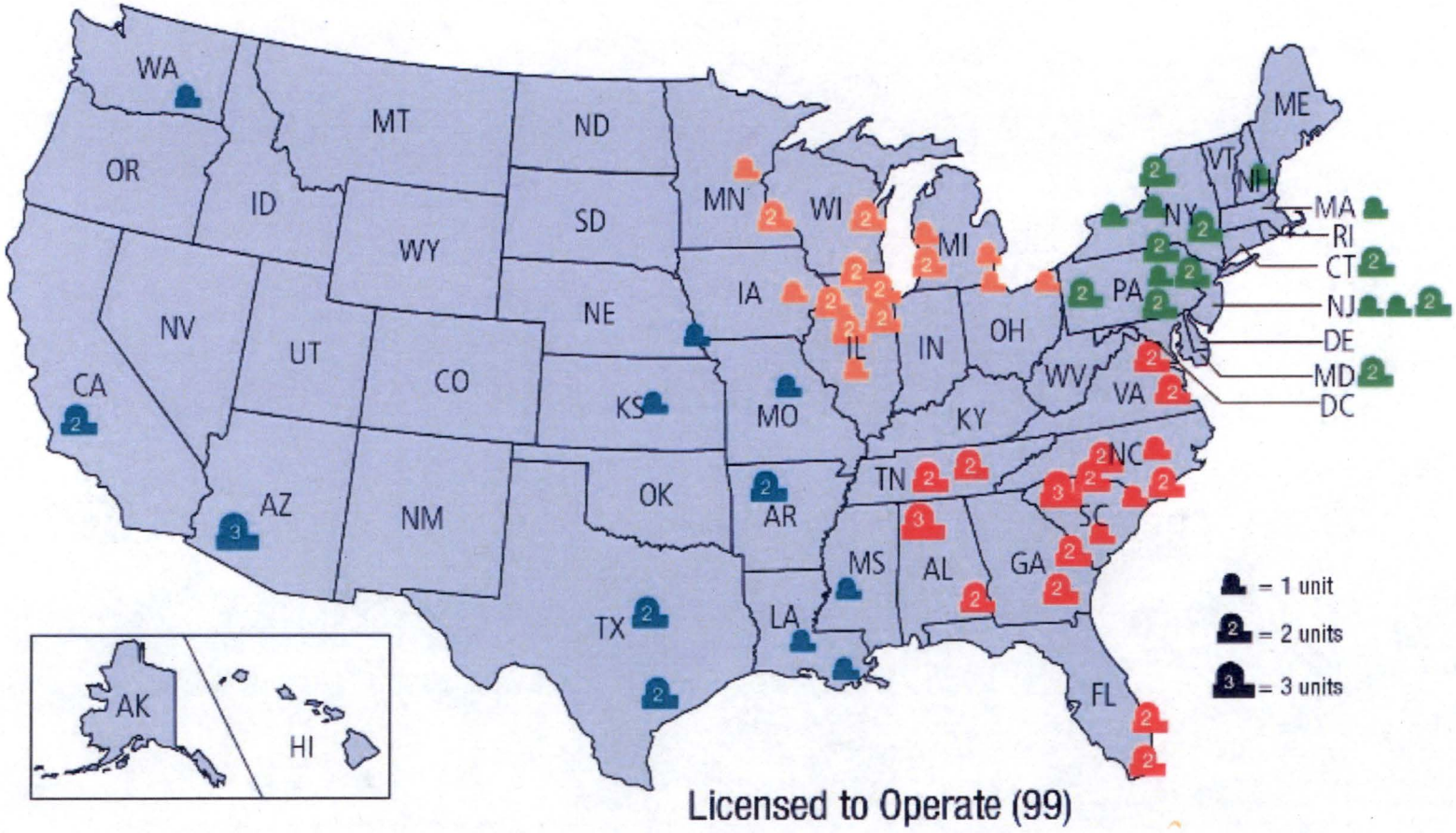
Agenda

- Brian Holian, Acting Director, Office of Nuclear Reactor Regulation
- Shana Helton, Deputy Director, Division of Engineering, Office of Nuclear Reactor Regulation
- Anna Bradford, Deputy Director, Division of Licensing, Siting, And Environmental Analysis, Office New Reactors

