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2019 Reliability Technical Conference
Regarding the Bulk-Power System

Docket No. AD19-13-000
Thursday, June 27, 2019
9:00 a.m. - 5:00 p.m.

Federal Energy Regulatory Commission
Commission Meeting Room
888 First Street, NE
Washington, DC 20426

1 Commissioner Neil Chatterjee

2 Commissioner Cheryl LaFleur

3 Commissioner Richard Glick

4 Commissioner Bernard McNamee

5 Panel 1 Panelists:

6 Jim Robb, CEO, NERC

7 Mark Lauby, Senior VP and Chief Reliability

8 Officer, NERC

9 Tim Gallagher, President and Chief Executive

10 Officer, ReliabilityFirst; Lead Representative,

11 ERO Enterprise Executive Committee

12 Jennifer Sterling, Vice President, NERC Compliance

13 & Security, Exelon, on behalf of EEI

14 Jack Cashin, Director, Policy Analysis &

15 Reliability Standards, American Public Power

16 Association

17 Nick Brown, President and CEO, SPP, on behalf of

18 the ISO/RTO Council

19 Peter C. Balash, Ph.D., Senior Economist, United

20 States Department of Energy's National Energy

21 Technology Laboratory, NETL

22 Panel 2 Panelists:

23 Ashley Mahan, Acting Director, FedRAMP

24 Antiwon (AJ) Jacobs, Chief Information Security

25 Officer, Sacramento Municipal Utility District

1 David Rosenthal, Director, Incident Response &
2 Systems Recovery, Midcontinent Independent System
3 Operator, Inc., (MISO)

4 Michael Ball, Vice President & Chief Security
5 Officer, Berkshire Hathaway Energy

6 Brenda Lyn Truhe, CIP Senior Manager, PPL Electric
7 Utilities

8 Michael South, Americas Regional Leader, World
9 Wide Public Sector Security & Compliance, Amazon
10 Web Services

11 Panel 3 Panelists:

12 Dede Subakti, Director, Operations Engineering
13 Services, CAISO

14 Bruce Rew, Vice President of Operations, SPP

15 Melissa Seymour, Executive Director of Seams
16 Coordination, MISO

17 Michael Bryson, Vice President of Operations, PJM
18 Interconnection

19 Asher Steed, Manager, Provincial Reliability
20 Coordination Operations, BC Hydro

21 Commissioner Jordan White, Commissioner, Utah
22 Public Service Commission on behalf of Western
23 Interconnection Regional Advisory Body (WIRAB)

24 Panel 4 Panelists:

25 Mike Brozek, Sr., Vice President, Technology and

1 Engineering, Anterix (formally pdvWireless)
 2 JP Brummond, Vice President, Business Planning,
 3 Alliant Energy, on behalf of EEI
 4 Joy Ditto, President and CEO, Utilities Technology
 5 Council (UTC)
 6 John Marinho, Vice President Technology and Cyber
 7 Security, CTIA
 8 John W. Kuzin, Vice President and Regulatory
 9 Counsel, Qualcomm Incorporated
 10 Steve Lowe, Strategy Director, AT&T's IoT Utility
 11 Grid Modernization and Smart City Solutions

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P R O C E E D I N G S

1 Opening Remarks and Introductions

2 COMMISSIONER CHATTERJEE: Good morning,
3 everybody. Good morning.

4 Welcome to the Commission's annual
5 reliability tech conference. This is one of the
6 most important technical conferences that we hold
7 each year, and I thank each of our panelists for
8 coming here to be with us today. Safeguarding the
9 reliability and security of the nation's bulk
10 power system is one of the most important
11 responsibilities that we have here at the
12 Commission.

13 It is one that we share with NERC and
14 the regional entities. Since the passage of
15 EPAct 05 the industry has made major strides
16 toward a more reliable and secure grid, which
17 could not have been accomplished without a
18 concerted effort from the Commission, NERC, the
19 regional entities and everyone in industry.

20 While we have accomplished much over the
21 past 14 years, we can't rest on our laurels.

22 Building on all that we have
23 accomplished requires maintaining open, honest
24 lines of communication and relentless focus on
25 continual improvement.

1 This annual technical conference is an
2 important forum for addressing both of those
3 objectives. During today's technical conference,
4 we'll focus on four fundamental topics.

5 First, the status of the electric
6 reliability organization and overall assessment of
7 the current state of reliability.

8 Second, the impact of cloud-based
9 services and virtualization as more and more
10 utilities adopt this technology.

11 Third, reliability coordinator seams
12 issues.

13 And fourth, the impact of changes in
14 communication and the potential impacts on the
15 BES. I look forward to hearing the views of our
16 panelists on each of these important topics.

17 Before we get started, I'd like to
18 mention a few housekeeping matters. No food or
19 drink allowed in the Commission meeting room, only
20 bottled water.

21 Please turn off your cell phones. For
22 Wi-Fi access, please see the table outside the
23 meeting room for the guest wireless network rules
24 and behavior which includes the instructions for
25 signing into the Wi-Fi. We're going to break for

1 lunch at 12:30. We will resume at 1:30 with the
2 reliability coordinator seams panel.

3 Hearing Room 2 is available for storing
4 bags and for overflow. I will be stepping out
5 during the second panel and returning for the last
6 panel on communications. In my absence,
7 Commissioner McNamee has graciously agreed to
8 chair those panels.

9 Finally, I'd like to remind the
10 panelists that we're somewhat time constrained, so
11 we'd like to limit individual statements to no
12 more than four minutes. The clock will be at the
13 table. While it's not a hard stop, in the
14 interest of hearing from all the panelists and
15 allowing for the discussion, I'd ask that you
16 highlight the major points for your statements
17 rather than reading statements.

18 And then now for the security statement.
19 Members of the public are invited to observe,
20 which includes attending, listening, and taking
21 notes, but does not include participating in the
22 conference or addressing the Commission. Actions
23 that purposely interfere or attempt to interfere
24 with the commencement or conducting of the
25 conference or inhibit the audience's ability to

1 observe or listen to discussions, including
2 attempts by audience members to address the
3 Commission while the meeting is in progress, are
4 not permitted.

5 Any persons engaging in such behavior
6 will be asked to leave the building. Anyone
7 refuses to leave voluntarily will be escorted from
8 the building.

9 And, finally, we will not have a general
10 Q and A with the audience during the conference;
11 however, we will accept written post-technical
12 conference comments, in Docket Number AD19-13. A
13 formal invitation for those comments including
14 submissions and deadlines, will be issued in the
15 near future.

16 With that, I will turn to my colleagues
17 for any opening statements.

18 COMMISSIONER LaFLEUR: Thank you, Mr.
19 Chairman.

20 I'd also like to welcome everyone
21 to today's conference. I know a lot of people
22 have flown to be here, and I particularly want to
23 thank all of the panelists at all four of the
24 panels.

25 This is the day that I look forward to

1 every day -- every year. It's a very important
2 conference, and one that I really enjoy. And I'm
3 particularly excited about the first panel, where
4 we take a broad look at the state of reliability
5 and the work of the ERO, including the REs, and
6 all of our collective works and what we should be
7 doing more of.

8 I have piles of questions prepared, but
9 I'm going to add what I'm sure will be the most
10 value that I'll add all day, which is to say, I
11 have had a lot of meetings in this room, and on a
12 day like today, it gets really, really hot. So
13 I'm going to take off my jacket if it gets hot,
14 and I strongly invite all of the panelists to.
15 Because it's going to be 90-something degrees out
16 there. And I'm sure by the third panel, we'll be
17 feeling it. So a bit of housekeeping. Thank you.

18 COMMISSIONER GLICK: Thanks.

19 Mr. Chairman, I'll be brief. I just first
20 wanted to thank actually Lodie White and OEQ staff
21 for all their hard work in putting together this
22 conference.

23 They did a lot of work, put together a
24 lot of a very voluminous briefing books. I really
25 appreciate everybody's efforts here, and I also

1 want to thank the panelists for traveling from
2 across the country to be here today.

3 As everyone knows, it's a very exciting
4 time to be in the energy industry. There's a lot
5 happening, a lot of rapid transformation. And
6 these changes do present some challenges. But
7 that doesn't mean we necessarily need to return to
8 the grid of yesterday, instead we just need to
9 figure out ways to address the needs so we can
10 reach the grid of the future.

11 Today's technical conference focuses on
12 some of the most interesting changes to our
13 system, from leveraging new technologies to using
14 cloud services, and virtualization, to electric
15 companies' increasing needs for spectrum and how
16 to improve coordination and operations across the
17 seams today.

18 I look forward to hearing from everybody
19 today, and I think we're going to have a very good
20 discussion. Thank you.

21 COMMISSIONER MCNAMEE: I also want to.
22 thank the panelists and the FERC Staff for their
23 work on this, and this is my first conference for
24 the reliability, and it's one that I've been
25 looking forward to because it is so vitally

1 important, especially with the transformation of
2 the grid, and the convergence of new technologies
3 and communications technologies, and, of course,
4 the various threats.

5 It used to be we just worried about the
6 weather-beating reliability. Now we're worried
7 about man-made actors, both on the physical and
8 cyber levels.

9 And so I'm looking forward to hearing
10 about the various issues that are going to come as
11 we go to virtualization, cloud-based services, the
12 use of spectrum, and how different agencies in the
13 federal government are looking at it, and how the
14 utilities use it. And I think that it's easy when
15 we're here in this job just to focus on the
16 day-to-day work, looking at tariffs, looking at
17 rates, but one of the most important things we do
18 is dealing with reliability. And so I thank each
19 of you for being here, for taking the time, for
20 everybody at FERC and at NERC for taking the time
21 because we needed to stay focused on this. And
22 this is something very important. Thank you.

23 COMMISSION CHAIRMAN CHATTERJEE: Thank
24 you.

25 Then we'll turn it over to our panel,

1 starting with Jim Robb.

2 MR. ROBB: Thank you, Mr. Chairman.

3 I want to thank the Commission for the
4 opportunity to be here this morning. As we all
5 know, electricity's an essential component of
6 modern society. And by conducting this conference
7 every year, you underscore the high priority the
8 Commission places on reliability and security of
9 the power system in our respective
10 responsibilities to the citizens of the United
11 States, the nearly 400 million people across North
12 America that depend on a reliable electricity
13 supply for their every day lives.