Safe and Secure Nuclear Electric Generation



Nuclear Power is a Significant Portion of the U.S. Electric Generation

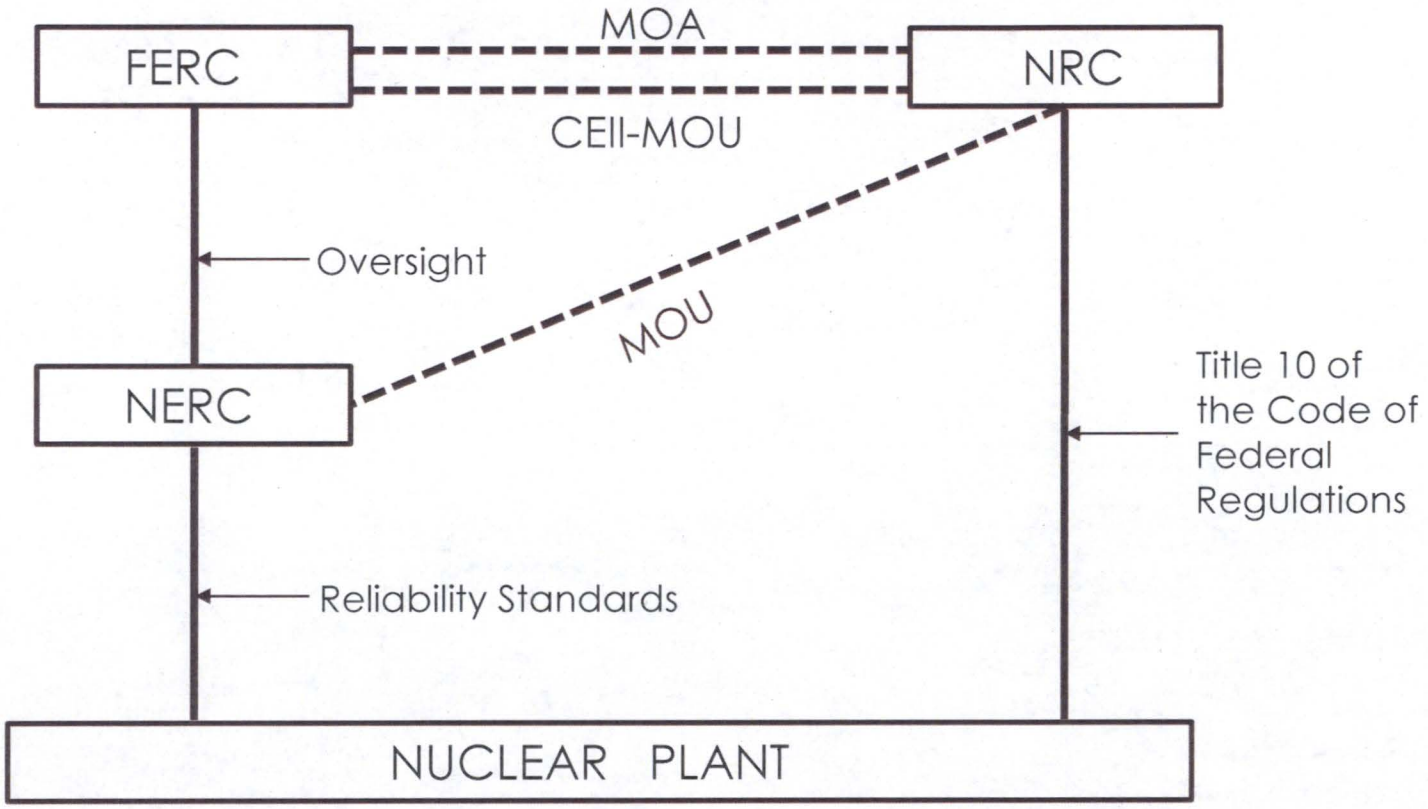


Licensed to Operate (99)

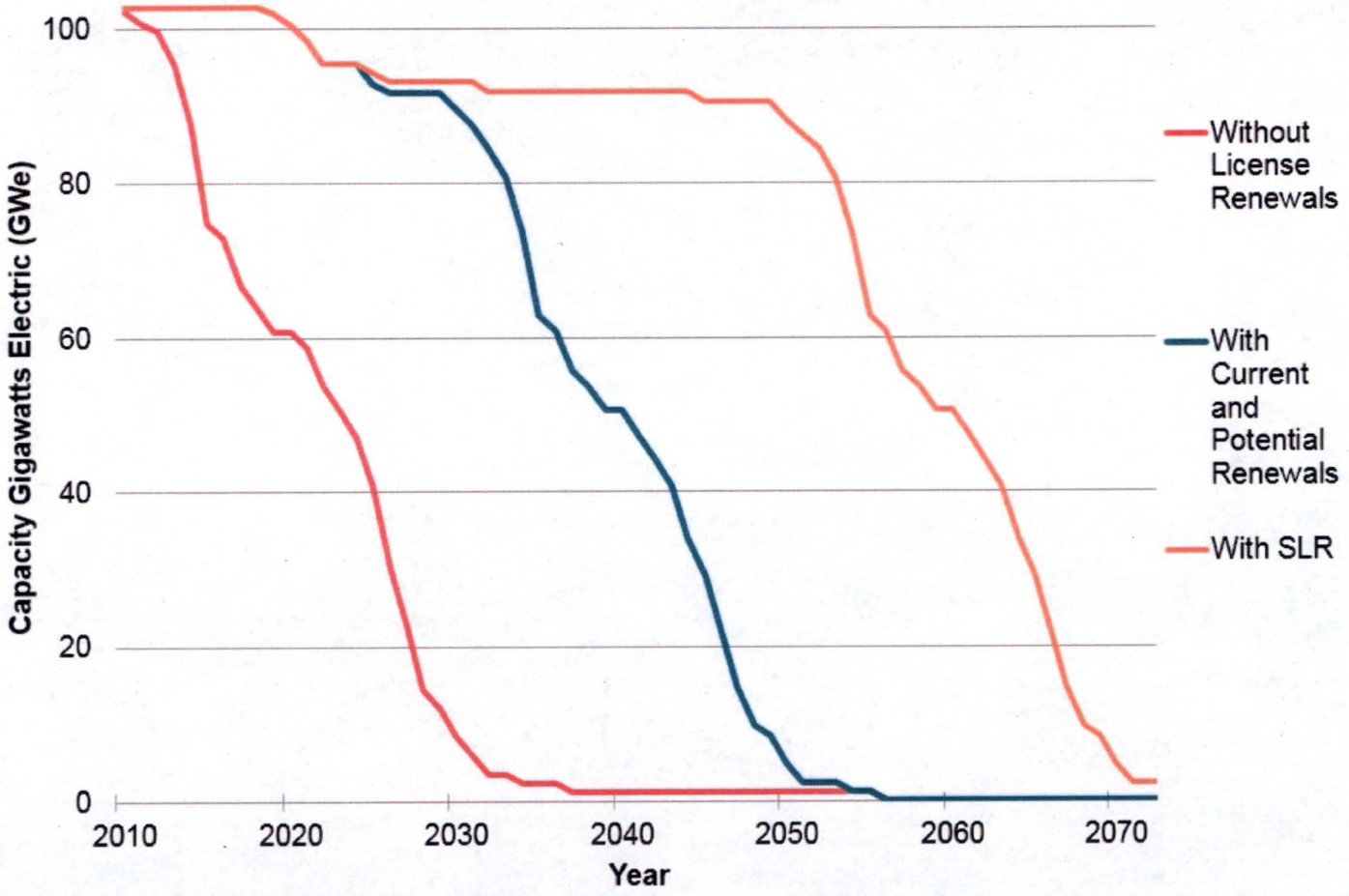
Shana Helton, Deputy Director, Division of Engineering, Office of Nuclear Reactor Regulation

- NRC/FERC/NERC Interactions
- License Renewal
- Subsequent License Renewal
- Decommissioning