14 Although we don't have our hands on any
15 controls, the work of FERC, NERC, and the regional
16 entities serves to strengthen the fabric of the
17 industry.

18 I think we can all take pride in
19 recognizing that the reliability and security of
20 the grid is strong and continues to improve. As
21 our recent State of Reliability Report --
22 Assessment reported, 2018 was one of the best
23 performing years we've had in recent memory.

24 And this is all the more remarkable when
25 you consider the transformational change going on

1 in technology, fuel mix, the deployment of more
2 digitized and distributed resources, and the
3 persistent security threats from determined
4 adversaries. But with continued diligence and
5 vigilance, I'm quite confident that the
6 electricity sector will continue to navigate the
7 challenges in front of it.

8 Last year when I was here, I identified
9 three thematic priorities that we continue to be
10 very focused on within the ERO enterprise.

11 First among them are the issues
12 surrounding security of the system. Last year, we
13 sorted out the leadership of the E-ISAC, and our
14 team there is now highly focused on the execution
15 of the five-year strategic plan that was put in
16 place. The early returns from that work are good
17 as we have expanded our watch capability and our
18 analytical capabilities, and continue to develop
19 new tools for communicating information to
20 industry, such as our recently established
21 All-Points Bulletins.

22 Supply chain remains a significant and
23 challenging issue, as we all know. We are
24 preparing to issue a 1600 data request to better
25 inform our thinking on the next steps to improve

1 the effectiveness of the supply chain and CIP
2 standards in general as well as a NERC alert to
3 gather more specific data on the extent of use of
4 certain Chinese-manufactured equipment on the bulk
5 power system.

6 Now that EPRI's finished its technical
7 work on EMP, we have a team working with industry
8 experts to determine the right regulatory approach
9 to secure key facilities from an EMP event, and
10 we're exploring opportunities to revamp certain
11 standards to allow for prudent and secure use of
12 cloud-based services by focusing on the security
13 of information and data, as opposed to security of
14 the equipment itself.

15 The secondary key focus for us right now
16 are the RC transitions that are occurring in the
17 Western Interconnection. NERC and WECC are
18 laser-focused on the certification of the emerging
19 RCs and ensuring that the appropriate
20 information-sharing and coordination mechanisms
21 are in place to ensure seamless operation among
22 them.

23 The third area are all of the issues
24 surrounding the rapidly changing resource mix
25 that's occurring in the industry.

1 As we reported last year, the pace of
2 that transition is critical and needs to be
3 managed to ensure ongoing fuel and resource
4 adequacy to serve load while addressing a couple
5 of really important reliability challenges as we
6 move from a solid, liquid fuel-based industry to
7 one that's much more stochastic in nature.

8 The first is how to best integrate
9 inverter-based resources.

10 Since we met last year, we've issued a
11 reliability guideline on inverters and are
12 currently working on an important modification to
13 our PRC standards to address many of the issues we
14 have learned and uncovered from the use of these
15 resources.

16 Last year, I also pledged that we would
17 pivot from admiring the problems associated with
18 increasing use of natural gas in the system, to
19 focusing attention on developing solutions and
20 resolving many of the planning, operating, and
21 increasingly security issues related to the
22 interdependence of the two industries.

23 Mark Lauby will discuss in more detail
24 some of the work that our electric gas working
25 group, which we've chartered to address these

1 issues, in a few minutes.

2 In terms of leading NERC in the ERO
3 enterprise, we have two major priorities right
4 now. The first is capturing the series of
5 effectiveness and efficiency opportunities with
6 the near-term focus on what we call the "big
7 three."

8 First of that is the standards
9 efficiency review, where according to the
10 Commission's approval of the retirement, we have
11 proposed coming out of Phase I, and are currently
12 working now on Phase II opportunities to include a
13 review of the CIP standards.

14 Second is completing the development and
15 deployment of the aligned CMEP data and work
16 management tool across the enterprise. This will
17 improve security of our activities, enable better
18 reporting and performance management of our CMEP
19 processes and assure a higher level of executional
20 consistency across the regional entities.

21 And the third area is reimagining our
22 stakeholder engagement structure, to better align
23 our committees with the emerging realities of the
24 industry, more integration across previously
25 siloed disciplines, and to bring more focus on

1 developing discrete deliverables through
2 mission-driven task forces.

3 Lastly, I'd be amiss if I didn't comment
4 that we're also quite focused on capturing what we
5 would all think of as a once-in-a-lifetime
6 opportunity to renew the way NERC and the regional
7 entities come together to execute our shared
8 mission.

9 Over the last 18 months, the enterprise
10 has undergone significant structural and social
11 change and these have unlocked mine and my
12 colleagues' imaginations as to how we can best
13 work together to embrace the brilliance of the
14 regional model and make it work as a single
15 synchronous machine.

16 I look forward to discussing these and
17 other issues with you later today, so thank you
18 very much for the opportunity.

19 MR. LAUBY: Thank you also for the
20 opportunity to participate in today's panel.
21 FERC's annual reliability technical conference has
22 become a premier venue to discuss the state
23 of reliability and peer into the horizon for
24 emerging reliability risks and potential
25 mitigations to those risks.

1 I'll focus my remarks on two areas.

2 First key findings of our state reliability
3 report, and then the status of two priority areas:
4 Electromagnetic pulse and natural gas delivery.

5 Last week, we published our annual State
6 of Reliability Report, which identifies
7 reliability and performance trends, actions needed
8 to address risks and whether mitigations are
9 working or if there are other interventions that
10 are necessary.

11 Our goal with this report is to inform
12 regulators, policymakers and industry leaders.

13 Based on the metrics that the ERO
14 enterprise tracks, on average, 2018 was a good
15 year for reliability, and North America's bulk
16 power system remains highly reliable.

17 Extreme weather continues to be a
18 leading contributor to transmission, generation,
19 and load loss. Yet the total number of load loss
20 events was lower than our prior four years. There
21 was no significant non-weather-related events. In
22 addition, not including inconsequential load loss
23 or load loss due to distribution oddities, 99.92
24 percent of the time in 2018, there were no
25 operator-controlled firm load shed.

1 Frequency response improved for all
2 interconnections. While protection system
3 misoperations ticked slightly higher in 2018, we
4 are still seeing a statistically significant
5 downward trend over a five-year period. To
6 address inverter-based resource unplanned and
7 widespread loss during routine transmission line
8 outages, we remain focus on implementing the
9 guidelines, clarifying reliability standards, and
10 increasing industry engagement on device
11 performance.

12 The ERO enterprise continues to monitor
13 performance of gas-fired power plants during cold
14 weather, and have paid close attention to the
15 performance, since the polar vortex. Although
16 there have been significant improvements, issues
17 persist in certain areas.

18 Texas is another focus area, as there's
19 projected lower than targeted reserve margins in
20 2019. We remain concerned about the ERCOT
21 resource adequacy this summer, but acknowledge
22 that ERCOT and its generators have successfully
23 navigated low reserve margins in previous summers.

24 In 2018, despite continued threats,
25 there were no reported cyber or physical attack

1 incidences that resulted in unauthorized control,
2 action or loss of load.

3 At the same time, we are mindful of the
4 need to continue our vigilance, and we thank the
5 Commission for approving NERC's petition regarding
6 the enhanced cyber reporting.

7 Based on these findings, NERC recommends
8 continued focus on understanding, modeling, and
9 planning for the bulk power system transformation,
10 or sometimes I call it the metamorphosis, with
11 particular focus on frequency of response,
12 inverter-based resource issues, and resource
13 adequacy including capacity and energy.

14 The ERO and the industry should also
15 develop measurement and metrics for resilience,
16 and there should be continued close collaboration
17 on physical and cyber security.

18 On the electromagnetic pulse or EMP,
19 with the completion of that research, or first,
20 I'll say, second phase of the research, we have
21 launched a task force to identify key areas of
22 concern and potential areas for improvement.

23 The task force will submit best
24 practices, reliability guidelines, and develop, if
25 needed, any standard authorization requests.

1 That's targeted for near the end of the year.

2 In regards to natural gas, NERC's
3 planning committee has formed the Electric Gas
4 Working Group, which is developing an industry
5 guideline on fuel assurance.

6 This guideline will address natural gas
7 pipeline contingency risk and set the stage for
8 industry action that might include enhancing
9 existing or creating new reliability standards.
10 The working group expects to also complete their
11 work also by year end.

12 So I thank the Commission for having us
13 here today. And I look forward to additional
14 conversation on these issues.

15 MR. GALLAGHER: Thank you for inviting.
16 me. Commissioner LaFleur, I'm really going to
17 miss working with you. I want to thank you for
18 What you've done during your tenure for
19 reliability. You've been fantastic.

20 COMMISSIONER LaFLEUR: Thanks a lot,
21 Tim. Thank you.

22 MR. GALLAGHER: So I'm here as one of.
23 the regional entities, so I'm going to give you
24 some regional entity perspective on the issues
25 that you've provided in your agenda.

1 The regions share the ERO-wide risk
2 priorities that were identified in NERC's data
3 reliability report, and I'm going to highlight
4 some of those in just a few moments. But first, I
5 do want to note, however, that reliability and
6 security risks can vary across the regions, due to
7 the regions' unique geographical locations,
8 electrical system configurations, and load
9 density.

10 To account for these variations, the
11 regions do conduct separate regional risk
12 assessments for each region to prioritize the NERC
13 risk elements facing our individual footprints,
14 and to include these unique regional risks and
15 considerations.

16 That's one of the real tangible benefits
17 of the delegated model that forms the basis of the
18 ERO and demonstrates the value of having
19 complementary and sometimes supplemental regional
20 analysis performed that gives us the ability to
21 identify very specific risks particular to our
22 footprints and to work closely with industry in a
23 collaborative fashion to identify avenues to
24 address those risks.

25 Regarding ERO-wide risks facing the

1 industry, cyber and physical security continues to
2 be a major area of focus in regions.

3 While many of the entities we work with
4 have very successful cyber security programs, we
5 have also seen some of our entities face
6 significant challenges in this area, given the
7 rapidly evolving nature of the threats that
8 they're dealing with.

9 So we must stay vigilant and constantly
10 work to identify and mitigate risks in this area.

11 And we must do that before the risks are
12 realized.

13 I'm proud of the work that we've done to
14 date with our industry partners to help improve
15 their CIP programs, their cultures. And we've
16 provided extensive outreach efforts to them in
17 this process, including things such as assist
18 visits, workshops, and reports.

19 Another key ERO-wide risk area, involves
20 the interdependencies and complexities surrounding
21 gas and electric coordination, the deployment of
22 new technologies, virtualization, which is
23 something you'll hear about later today, and the
24 changing nature of our power system.

25 But I always look at these changes as

1 positive opportunities for us to impact this in a
2 positive way. We can restructure things, plan for
3 these things and build in protections as we
4 redesign and the power system changes on us. So
5 it's not all dangerous and bad when the system
6 does change.

7 NERC and the regions do play a key role
8 in addressing the risk of high impact, low
9 frequency events such as catastrophic gas pipeline
10 failures and EMP.

11 It's important that we study these risks
12 and that we share our knowledge across the
13 industry and with policymakers. Just as Jim said,
14 although we don't have our hands on levers, we
15 certainly can influence and provide information
16 and direction.

17 Specifically NERC and the regions can
18 provide value by studying these areas to identify
19 emerging risks and common failure modes, to
20 identify preventative measures and mitigating
21 actions for these, and to identify the root causes
22 learned from actual events.

23 Efforts to enhance the resilience of the
24 electric grid are necessary to help withstand and
25 recover from these high impact, low frequency

1 events when they do occur, and NERC and the
2 regions have increased our focus on resilience in
3 recent years.

4 The recent regional entity changes have
5 helped to levelize the size and risk and breadth
6 and depth of the work that's done across the
7 regions, and it better positions the regions to
8 perform our critical roles to ensure the
9 reliability and security of the grid.

10 And I can say with confidence that the
11 regions always engage in continuous improvement
12 and we do preach this to the industry, and we
13 practice it ourselves.

14 So we're always seeking to further
15 enhance our efficiency, our effectiveness, and our
16 consistency. One key effort there is the Align
17 tool that Jim mentioned that's going to be a
18 common compliance monitoring system for all of the
19 entities across North America.

20 The regional boots on the ground model
21 enhances reliability and security in numerous
22 important ways. And I spoke earlier regarding the
23 fact that risks can vary across the regions due to
24 our distinctive geographic and electrical
25 configurations and the realities of each regional

1 footprint.

2 As such, the regions do serve as the
3 experts for these evolving risks and varying
4 issues facing their particular areas of the
5 country. Moreover, the regions have over a decade
6 now of firsthand experience from thousands of
7 engagements with entities on how to best mitigate
8 these risks and drive them to its improvement.

9 This includes important activities that
10 occurs outside our traditional tools, such as
11 standards and enforcement and auditing.

12 As we all know, threats to the grid are
13 rapidly evolving, and we must work to stay ahead
14 of these threats to ensure reliability and
15 security. The regions live on the front lines of
16 reliability and we're well positioned and well
17 equipped to identify these threats from various
18 inputs, including event analyses, compliance
19 monitoring enforcement activities, reliability
20 assessments and data analytics.

21 Once we identify a threat, we need to
22 prioritize which of our tools we're going to use
23 to address it. Standards are absolutely essential
24 to our reliability mission and are especially
25 appropriate for addressing widespread,

1 well-understood risks that ensuring uniform
2 performance is key to addressing.

3 So this concludes my remarks. Again, I
4 thank you for inviting me. I look forward to your
5 questions.

6 MS. STERLING: Good morning. I am
7 Jennifer Sterling, the vice president of NERC
8 Compliance and Security for Exelon.

9 On behalf of EEI and EEI's members,
10 thank you for the opportunity to participate in
11 today's technical conference and for providing an
12 important forum to discuss the status of the ERO
13 and the reliability of the bulk electric system.

14 As I am sure you are aware, Exelon's
15 family of companies represents every stage of the
16 energy value chain, through our six utilities, our
17 generators and our retail electric service
18 provider.

19 Today, I will focus on the pace of
20 change to the grid, the need for coordination and
21 the information sharing and protection to support
22 grid reliability.

23 The greatest challenge the electric
24 industry faces today for maintaining reliability
25 is the rapid pace of change to the grid due to new

1 policies, customer preferences, and new
2 technologies that seek to provide cleaner, more
3 efficient electricity to customers. However, the
4 threats, such as malicious actors seeking to
5 access control and potentially disrupt the grid,
6 are also increasing.

7 Meanwhile, the grid is becoming more
8 dependent on other sectors, including but not
9 limited to manufacturers and service providers of
10 cyber systems, communications, and fuel supplies
11 such as natural gas.

12 The CIP standards have established a
13 comprehensive set of security requirements to
14 support reliability of the bulk power system.

15 However, the pace of change to the
16 mandatory CIP standards has been and continues to
17 be substantial since they originally became
18 enforceable nearly 10 years ago.

19 Meanwhile, some of the current CIP
20 requirements may not be flexible enough to keep up
21 with new and evolving technologies, such as cloud
22 services and virtualization, which will be
23 discussed in greater detail in another panel.

24 EEI encourages NERC and FERC to seek new
25 and innovative approaches to address these

1 changes, as the NERC reliability standards alone
2 may not be sufficient to address emerging risks to
3 reliability in a timely manner.

4 For new risks, research and analysis
5 will be needed to identify appropriate technical
6 solutions. For example, at the end of April, EPRI
7 released their latest report on the impacts of
8 EMP.

9 NERC has since established an EMP task
10 force to identify and address EMP reliability
11 concerns. While the task force has an aggressive
12 schedule, the approach outlined is methodical and
13 structured to ensure adequate analysis for
14 managing the risks.

15 In addition to risks from new
16 technology, the Commission is rightly focusing
17 more on risks introduced by other sectors. We
18 encourage the Commission to continue to
19 proactively coordinate with other industries such
20 as natural gas and communications providers, and
21 their respective regulators, and to work closely
22 with those federal agencies responsible for
23 national security to address these cross-sector
24 risks.

25 The Commission's collaboration with DOE

1 for the March Technical Conference on security
2 investments was a good start to ensure continued
3 grid reliability.

4 The industry has and continues to invest
5 significant resources in the E-ISAC operated by
6 NERC to provide timely and voluntary sharing of
7 security threat information.

8 Industry executives are working with the
9 E-ISAC on a multiyear plan to expand and
10 strengthen the value of the E-ISAC. We encourage
11 the Commission to continue to support this effort.

12 Success will require robust information
13 sharing and collaboration between industry, NERC,
14 and the federal government to identify risks, and
15 will require each of these entities to protect
16 sensitive information.

17 In conclusion, I appreciate the
18 opportunity to participate in this technical
19 conference, as it provides a needed forum to
20 discuss the important issues associated with
21 reliability.

22 We look forward to collaborating with
23 the Commission, NERC and stakeholders in
24 considering solutions that support our collective
25 efforts to ensure continued reliability and

1 security of the bulk electric system. Thank you.

2 MR. CASHIN: Good morning. And thank
3 you for the opportunity for Public Power to
4 participate in the 2019 Reliability Technical
5 Conference.

6 As the agenda for this year's conference
7 shows, electric industry stakeholders including
8 the Commission continue to face important
9 questions about how to best protect and maintain
10 reliability of a bulk electric system in an
11 evolving landscape, where technological changes
12 can present both risks and opportunities.

13 NERC and the regional entities play a
14 central role in maintaining the EAS reliability.
15 And I commend the Commission for convening this
16 panel to explore how NERC and the regional
17 entities in coordination with industry
18 stakeholders can best accomplish this common
19 mission. I appreciate the chance to share the
20 perspective of the American Public Power
21 Association on the select panel issues.

22 As the Commission knows, there are 2,000
23 public power utilities, big and small, throughout
24 the nation. And while 12 percent of that number
25 are NERC-registered entities, all public power

1 utilities share an interest in supplying secure,
2 low-cost, reliable electric service.

3 I look forward to discussing all the
4 issues the Commission has identified in the
5 notice, but in my introductory remarks, I'd like
6 to focus on two points.

7 First, as an overarching priority, the
8 Commission, NERC and industries, collaborative
9 reliability regimes should continue to maintain a
10 focus on operational efficiency and effectiveness.

11 In 2018, NERC initiated a process to
12 identify and evaluate opportunities to improve the
13 ERO enterprise, effectiveness, and efficiency,
14 including the effectiveness and efficiency of NERC
15 stakeholder engagement and operations of the ERO
16 enterprise.

17 APPA is encouraged that NERC continues
18 to engage in this effort. This is not to suggest
19 that NERC should simply concentrate on cost
20 savings or cutting back processes and procedures.
21 Greater efficiency should not come at the expense
22 of reduced effectiveness.

23 For example, increased spending on the
24 Electricity Information Sharing and Analysis
25 Center, the E-ISAC, can spur efficiencies that

1 will provide increased security, resulting in
2 fewer incidents and lower overall costs.

3 Similarly, opportunities for robust
4 stakeholder input and debate might be regarded in
5 some sense as inefficient. But the end results of
6 such subject matter expert stakeholder-informed
7 processes are likely to be more effective than
8 decisions made without adequate stakeholder input.

9 Second, APPA believes that identifying
10 cyber and physical security threats and
11 communicating defenses against those threats
12 should be a key priority for NERC working through
13 the E-ISAC.

14 While it is encouraging that no reported
15 cyber or physical security incidents resulted in
16 the loss of load in 2018, it is essential to
17 remain vigilant against these threats and to
18 ensure that industry stakeholders have access to
19 reliable threat information and mitigation
20 strategies.