Nuclear Safety & Security Enhanced by Interagency Agreements and Interactions



Projected Electric Capacity Dependent on License Renewals

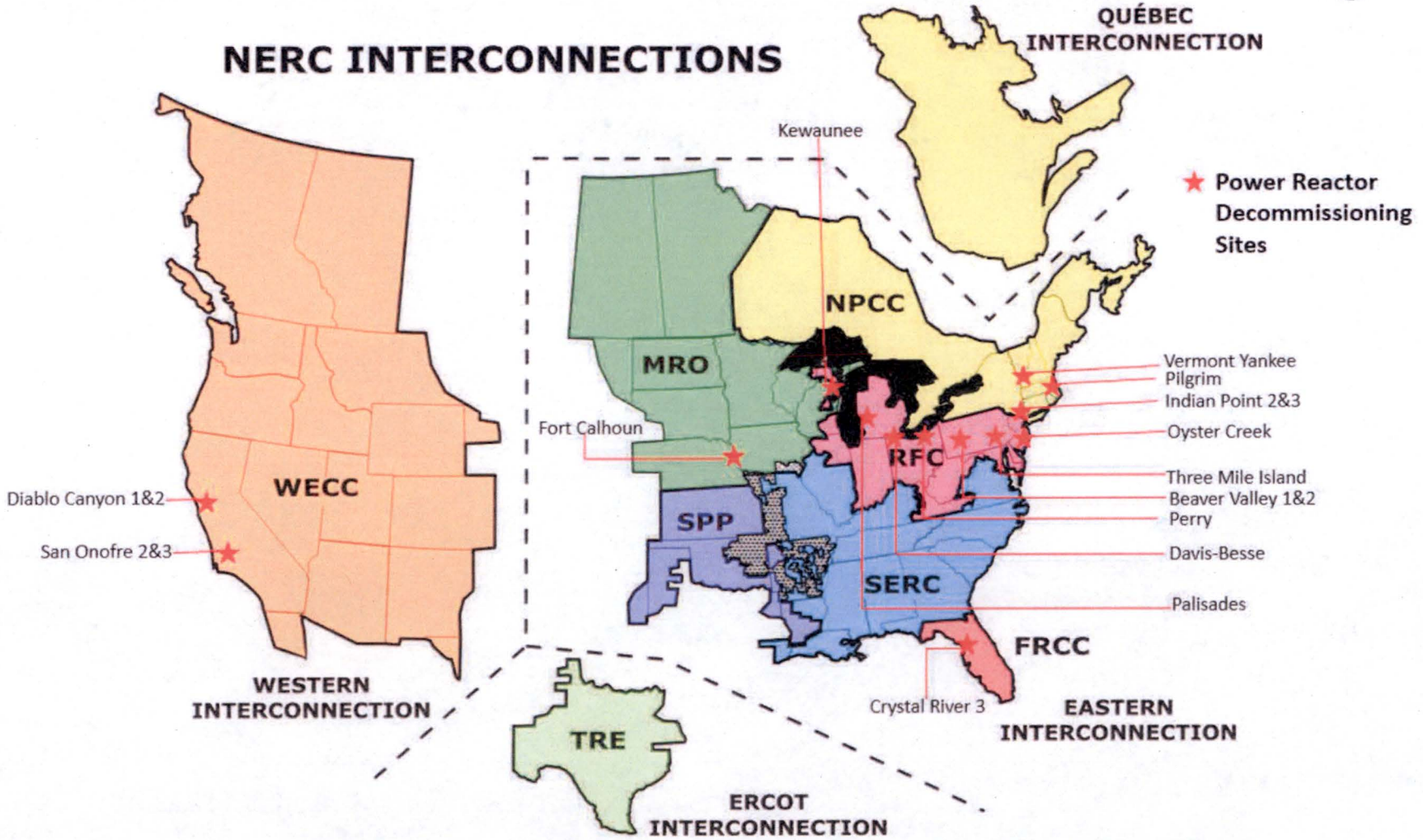


As of May 2018

Subsequent License Renewal (SLR) Moving Forward

- Issued SLR guidance in July 2017 in anticipation of applications
- Reviewing 1 application
- Anticipating 3 more applications between 2018 and 2021
- Making progress on technical issues

Electric Capacity Decreased by Power Reactors Decommissioning



"NERC Interconnections." NERC. Web. 22 May 2018. <https://www.nerc.com>.