21 Thank you for this opportunity, and I
22 look forward to your questions.

23 MR. BROWN: Well, good morning. Let me.
24 begin by clarifying that I'll be speaking today
25 as a member of the ISO/RTO Council rather than on

1 behalf of the international nature and diverse
2 nature of the organization that really makes it
3 difficult for us to reach agreement in a timely
4 fashion on joint comments. I can tell you,
5 however, that many of my counterparts share my
6 thoughts on these issues.

7 I'm encouraged by your interest in
8 reviewing the ERO activities in this conference.
9 As CEO of SPP since before the passage of the
10 Energy Policy Act of 2005, I can tell you that
11 it's been interesting watching as our industry has
12 matured through the move to mandatory standards.

13 I predicted in 2005 that this process
14 would be adolescently clumsy, and, in many ways,
15 it has been.

16 I will say, though, that there has been
17 huge maturation in both the operation and planning
18 aspect of the standards, but I believe there is
19 still significant work on the cyber aspect of the
20 standards, and, frankly, nothing could be more
21 important.

22 Cyber remains our single biggest threat
23 for my company and for other ISO RTOs. And I
24 believe there are three specific areas that need
25 much more focus.

1 First, the standards development process
2 is continually outpaced by technology and the
3 changing threat vector. We all know that. And we
4 simply need to speed the process of modifying the
5 standards. Policy will never keep up with
6 technology, we all know that, we need to recognize
7 that, but the standards development process is
8 going to have to speed up.

9 Second, at times the varying
10 interpretations of what compliance means by the
11 regional entities is -- is varied. Bottom line,
12 that creates confusion for us, and, I mean, just
13 -- just creates problems.

14 While I appreciate NERC and the regions'
15 efforts to harmonize their view of the standards
16 and their interpretation of the standards, I will
17 say after 12 years, this area remains elusive, to
18 say the least.

19 And, third, priorities on the
20 enforcement efforts, in my view, are slowing the
21 maturation of both the standards development
22 process and the consistency in interpreting those
23 standards.

24 I would highly encourage NERC and the
25 regions to take full advantage of the outreach and

1 assurance assessment component of the CMEP. That
2 collaborative approach is far more beneficial than
3 focusing on the enforcement aspect when it comes
4 to compliance.

5 Internal controls, in my view, are the
6 best and most appropriate way to move us toward a
7 more reliable bulk electric system.

8 Switching gears, then, to a couple of
9 other questions that you presented to our panel.
10 SPP for sure believes that the fuel supply chain
11 should be considered part of the bulk electric
12 system for contingency analysis purposes.

13 And I'll also say that we believe
14 capacity obligations need to move under NERC's
15 purview, rather than continue to be under the
16 purview of the individual regions. I'll note,
17 there are lot of disagreement out there among the
18 parties, but that's hard to believe.

19 And, lastly, we fully support the
20 E-ISAC, all of the industry needs to participate
21 in that.

22 The only thing that I would simply add
23 is for the information coming out of the E-ISAC to
24 be more actionable.

25 With that, I look forward to your

1 questions. Thank you.

2 MR. BALASH: Good morning, I am Peter
3 Balash, associate director for Systems
4 Engineering and Analysis, and senior economist
5 with the Department of Energy's National Energy
6 Technology Laboratory.

7 I would like to thank the Commission for
8 the opportunity to speak today. Due to regulatory
9 pressure, plentiful supplies of natural gas, and
10 state-level policy interventions, the power system
11 has been in great turmoil for the past decade.
12 And these changes are not likely to abate any time
13 soon, but rather, increase.

14 Reliability within many regions of the
15 U.S. bulk electricity system, is becoming more
16 vulnerable as the amount of fuel-secure
17 generation, namely coal and nuclear power, which
18 can sustain long-term supply disruptions, is
19 significantly decreasing.

20 While substantial natural gas-fired
21 capacity is coming online, its fuel security is
22 uncertain as on-site fuel storage is expensive and
23 would require a large footprint to be serviceable.

24 Much of the remaining generation void
25 has been filled with variable energy resources,

1 which offer far less capacity and are
2 intermittent.

3 During extreme winter weather, the lack
4 of pipeline capacity and reliable resources led
5 operators in the Northeast to burn oil for power
6 during repeated recent cold weather events, with
7 many plants running out or nearly out of oil, and
8 increasing short-term emissions to rates higher
9 than those of controlled coal-fired units.

10 A fundamental principle of
11 FERC-regulated markets is fuel neutrality.
12 However, since those changes began in the 1990s,
13 other policy goals have emerged, including
14 renewable portfolio standards and federal tax
15 credits for wind and solar generation that drive
16 the amount of renewable generating capacity within
17 states without the check and balance of
18 reliability.

19 We encourage the Commission to recognize
20 the spirit of the 2017 Department of Energy NOPR
21 and construct a viable fuel security framework
22 that will ensure that the nation's bulk power
23 system remains operable and resilient in the face
24 of unpredictable events.

25 We further recommend that the

1 retrospective duration of the state of reliability
2 report lengthen far beyond five years to reach
3 back to a more stable period, and that the
4 Electric Reliability Organization Event Analysis
5 Plan include near-miss events in its scope to
6 prevent such events from cascading to something
7 more serious.

8 Thank you.

9 COMMISSION CHAIRMAN CHATTERJEE: Thank
10 you all for your participation in the quality
11 presentations. One of the important trends that
12 I've pointed out on a number of occasions is that
13 the maturation of the operations and planning
14 standards over the past several years has allowed
15 NERC to spend more time on emerging risks that
16 the industry doesn't historically have as much
17 experience with, such as supply chain security,
18 fuel security, resilience, and EMP.

19 I think it's great that NERC has been
20 focusing on these issues, and I know there are a
21 number of task forces looking at these issues.

22 So my question is this. Once the task
23 force is done with its report on one of these
24 emerging issues, how do we make sure that all of
25 that good work doesn't just wind up sitting on a

1 shelf somewhere, but that we keep building on it
2 and making progress? Maybe, Jim, I'll start with
3 you and then open it up to others.

4 MR. ROBB: I'll make a few comments. I
5 also suggest that Mark weigh in as well, if
6 that's okay. I think one of the great hallmarks
7 of the way NERC approaches its work is the strong
8 degree of stakeholder engagement in all of this
9 work. And so my sense is that in addition to kind
10 of having the task forces working on the issue,
11 you're also building kind of commitment to the
12 solutions and an evangelical capability to
13 socialize the findings and have that spread
14 through industry.

15 Many of these task forces end up
16 resulting in reliability guidelines, which can be
17 the precursor at some point to a standard, if
18 appropriate, or other alerts, industry, education
19 and so forth around issues.

20 It's clearly not in anyone's interest or
21 in our aspiration to do interesting work and have
22 it sit on a shelf. So for us the whole game here
23 is impact which involves changing behaviors and
24 decisions that people make out on the system of
25 what we're working on.

1 MR. LAUBY: I think you said it well,
2 especially in the groups that you're talking
3 about, in the areas you're talking about, the
4 whole thought is, do some of the basic ground
5 work.

6 What are some of the better practices,
7 make sure that we then document them in
8 guidelines, guidelines that are posted on our
9 website, are approved by the committees, so, of
10 course a broader socialization has a lot more and
11 a lot more visibility.

12 And, then, of course, you know, you have
13 to look at risks in a different light. If, for
14 example, something is moderately impactful and
15 likely, then maybe that's something you need to
16 start looking at, what does our toolkit look like.

17 As Jim mentioned, we have alerts, we
18 have lessons learned, we have guidelines, we have
19 standards, so it's moderate and likely to happen,
20 maybe that's something we start focusing the
21 standard on or if it's unlikely, but high impact,
22 high, you know, high severity, then, maybe again
23 we look at a standard.

24 But then if it's something a little bit
25 less risky, likely, but maybe low impact, then you

1 start looking at some of the other tools. But we
2 usually tend, as Jim said, to use these in a
3 tandem way, so the guidelines start setting the
4 stage, industry kind of picks up, and then at the
5 right time standards makes sense.

6 COMMISSION CHAIRMAN CHATTERJEE: So to.
7 zero in a little bit on that, speaking of risks
8 that the industry does not have a lot experience
9 with. EMP has emerged as an important priority
10 as evidenced by the administration's recent
11 executive order. I know NERC has a task force on
12 that issue, and so I'm just interested, Jim, if
13 you could talk about the goal of that task force
14 and whether that's going to result in actionable
15 information for the industry.

16 MR. ROBB: Yeah. The -- so, obviously,
17 we knew that this report was coming, and so we
18 had prepositioned with our industry stakeholders
19 a working group that would be ready to receive
20 the report, digest the science behind it, and
21 then start to work toward what the appropriate
22 regulatory response is.

23 Our sense is that that task force is
24 going to take about six months to work through the
25 research and the opportunities, and I would say

1 there's a reasonably high likelihood that by the
2 end of this year, we will have a SAR prepared that
3 would outline the parameters for a new standard
4 surrounding EMP.

5 I can't at this point speculate on what
6 that standard would be, but that's the time frame
7 that we're working against.

8 COMMISSION CHAIRMAN CHATTERJEE: Thank.
9 you. Nick, you had some tough words for the CIP
10 standards paradigm in your prepared testimony.
11 In particular, you noted concerns about
12 consistency of enforcement across regions, and
13 years of participation in some projects without
14 results.

15 How do we create that better consistency
16 in enforcement and make the standards development
17 process results-driven and not just a bureaucratic
18 exercise?

19 MR. BROWN: Well, first, create the.
20 standards that are more forward-looking in terms
21 of compliance, and then looking in the rear view
22 mirror at where entities have been.

23 And, two, penalties are fine when there
24 are clearly bad actors, but the focus on
25 enforcement's just gone up. It's ratcheting up,

1 and that's creating less communication in the
2 audit process, less communication between
3 ourselves and the regional entities. SPP is a
4 collaborative organization; we believe in the
5 power of collaboration.

6 And I think our focus on enforcement has
7 been because the few bad actors have moved us into
8 that arena. I believe the vast majority of this
9 industry wants to do the right thing, and when
10 they can understand the intent behind the
11 standards and collaboratively agree on what
12 compliance means, then we're going to be better
13 off.

14 And compliance is going to have to
15 broaden because the threat vectors are changing so
16 fast. Technology is available today that we
17 believe is more secure.

18 Members of audit teams have believed we
19 were compliant, others believe we're not compliant
20 with standards that are old, yet we've been in the
21 standard development process to address this issue
22 for two years, and there's no end in sight.

23 So it's -- something's got to give on
24 that. We need to be focused on security and not
25 just compliance. And technology will enable us to

1 do that, but we're going to have to embrace that
2 in a more quick fashion.

3 COMMISSION CHAIRMAN CHATTERJEE: Anyone
4 else have thoughts on that particular issue?

5 MS. STERLING: I have a slightly.
6 different view than Nick, but -- but I appreciate
7 your comments. We've been able to work with our
8 regions to develop more of a collaborative
9 approach to compliance with the CIP standards.

10 I think recent enhancements such as
11 self-logging really show a lot of promise. The
12 compliance exception process, which allows for us
13 to basically self-identify issues, mitigate them
14 quickly without -- without a penalty threat are
15 very helpful, and allow us to, sort of, you know,
16 look at the bottom of the pyramid, and be very
17 open and honest with our issues.

18 I do think there have been issues with
19 consistency, but I think NERC is -- is working on
20 that to the best of their abilities.

21 You know, the issue, though, with the
22 standards is that there's always a balance between
23 being proscriptive and being forward-looking or
24 risk-based. And I think that's the philosophical
25 issue that we're working with in the industry

1 today.

2 COMMISSION CHAIRMAN CHATTERJEE: Thank
3 you.

4 I want to switch gears a little bit to
5 the issue of resilience. I've noted on a number
6 of occasions my appreciation for the important
7 work that ISO New England, and more recently, PJM
8 have done to evaluate the issue of field security.

9 Peter, the issue of field security is
10 obviously one that you've spent a great deal of
11 time examining. So for those RTOs and ISOs that
12 have not taken proactive steps to examine the
13 issue like ISO New England and PJM, do you have
14 any advice on where they should start that
15 examination and then where to proceed from there?

16 MR. BALASH: Two general comments. One,
17 they should examine the level to which their
18 space heating market depends on natural gas. And
19 to the degree to which they are susceptible to
20 large swings in natural gas consumption during
21 the winter months, so for the northern regions.

22 Because when that happens, there's a
23 large shift in the supply curve of natural gas
24 from power generation to the home heating market
25 into the commercial space heating market.

1 As a result, that natural gas is not
2 available to the power generation market. When
3 that happens, if there's a pipeline constraint,
4 then the price can spike for natural gas. And if
5 natural gas is the fuel that sets the price for
6 your region, then you will experience large
7 increases in the price of electricity.

8 Secondarily, if your region has -- well,
9 let me back up.

10 That can be ameliorated, perhaps, with
11 on-site natural gas storage. Natural gas storage
12 is not inexpensive. However, I've had
13 conversations with Professor Apt at Carnegie
14 Mellon, and we've discussed that four-fifths of
15 weather events could probably be ameliorated with
16 three days of natural gas on-site storage, which
17 would, however, increase the capital cost for
18 natural gas on the order of about 15 percent.

19 However, that would be a price to pay
20 for reliability and resilience for most weather
21 events.

22 Turning to intermittent resources, on
23 January 28th of this year wind comprised 47
24 percent of peak output in SPP, and 17 percent in
25 MISO. Two days later, it had collapsed.

1 So each region lost 11 gigawatts of wind
2 output between the peak on the 28th and then two
3 days later. That's what filled the void was coal
4 and natural gas resources.

5 Coal generation increased, natural gas
6 then followed and increased. But with the policy
7 direction of certain areas -- if those resources
8 no longer become available, then you would have to
9 rely either on a very large wide area network, or
10 vast amounts of battery storage. And battery
11 storage to date, is only at four hours of
12 discharge, and you can take the capacity of your
13 intermittent resource multiplied by six, about the
14 capacity you would need to back that up securely,
15 for storage.

16 So as a result, there's many ways you
17 can look at how having a truly reliable system,
18 and resilient system, will increase your capital
19 costs of operation.

20 COMMISSION CHAIRMAN CHATTERJEE: Thank
21 you.

22 Tim, you mentioned in your testimony
23 that RF and the other regions are working on
24 resilience metrics and tools. Could you elaborate
25 a little bit on those efforts and other

1 ways that we could have NERC and the regions
2 working collaboratively with registered entities
3 on the issue of resilience?

4 MR. GALLAGHER: Yes, sir. We're very
5 excited about a project we've been working on
6 with CREDC, which stands for Cyber Resilient
7 Energy Delivery Consortium. It's a consortium of
8 energy companies, academia, reliability persons
9 are participants, portions of it are funded by
10 the Department of Energy.

11 And one of the products that's come out
12 from my staff is a way to measure your cyber
13 resiliency, and it's done and based on
14 tried-and-true methods. There's something called
15 the four R's, which are robustness,
16 resourcefulness, rapidity and redundancy. Those
17 are kind of the tenets of cyber resilience or any
18 kind of resilience.

19 It's a self-assessing tool that we
20 provide free to the industry. It covers 28
21 different categories across those four R domains
22 that I talked about. We have done some testing
23 with our industry partners, and the results are
24 very good.

25 It takes 30 minutes to five hours to

1 complete the assessment, depending on which expert
2 is completing the questions, and what it does it
3 highlights for you where your strengths are from a
4 resiliency standpoint, and where you have
5 opportunities.

6 We're very excited to roll that out.
7 We're partnering with NERC to make this available
8 when it's ready to be deployed ERO-wide.

9 COMMISSION CHAIRMAN CHATTERJEE: In
10 addition to resilience, obviously physical and
11 cyber security remain a top priority here at the
12 Commission. At our security investments
13 technical conference several months ago, the need
14 to continue coordinating with other federal
15 agencies including DOE and DHS was clear.

16 Ms. Sterling, you had a similar theme in
17 your prepared testimony about coordinating with
18 DOE and DHS. In your view, does that coordination
19 mainly include information sharing, or are there
20 more specific actionable items we should be
21 coordinating on? And happy to start with you and
22 then open it up to others.

23 MS. STERLING: Well, let me say a few
24 things about that, because I do think that
25 coordination is key, and information sharing is

1 really important. We need the technical experts
2 of many federal agencies to be able to coordinate
3 and talk about their particular viewpoint for
4 these issues.

5 You know, for us, as an electric
6 company, we just don't depend on any one source of
7 information, and we don't depend on just the CIP
8 standards to divine our overall cyber security
9 posture.

10 So to the extent we have early and
11 actionable information, as you say, I think it's
12 really important. So I think information sharing
13 is a top priority, but as we move through these
14 conversations, other priorities will certainly be
15 identified.

16 COMMISSION CHAIRMAN CHATTERJEE: Anybody
17 else care to chime in on that?

18 MR. LAUBY: One thought I had is that.
19 just observing the issues as they come onto our
20 system, and then reacting to them, I worry a
21 little bit that eventually that's going to
22 become kind of a steady stream.

23 So how do we -- how do we step back and
24 do all of the kind of exercising and making sure
25 that we have -- we're putting in front of the

1 attackers a system that's more robust, more
2 segmented, more -- so as we add more technology,
3 we're also de-risking the system, separate, making
4 it separate.

5 And so looking at, from a planning
6 perspective, building a system that is more
7 robust, and -- and defensible, and then once you
8 know you've been attacked, then of course,
9 pre-posturing and then being able to come back
10 afterward. I think those are all areas that we
11 need to kind of be focusing our attention on,
12 along with the situational awareness.

13 COMMISSION CHAIRMAN CHATTERJEE: Thank
14 you. On the issue of cyber security, supply
15 chain security has been a major concern of mine
16 which is one reason that I strongly supported the
17 approval of the NERC supply chain standard.

18 Mr. Cashin, in your testimony, you
19 mentioned that the burden should be on the vendors
20 to certify their security, not the utilities.

21 Given that we don't have jurisdiction
22 over the vendors, how would you see a system like
23 that working?

24 MR. CASHIN: Well, I think we've been in
25 discussions with NERC, as well as other

1 organizations, for example, you know, as you just
2 mentioned, you know, our federal partners.

3 You know, I know that a lot of our folks
4 really look to, say, FedRAMP with respect to
5 looking for some certification on the cloud, and
6 that's something that, you know, I know you're
7 going to hear about more on the second panel.

8 So that's just, you know, one example of
9 that. But I think that, you know, with respect to
10 a supply chain, you know, we do recognize, and I
11 think that's even been recognized within this
12 conference last year, that, you know, that there
13 is, sort of, a third leg to this stool with the
14 vendors and that's just it.

15 I think looking to some kind of
16 certification program with NERC, some kind of idea
17 where they can accept the work of others. And
18 there are, as I mentioned, organizations such as
19 FedRAMP that would fit into that kind of role, and
20 we feel that that's important, and I think it goes
21 to the point a lot of analysts have made as with
22 changing technologies, there has to be that
23 flexibility to have a program like that, and have
24 some kind of verification for the vendors.

25 COMMISSION CHAIRMAN CHATTERJEE: You

1 also mentioned the idea of developing incentives
2 for good risks and control assessment.

3 Can you just elaborate on what that
4 means?

5 MR. CASHIN: I'm not sure the context.
6 of, I guess, the remark, but I believe that, you
7 know, what we're looking for is a program where
8 companies have that flexibility so that they feel
9 that they can operate in a way that is consistent
10 with how they really want to move forward with
11 new technologies.

12 COMMISSION CHAIRMAN CHATTERJEE: Thank
13 you all.

14 Commissioner LaFleur.

15 COMMISSIONER LaFLEUR: Thank you very
16 much. Terrific presentations. I don't have a
17 question, but I wanted to thank Jim, Mark, and
18 Jennifer for your focus on the recent EMP report.

19 I was encouraged to see the EPRI report
20 and the timeline for analysis and piloting coming
21 out of it. I would encourage prompt action to
22 take it to a SAR or an actionable set of steps.
23 I'll certainly be continuing to watch it, although
24 not from this seat on that timeline.