Safety Ensured Prior to and During Decommissioning Activities

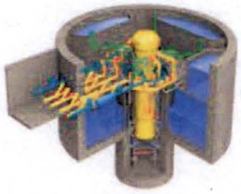
- NRC continues to ensure safety during the entire decommissioning process
  - Timely reviews
  - Draft proposed rule
- Decommissioning rulemaking aligns regulatory requirements to reflect decreased risk at decommissioning sites

Anna Bradford, Deputy Director, Division of Licensing, Siting, And Environmental Analysis, Office of New Reactors

- New Reactors

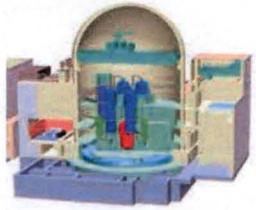
New Reactor Licensing in the U.S.

ABWR –
1,300 MWe



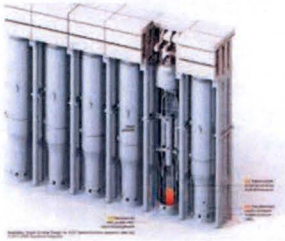
ESBWR –
1,500 MWe

AP1000 –
1,110 Mwe



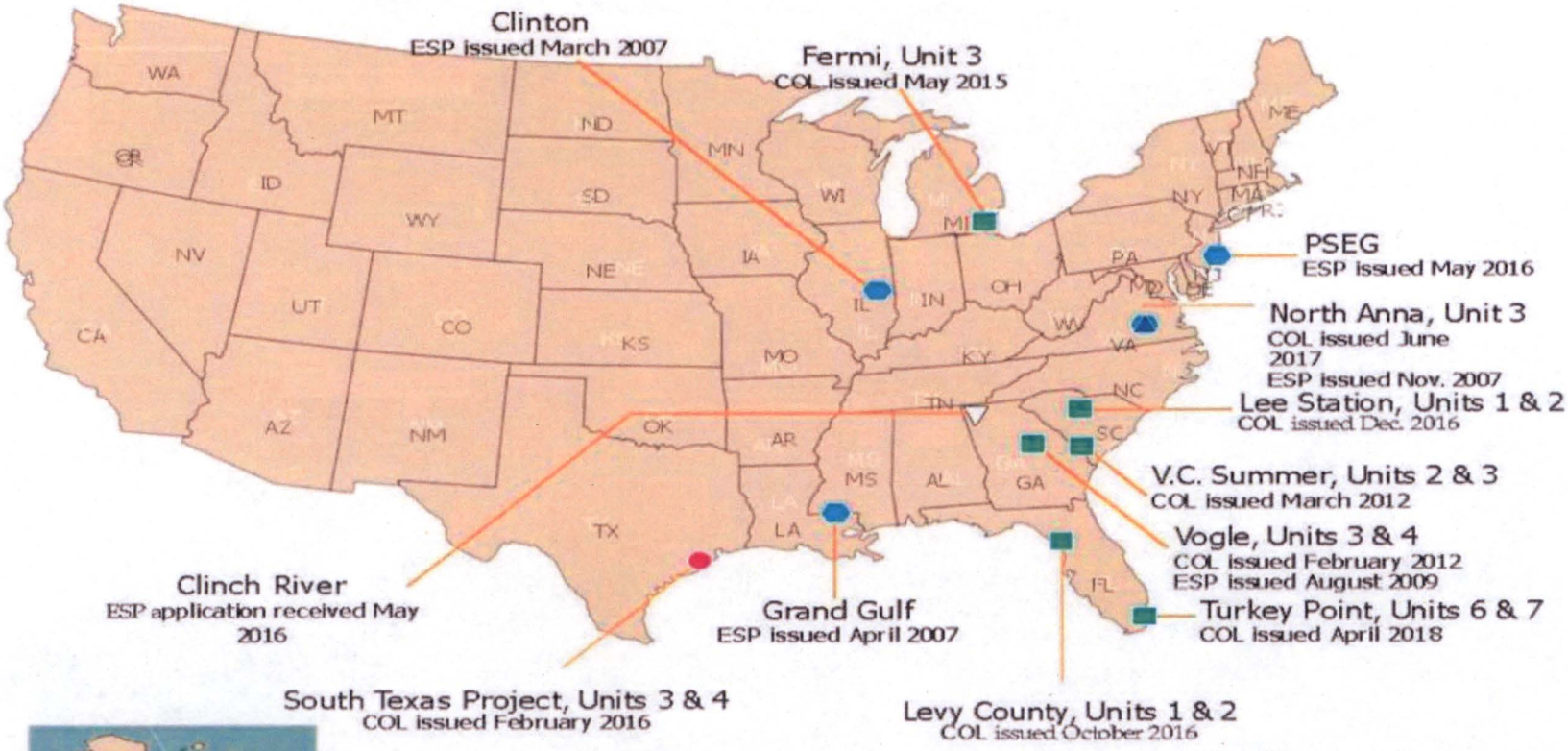
US APWR –
1,700 MWe

APR1400 –
1,450 MWe



NuScale
50 MWe/module

Fourteen Licenses for Light Water Reactors Issued

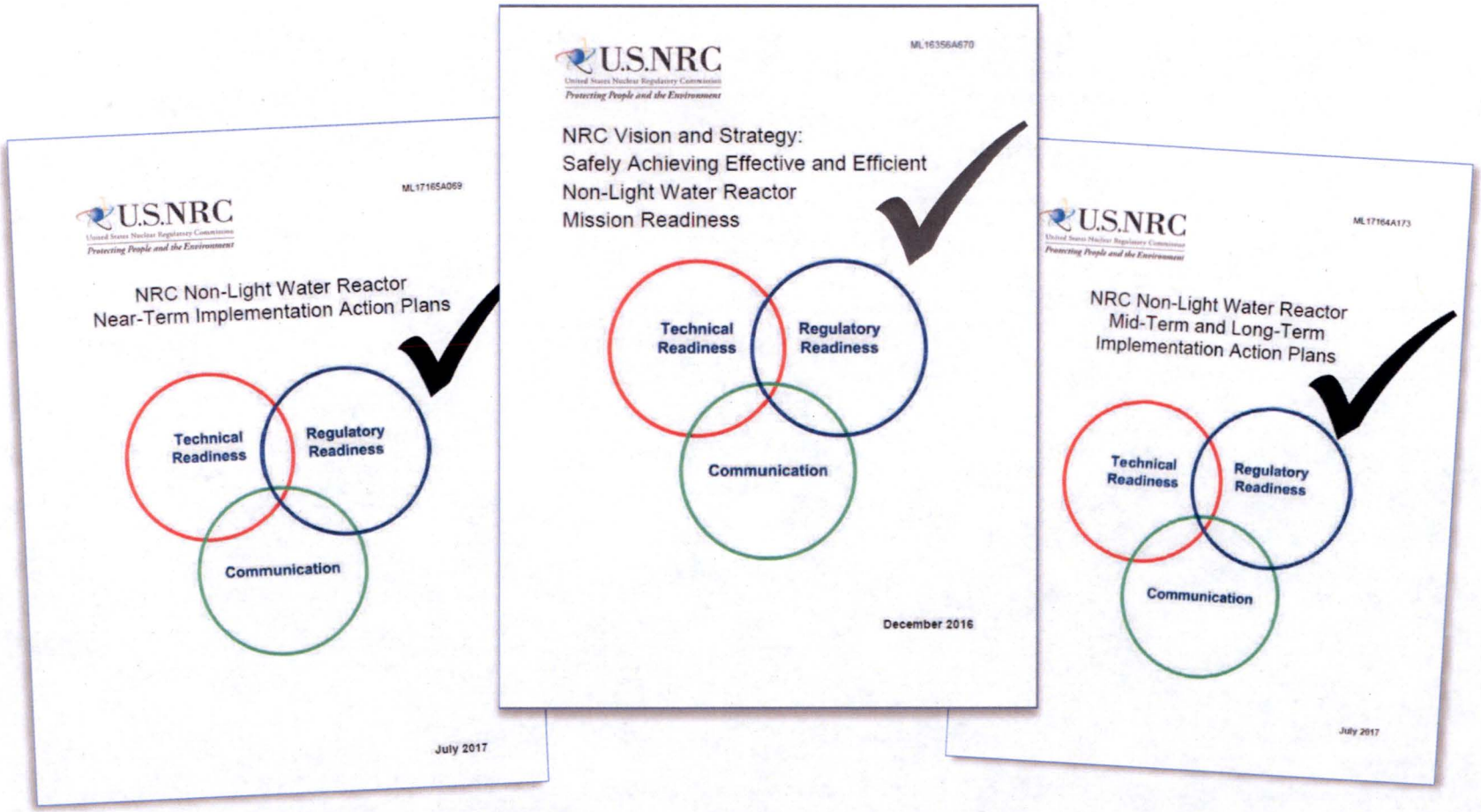


April 2018

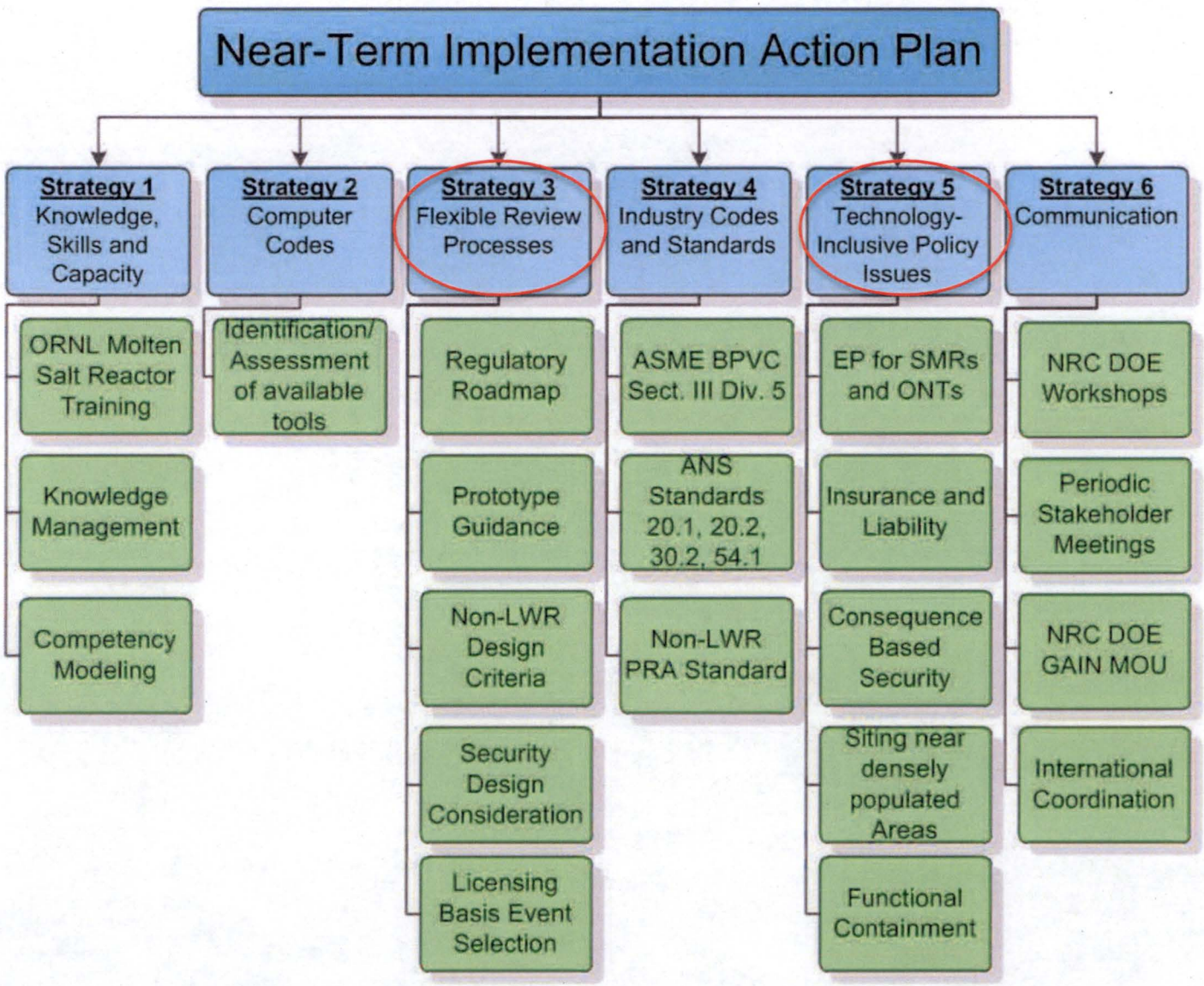
Supporting Small Modular Reactors (SMRs) Efforts