25 I want to focus in, first, on extreme

1 weather events. The 2000 -- the most recent State
2 of Reliability Report showed that response was
3 good last year.

4 But, of course, although we talk an
5 awful lot about cyber security and so forth, all
6 very important to talk about, extreme weather is
7 the biggest cause of load loss to -- and
8 reliability issues that customers see, and climate
9 change science suggests we're going to be seeing
10 more of it, not less of it. We're certainly
11 seeing the wild fires in the West, the hurricanes
12 in the Southeast, extreme cold and blizzards in
13 the Northeast.

14 And I want to ask, you know, how -- what
15 NERC and the REs can do to help our collective
16 preparation or response because this just seems to
17 be a feature although, we're trying to work on the
18 mitigation end of climate change, you know, that
19 seems to be a feature of modern life, that, you
20 know, every year, you have a hundred-year storm.

21 So what do you see your role in helping
22 the industry respond to this?

23 MR. GALLGHER: Specifically in terms of.
24 cold weather preparation, after the polar vortex
25 occurred, we did the traditional tools, which

1 would be executing surveys and things, but in
2 addition to that, Commissioner, we actually sent
3 experts from our staff out into the field to meet
4 with plant owner operators to identify areas
5 where the weatherization efforts were not
6 sufficient and that's been a fantastic program.
7 We've done it every year since then.

8 And every year we find very, very
9 innovative ways that plant owners and operators
10 have addressed this, and we disseminate those
11 lessons across all the other plants.

12 So doing things like that, getting hands
13 on, being targeted, understanding the risks, we've
14 identified the highest priority plants, those that
15 have had the biggest struggles, and we went on
16 on-site visits with them.

17 The other thing we did was partner with
18 our RTOs to have market provisions put in place
19 that rewarded the kind of behavior we were looking
20 for, and to deter the kind of behavior we weren't
21 looking for. We're in a unique position, because
22 in my region we're totally comprised of RTOs, so
23 we have an advantage. But that's been very
24 successful with us in dealing with issues like
25 cold weather.

1 COMMISSIONER LaFLEUR: Capacity

2 performance and so forth?

3 Jim?

4 MR. ROBB: I'd just make an observation
5 particularly around the major severe weather
6 events that we saw last year, the two major
7 hurricanes. One of the privileges that I have in
8 the role that I'm in is participating on the
9 ESCC, and I have to tell you, and I don't know
10 what FERC's visibility into the pre-storm process
11 and the ongoing storm cause and so forth, most of
12 this is coordinated through EEI, but the level of
13 collaboration amongst the leaders of the affected
14 utilities, the support of our government partners,
15 in terms of clearing the air space for
16 drones, providing the kind of vehicles to get
17 through high water, all of those kinds of issues,
18 the environmental waivers that are required, it's
19 really an extraordinary kind of thing of beauty
20 to see how well coordinated that is, pre-storm,
21 during, and then post-recovery.

22 So I think for the very major events
23 that we see coming, the industry has a very
24 effective process for coordination, both amongst
25 itself with the Mutual Assistance Program, but

1 also with our government partners that are so
2 critical to being able to make the restoration and
3 the impact of the storms as de minimis as
4 possible.

5 COMMISSIONER LaFLEUR: I mean, you're
6 absolutely right. And the industry has always
7 done its best work in storms, forever. We've
8 always said if people could just, even in big
9 hurricanes, we've had the fewest lost time
10 accidents, and if we could do our -- make it like
11 there was a hurricane every day, there would be
12 the best performance -- I mean, I realize that's
13 not what we want.

14 But are there things we should be doing,
15 in terms of the configuration or hardening, or the
16 way we look at the grid with the greater wildfires
17 and hurricanes and so forth. Is this something --
18 I know a lot of work has been going on, on the
19 coast, but is this something that we should look
20 at, either regionally or a national level?

21 MR. LAUBY: We do gather information.
22 after the fact, as Tim indicated. For example,
23 and put together programs, be it lessons learned,
24 guidelines, so when we learn something after the
25 fact, gather information, do an events analysis,

1 post their lessons learned, maybe also drill out
2 to a guideline.

3 And, ultimately, if it's something that
4 makes sense, even further into a standard. But we
5 work with our industry partners all the time
6 trying to understand what has happened and what we
7 can learn from it and share those results with
8 everyone else.

9 MS. STERLING: I think by nature of
10 some.
11 of these events, they are regional events and so
12 the amount of hardening that can be done and the
13 types of reconfiguration, that is almost by
14 definition "regional."

15 I can tell you that I've sat in numerous
16 industry presentations that show a really
17 impressive progress in, you know, both reducing
18 the duration of outages, reducing the number of
19 outages. Some of the utilities in Florida, on the
20 East Coast, in Texas have done a significant
21 amount of storm hardening and the metrics actually
22 show impressive results.

23 And I agree, the amount of mutual
24 assistance and coordination has also increased and
25 improved, and it is -- you know, it is, by nature

1 a big focus of the industry.

2 COMMISSIONER LaFLEUR: Thank you. I
3 just think that's something that NERC and the REs
4 can do an important work-sharing, lessons.

5 What I found, both when I was in the
6 private sector, but then sitting in this seat is
7 that the lessons are always applied right where
8 the problem was.

9 I mean, in the wake of Hurricane Sandy,
10 we've seen so much hardening in New York and New
11 Jersey, and, similarly, after Katrina. But making
12 sure that the lessons are spread to other regions
13 that might have similar geography that you didn't
14 get with the last storm is something that NERC can
15 do.

16 That kind of leads sideways to my next
17 question, which I want to focus a little bit on
18 what's done nationally and what's done regionally.
19 And several of you touched on that. Both Jim and
20 Tim talked about the robustness of the RE model,
21 and aligning the RE, so that they work better.

22 Jack, in your prefiled testimony, you
23 suggested the need for doing more things
24 regionally rather than nationally. And, Nick, I
25 thought I heard you say the opposite, we should be

1 looking at nationally at some of these capacities,
2 just rather than the regions. Maybe I'm confused
3 about what you said.

4 But I guess, starting with Jim.

5 How should we look at whether -- are
6 there things that we legitimately should have a
7 regional standard, or is there -- you know, things
8 done differently in different regions, or are we
9 repeating ourselves too much when we should do
10 more things nationally?

11 MR. ROBB: It's a great question. I.
12 think that's one that we implicitly debate quite
13 frequently.

14 I think in some cases, there's a very
15 strong role for a regional standard. And we'll
16 take one of the issues that's on the table that
17 we're looking at right now, is the Western
18 Interconnection on the RC situation out there.

19 The Western Interconnection is just
20 structured very differently than the Eastern
21 Interconnection, so the level of coordinated
22 insight into the system requirement there is much
23 different than it is in the East. So there's a
24 standard -- I believe it might be in front the
25 Commission now for approval.

1 COMMISSIONER LaFLEUR: The IRO standard,
2 yeah.

3 MR. ROBB: To modify the IRO standards.
4 to ensure that, one, that RCs are modeling all
5 the RAS schemes in the West because that's a very
6 critical component of how the transmission system
7 works. And that they all have a common model
8 picture of the interconnection, because the
9 interconnection works as one machine. That's the
10 case where the regional standard's absolutely
11 required.

12 But that standard will not be required
13 in the East because it's not as important for the
14 Florida RC to understand what's going on in New
15 England, as it is for someone in the Southwest to
16 understand what's happening in the Northwest.

17 I think when it comes to the execution
18 of programs, however, as Nick pointed out, I think
19 we have lots of headroom in -- in how we drive
20 consistency and alignment, and how the regional
21 entities and the boots on the ground approach
22 problems.

23 They, obviously, had independent
24 heritage. Many of these entities were doing this
25 kind of work before the ERO was even formed, so

1 it's no great mystery why we have eight, now
2 seven, soon to be six ways of doing things. I
3 think the process that we have gone through over
4 the last year in developing the Align tool has
5 really been pivotal in, kind of, our ability to
6 drive alignments.

7 So -- and I keep quoting this number,
8 and I don't know if it's right, so someone's going
9 to correct me one of these days, but, I think to
10 date we've done something like harmonized 70
11 subprocesses associated with the CMEP across the
12 regional entities, and that took a tremendous
13 amount of leadership, time, and commitment, for
14 people to come together and figure out what's the
15 way we should do this, as opposed to depending on
16 the way that we do it in my region.

17 So I've got to take my hat off to the
18 regional entities for really coming to the table
19 to develop kind of a best-practice way of
20 approaching this. And I think once we get the
21 tool in place and all the training associated with
22 it, the registered entity experience, particularly
23 entities like Nick that touch several different
24 regional entities, will have a much more
25 harmonious experience with that.

1 COMMISSIONER LaFLEUR: I mean, I know
2 I've said before, if we were starting from
3 scratch, we might have NERC inc with the regional
4 offices, but we're not starting from scratch. We
5 have a very well-developed heritage of a different
6 system, and I guess -- I know, Tim, you've done a
7 lot of work of getting to that consistent place
8 or --

9 MR. GALLAGHER: First, I think regional.
10 standards should be few. I think -- again,
11 standards are for well-known, widespread risks,
12 and that means that it should be common across
13 all the regions, but there are special
14 circumstances. But I think regional standards
15 have been few to date.

16 In terms of consistency, especially in
17 the cyberspace, because this is where we get most
18 of the traction, I just think it's important to
19 recognize that what we deal with as regions can be
20 very unique. You never know what you're going to
21 walk into that day. And one of the things that I
22 challenge my team with is to be open-minded enough
23 to understand the deployment of new technologies.

24 Virtualization and the cloud are not new
25 technologies, but we're going to hear about those

1 later. If we apply a very strict instructionist
2 approach to that, the standards would basically
3 forbid the use of those tools, and I don't know if
4 that's the right --

5 COMMISSIONER LaFLEUR: Regional -- does
6 cyber have regional differences? Isn't it, you
7 know, the World Wide Web or...

8 MR. GALLAGHER: It's regional
9 entities -- regional companies that we work with.
10 Each entity we visit has differences and how --
11 where they are in the curve and how they've
12 deployed the technologies.

13 And very similar to what Nick said, we
14 tried to make the conversation about limiting
15 their security liability, not limiting their
16 compliance liability. Because if the entities I
17 work with are focused on limiting their compliance
18 liability, we're not going to have fruitful
19 conversations.

20 The lever that we use on that,
21 Commissioner, is I ask them to consider what are
22 the ramifications of a major security breach:
23 Their reputation, financial harm, loss of customer
24 information versus getting a fine from me. So I
25 am firmly convinced to tackle this stuff, we have

1 got to have an all-hands-on-deck approach.

2 And we have to look at the regions and
3 NERC and the Commission as allies in this fight.
4 If we're hiding things from one another or if I'm
5 focused on something that happened four years ago
6 or chasing yesterday's problem, we're not going to
7 be able to tackle this problem.

8 It's the threat vectors, technology, the
9 opportunities, the motivations constantly change
10 so we have to be on the same team. That means
11 we're going to be inconsistent sometimes.

12 COMMISSIONER LaFLEUR: Anyone else?

13 MR. CASHIN: Well, first, I'm very.
14 impressed by Tim's remarks, and I think that, you
15 know, just so that my remark was understood, I
16 think that really APPA favors national standards.
17 We don't want regional standards. I think it was
18 just more of the idea that many of the problems
19 that seem to have been mentioned in the context
20 of creating a standard seems like there's been
21 more of a knee-jerk reaction to standard creation
22 as opposed to looking at other tools that are in
23 the tool box, such as guidance, and that's just
24 it.

25 I think we appreciate some of the

1 elements that, you know, NERC has embraced along
2 those lines with respect to providing guidance,
3 say, on winterization and things like that, that
4 are a good first step rather than jumping to a
5 standard. So that was the idea on not trying to
6 necessarily move toward that kind of
7 regionalization.

8 COMMISSIONER LaFLEUR: Yeah, I guess I
9 feel like it's a little bit of cyclic, in the
10 beginning it was just standard, standard,
11 standard. We had, you know, hundreds of
12 directives out to NERC. And then as the
13 standards matured and we started the paragraph --
14 was it paragraph 81? Or whatever the process is
15 to streamline the standards. And now there seems
16 to be, sometimes, a slowness in turning to
17 standards as an approach for a new issue. So
18 it's a balance in my mind and there have to be
19 times when there should be a new standard,
20 because there's a new challenge.

21 I want to go to a different issue, but
22 that also kind of lies at transparency versus
23 security. And that's an issue that's gotten a
24 fair amount of attention in recent months, which
25 is, the request that we've been getting to

1 disclose the identities of people who violate the
2 CIP standards.

3 I mean, as the Commission's currently
4 processing FOIA requests for the identity of every
5 CIP violator, since the monthly filings began in
6 2010, and well over 200 individually processed
7 FOIA requests, the approach that NERC has taken
8 since the very beginning, which is to file CIP
9 violators as "undisclosed registered entity" was
10 largely unchallenged for many years, and, really,
11 unexamined, as far as I know. But it's being
12 squarely asked about now.

13 Just to note, there seems to be an urban
14 legend in the Twitter-verse that this is something
15 I invented, which is definitely not true. It was
16 happening before I got to the Commission, but it's
17 definitely in the spotlight right now.

18 We've never really had a public process
19 to have a discussion or a consideration of what
20 the right balance is between transparency, so we
21 can learn from what happened, and the state
22 regulators and others who have a -- who followed
23 this, who have an interest to know what's
24 happening, but, of course, protection of grid
25 security and how the monthly filings, or how the

1 filings on penalties might be adapted to better
2 balance those concerns.

3 I mean, I think there's very important
4 considerations on both sides. We have to
5 scrupulously avoid disclosing critical electric
6 infrastructure information, and follow the FAST
7 Act on our own regs, but we have to be careful
8 that we're not overprotecting information that
9 might have more reputational harm than security
10 harm. And there's a legitimate interest in
11 transparency.

12 So I'd like to -- I think there would be
13 real value in having some kind of public process
14 to discuss this, and I'm curious if anyone on the
15 panel would like to comment, either on the issue,
16 which seems to be hot right now, or how we get our
17 hands around it.

18 Jennifer.

19 MS. STERLING: So, as you know, this.
20 issue is very important to EEI's members, and, in
21 fact, to all registered entities.

22 It's not a secret that the industry had
23 its struggles in the early days of the CIP
24 standards, and that most utilities probably do
25 have a settlement agreement on file with FERC.

1 That said, we do have to balance. I agree with
2 your comments. There has to be a balance between
3 transparency and protecting critical information
4 that could be used by intelligent adversaries to,
5 sort of, back-engineer their way into exploiting
6 vulnerabilities.

7 COMMISSIONER LaFLEUR: Especially if it
8 hasn't been mitigated yet. But hopefully, most
9 of them have.

10 MS. STERLING: Well, probably most of.
11 them have and I don't disagree with you on that.
12 But some of the settlement agreements that were
13 filed early on contain a lot of information about
14 exactly how the issues were mitigated. And so if
15 you have any information about how an issue was
16 mitigated, then you have information on how a new
17 vulnerability might be exploited.

18 So there has to be a balance. We
19 support the process that FERC has embarked upon
20 now. It's tedious. We certainly recognize that,
21 but we think the case-by-case examination of the
22 particular agreements in question are helpful, and
23 useful, and I thank your staff because I know it's
24 a lot of work.

25 COMMISSIONER MCNAMEE: Anyone else?

1 MR. ROBB: I just need to make an
2 observation here.

3 I think this is a -- there is a lot of
4 froth around this issue right now with some of the
5 recent -- recent name disclosures, and I think
6 it's appropriate. And I would encourage the
7 Commission to have a very thoughtful and
8 deliberative process in determining how it would
9 like to proceed in this area.

10 I think it's really important to
11 understand the differences between CIP violations,
12 mitigated or not, and O&P violations.

13 O&P violations are the result of random
14 events that occur out on the system that may or
15 may not have been well protected against or won't
16 be well protected against. In the CIP area, we're
17 dealing with determined adversaries.

18 As well, I think we obviously have a
19 core principle in our country of transparency and
20 desire for that. And I think that's a very
21 valuable characteristic with democracy.

22 At the same point in time, we don't want
23 to be laying out blueprints, you know, for how
24 entities can be attacked, particularly in such a
25 critical sector.

1 So I think mitigated or unmitigated,
2 there's a lot of sensitivity around this issue,
3 and I would absolutely encourage the Commission to
4 have a thoughtful, deliberative process and a
5 public process around how to handle this, because
6 I don't think it's -- it's not a simple problem, a
7 simple issue to resolve.

8 MR. GALLAGHER: I agree with what's been
9 said. I just -- from personal experience working
10 with some of our industry partners that have had
11 some significant violations even after the
12 mitigation has taken place, there's still a
13 minimum recovery period. So I still worry about
14 these companies. The work doesn't end for me
15 when you sign the settlement agreement, sign off
16 on the mitigation. There's a sustainability
17 issue.

18 And my concern with releasing the names
19 too soon. I do support transparency by the way --
20 but releasing the names too soon, it's sort of
21 like there's a weakened animal in the herd and
22 that's where all the lions are going to go and I
23 just think we need to be extremely careful with
24 that because mitigation itself, there's still a
25 recovery period associated with it.

1 Because a lot of the issues we've run
2 into are not technological. They are cultural,
3 organizational, and those sometimes take longer to
4 correct, and there are little fall-downs along the
5 way.

6 MR. LAUBY: And I'll just briefly say I
7 agree; the issue needs more discussion.

8 COMMISSIONER LaFLEUR: Thank you very
9 much.

10 COMMISSIONER GLICK: Actually, I just
11 wanted to pick up where Commissioner LaFleur
12 left off, because it is a very important issue,
13 and it's not an easy issue.

14 It's complicated, as everyone has
15 mentioned, but transparency is a very important
16 goal, but I want to talk more about deterrence;
17 right, because I think one of the issues is, you
18 know, we certainly want people to know who's being
19 penalized, and so on if there's not any issues
20 with regards to security.

21 But, at the same time, we also want to
22 deter companies from not following or we want to
23 encourage companies, and incent companies to
24 follow CIP requirements, and so on.

25 And so I -- you know, this goes back to,

1 you know, first year of law school when you
2 learned about why people get, you know, penalized,
3 or why in criminal law why people get sent to
4 jail. And sometimes people get sent to jail
5 because of justice; sometimes we do it to deter
6 future action or prevent recidivism.

7 And so my concern is is that to the
8 extent that companies are penalized, but we don't
9 name the names, that they're not sufficiently
10 incented not to -- not to disregard the rules, or
11 not sometimes "disregard", sometimes just not
12 follow the rules sufficiently the next time.

13 And so I wanted to ask Mr. Robb, maybe
14 if you could -- and I know it's a tough issue.

15 And, again -- but is there a way maybe
16 we could design something where we don't -- we
17 list the companies that are penalized, but don't
18 necessarily connect those companies that are
19 penalized with the actual issues associated with
20 not following the CIP requirements, so that people
21 actually -- so it's not then a security issue?

22 MR. ROBB: I'm sure there's a path.
23 through this, right, that people can get aligned
24 around. I think my view is that the -- I just
25 think it needs to be clear and transparent so

1 that everybody kind of understands the rules of
2 the game.

3 The one point I would make, though, that
4 I think is important, and it builds on something
5 that Tim said that I think is really, really
6 important. We can't fine a company enough
7 relative to the risk that they have from a cyber
8 event; right? And I think management and the
9 executives understand that.

10 The issue that we have to make sure that
11 we're doing throughout all of our work, and
12 enforcement is part of the puzzle here, is that
13 the top management has attention to the issues in
14 play. If you go back to the work that Tim and a
15 couple of the other regions did around the root
16 causes of CIP -- of major CIP violations, the vast
17 majorities are not related -- are not related to
18 having wrong widget or something like that.
19 They're embedded in management structure,
20 approach, philosophy, all that kind of stuff. So,
21 really, what we need to be doing is making sure
22 that all of our actions around CIP compliance,
23 right, is all geared around changing management
24 behavior, right, as opposed to penalizing.