- NuScale Phase 1 review completed on April 16, 2018.
- TVA ESP application for SMR modules submitted in December 2016.
- UAMPS plans to reference the NuScale design.

Executing the Vision and Strategy



Making Progress in the Near-Term



Supporting Early Preapplication Interactions

Developer	Design	Power	Technology
Oklo Inc.	Oklo	~2 MWe*	Compact Fast Reactor
Transatomic Power	Transatomic	Small scale	Molten Salt Reactor
Terrestrial Energy	Integral Molten Salt Reactor (IMSR)	~190 MWe*	Molten Salt Reactor
X-Energy	Xe-100	~76 MWe*	Modular High Temperature Gas-Cooled Reactor (Pebble Bed)
TerraPower	Molten Chloride Fast Reactor (MCFR)	~1000 MWe*	Molten Salt Reactor

*Estimated output based on conceptual design information, subject to change

Acronyms

- CEII – Critical Energy/Electric Infrastructure Information
- ESP – Early Site Permit
- FERC – Federal Energy Regulatory Commission
- IAP – Implementation Action Plans
- MOA – Memorandum of Agreement
- MOU – Memorandum of Understanding
- MWe – Megawatt electric

Acronyms

- NERC – North American Electric Reliability Corporation
- NPP – Nuclear Power Plant
- SLR – Subsequent License Renewal
- SMR – Small Modular Reactor
- TVA – Tennessee Valley Authority
- UAMPS – Utah Associated Municipal Power Systems

U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Cyber Security Activities

NRC/FERC Joint Commission Meeting

June 7, 2018

James Andersen, Director Division of Physical & Cyber Security Policy, Office of Nuclear Security & Incident Response

- NRC Cyber Security History
- Full Implementation of Cyber Security Requirements
- Initial Results of Full Implementation Inspections
- NRC Cyber Security – What's Next

Cyber Security Programs Fully Implemented by Licensees in 2017

- 2002-2003: First cyber requirements
- 2009: Cyber security rule
- 2010: Interagency coordination
- 2012: Milestones 1-7, interim measures
- 2013: Graded-approach
- 2015: Cyber security notification rule
- 2017: Full implementation, Milestone 8

Full Implementation Requires that Licensees Address Multiple Controls

- Technical controls on all direct impact Critical Digital Asset (CDAs)
- Attack mitigation and incident response testing and drills
- Continuity of operations training & testing
- Configuration management

Additional Full Implementation Cyber Security Controls

- Supply chain
  - Adds security requirements relevant to vendors, contractors, and developers
- Ongoing evaluation and management of cyber risk
- Audit and accountability
  - Validates effectiveness of the cyber security program and controls

NRC Inspections Ongoing – Overall Positive Results

- Seven inspections are complete
- Number of inspection findings low
- Areas for improvement may need additional guidance:
  - Portable media & mobile device program
  - Critical digital asset assessments
- Plants under Construction

What's Next for the NRC in this Rapidly Changing Area

- The NRC staff will be conducting an overall cyber security assessment
- NRC staff will continue engagement with Federal Partners
- NRC staff will continue engagement with International Partners

Acronyms

- CDA – Critical Digital Asset
- CSP – Cyber Security Plan
- FERC – Federal Energy Regulatory Commission
- NEI – Nuclear Energy Institute
- NERC – North American Electric Reliability Corporation