25 The penalty is part of that, but it's

1 not the only part of it. So I think that's an
2 important piece to keep in mind.

3 COMMISSIONER GLICK: Wouldn't you agree.
4 that part of the incentive for CIP compliance to
5 get management to follow -- to ensure the
6 proper approach is that CIP requirements are
7 complied with is that they don't want to be
8 embarrassed that they were fined.

9 MR. ROBB: Absolutely. Absolutely.

10 COMMISSIONER GLICK: Switching subjects,
11 I was really intrigued, Mr. Brown, by your
12 suggestion about fuel supply chain, maybe we
13 should consider that as part of the bulk power
14 system. I was curious if you had any further
15 thoughts about how we might go about doing that.

16 MR. BROWN: If you don't mind, I'd like
17 to come in on that last question. I've worked
18 with a number of boards in my career, and the
19 focus of every one of those boards on audits of
20 any kind has been extremely sharp, whether it's a
21 financial audit, whether it's a controls audit,
22 whether it's a NERC audit.

23 I don't see any more focus from my
24 particular board on NERC compliance because of the
25 threat of a penalty. I just don't.

1 And I think boards that are properly
2 structured and are properly functioning would --
3 would be in that same boat. I don't disagree that
4 penalties are necessary when boards aren't that
5 focused. But to me, that's a small percentage of
6 our industry that that applies to, not a vast
7 majority. So onto the fuel supply.

8 I began my career as a planning engineer
9 and I guarantee that -- in minus one evaluations
10 to comply with NERC criteria -- that I constantly
11 focused on fuel, and the lack thereof for the
12 various plants.

13 In our part of the country, it's
14 interesting with respect to gas, because unlike on
15 the East coast and the West Coast, our gas
16 pipeline system is a network almost. Many of our
17 gas plants have two and sometimes three different
18 pipeline options for operation. And so we've been
19 blessed by that, from a reliability perspective,
20 but I still am a firm believer that fuel is a part
21 of the mix.

22 I mean, the plant's useless without
23 fuel. I mean, you can look at a forced outage
24 rate all day long, but fuel has got to be
25 considered as part of that in my view.

1 COMMISSIONER GLICK: Anyone else have
2 any thoughts on that?

3 MR. LAUBY: Yeah. I think to build on
4 his point, because I'm also a planner, to start to
5 think about this from a different perspective,
6 not just, you know, building to a capacity margin,
7 which, like Nick indicated, you can't have
8 infinite capacity without fuel.

9 I'd rather go to an energy problem,
10 start solving energy problems about making sure
11 that you make a system available to the operator
12 to have sufficient energy to serve energy needs,
13 and that can take the spectrum of different
14 solutions including demand response, pipeline, you
15 know, different resource types, intermittent
16 resources, opportunity variable resources,
17 battery, storage, whatever. You know, get --
18 change the paradigm so we're not thinking about
19 the one event in 10 years from a forced outage
20 calculation that's based on capacity, but start
21 looking more and more at the energy.

22 COMMISSIONER GLICK: Mr. Balash?

23 MR. BALASH: Yeah, I'd just like to.
24 comment that natural gas is a marvelous fuel, but
25 it serves many masters. It's an important source

1 of energy and feedstock for a number of
2 different industries as well as the space heating
3 market and power generation.

4 And notwithstanding the producing
5 regions and the newer producing regions that gas
6 network there was built primarily for the space
7 heating market, and now that all this new gas
8 capacity is coming online, although much of it is
9 served by wellhead-type production, some of it is
10 not, and it is still vulnerable to a legacy system
11 of pipelines, and there needs to be more
12 investment in that system in order to adequately
13 supply those units. But, nonetheless, in those
14 long weather events, that system will come under
15 stress because of the lack of either on-site or
16 virtual storage.

17 MR. ROBB: I'm just going to add on one
18 other point to build on this.

19 I think the other challenges that we're
20 talking specifically here around natural gas, and
21 in many ways, shapes, and forms, and I think one
22 of the other paradigms that we have to get beyond
23 is that the gas industry tends to always think of
24 itself on a volumetric basis, do I have enough
25 BTUs to serve the needs of my customers, whether

1 it's space heating or power generation. I think
2 what we learned coming out of California, with the
3 duck curve, the expansion of solar and the very
4 rapid ramp rates that we're seeing in plants.

5 The gas industry needs to start thinking
6 about itself much the way the power industry does,
7 in terms of peak versus average because you can
8 have all the BTUs you want, but if there's not
9 enough pressure in the system to meet the ramp
10 rate of the plants and the demands that the power
11 plants have, then it's not particularly helpful.

12 So the whole planning paradigm and the
13 integration becomes, I think, I guess one more
14 order more complicated.

15 COMMISSIONER GLICK: I want to switch.
16 for a second to Mr. Cashin's suggestion about the
17 supply chain and some sort of vendor certification
18 process. And so I just wanted to
19 ask you, Mr. Robb, you know, we've obviously
20 issued order 850 and so we've got some supply
21 chain requirements for utilities essentially to
22 come up with plans to figure out how to address
23 the supply chain concerns. But I'm just curious
24 whether you thought a vendor certification
25 program would be helpful.

1 MR. ROBB: I think we're very
2 supportive.
3 of that concept. Mark, I don't know if you want
4 to talk about what's actually underway.

5 MR. LAUBY: Yeah. We've been
6 encouraging organizations to work together to,
7 perhaps, establish some certification approaches.
8 For example, NAESB does that for the gas
9 industry, and so we've been working with NAESB
10 and the Northern American Transmissions Forum,
11 which has developed a set of criteria to be used
12 for that kind of certification.

13 So the conversation's ongoing, and we
14 think it would be a strong -- it would be very
15 helpful in the industry, along with, of course, I
16 think some of the standard contracting I think
17 that perhaps is needed, too. And maybe you want
18 to mention something on that, Jennifer.

19 MS. STERLING: Yeah. I will mention.
20 EEI's very supportive of the discussions going on
21 for third-party certification and accreditation.
22 I think we're going to need them. I don't think
23 it's an efficient paradigm to have all of the
24 companies auditing all of the vendors. I just
25 don't think that's sustainable.

1 One of the things that EEI has done, I
2 would be remiss if I didn't mention, is we have
3 developed model procurement language for contracts
4 for vendors of cyber systems.

5 This is public now. It's posted on
6 EEI's website and the idea is to set a level of
7 expectations for the vendors that are doing
8 business in this space, and to allow entities,
9 then, to take that language, you know, mold it as
10 they need to, to fit their specific business
11 practices, but to put all of the vendors on a
12 common ground, and to let them know what our
13 expectations are as an industry as a whole, and
14 not as a separate company by separate company.

15 COMMISSIONER GLICK: How do you-all
16 know -- I mean, that's one of the problems,
17 right, to have information about the vendors
18 themselves, that there are appropriate vendors.
19 I know there's been some reports in the press
20 that NERC is looking at some Chinese vendors on
21 certain equipment. And, obviously, you have to
22 get information from the government, so on, but
23 is it possible for the private sector to actually
24 have sufficient information to actually know
25 which vendors are trustworthy and which aren't?

1 MS. STERLING: It's a challenge.

2 And a lot of it is because of the number
3 of vendors that we're dealing with. We do have an
4 internal questionnaire process in Exelon where we
5 look at every -- every vendor. But, again, that's
6 not efficient for every company to give every
7 vendor -- this is an area where we will need
8 increased collaboration with the federal
9 government. No question about it.

10 COMMISSIONER GLICK: Okay, Mr. Cashin.

11 MR. CASHIN: Just Jennifer's last
12 statement is ever so true, and I think we even
13 heard just as of yesterday that, you know, the
14 DOE is moving in that direction, looking at this
15 very problem.

16 But I think, importantly, you know, from
17 just a public power perspective, you know, one
18 other piece of this is that, you know, we have
19 smaller companies dealing with a variety of
20 vendors. So that's all the more reason, I think,
21 that we want that program in place where we've got
22 some kind of certification.

23 But I think also to that end is that we
24 don't want to drive vendors away from our
25 industry, which as I would understand, say, for

1 example, security concerns in the nuclear industry
2 caused that kind of ripple effect, where all of a
3 sudden, you lost vendors that were important to
4 people, and, you know, I think we're all concerned
5 about the cost of electricity, and what the impact
6 would be there. So that's on one of those other
7 pieces.

8 COMMISSIONER GLICK: Two more subjects
9 that I wanted to switch to. The first one is
10 seams, and I know we have a panel this afternoon
11 on seams, and we're going to spend a lot more
12 time on this. But we obviously have a lot of
13 expertise on this panel. And the concern I have
14 is that obviously, Mr. Balash, and others, you
15 mentioned some cold weather events, we've had
16 some polar vortexes and so on over the last few
17 years.

18 And I wanted to get your; Mr. Brown and
19 actually everyone else on the panel, maybe your
20 thoughts on what we can do to improve
21 relationships and operations between regions so
22 that if it's really cold, like it MISO and SPP has
23 some additional power, we can get that power into
24 MISO and prevent or at least reduce the risk of
25 having outages.

1 MR. BROWN: So communication,.
2 communication, communication. I've stated almost
3 my entire career that, you know, most business
4 problems are people problems, and most people
5 problems are communication problems.

6 I'm pleased that the level of
7 communication continues to increase, the
8 relationships continue to increase and the clarity
9 surrounding the operating agreements continues to
10 increase, but that's what it takes in my mind.
11 It's pure and simple. And the stronger the
12 relationships are, the better the communication's
13 going to be.

14 COMMISSIONER GLICK: Anybody else?
15 Okay. We'll cover it more on the next panel.
16 Last point, Mr. Balash, I was struck by some
17 language in your written statement and you
18 actually mentioned it again this morning. You
19 said, "We encourage the Commission to recognize
20 the spirit of the 2017 DOE NOPR to construct a
21 viable fuel security framework," and it goes on
22 and on. That was kind of interesting I found
23 because, you know, the Commission voted 5-0 to
24 reject the DOE NOPR in large part, I think -- I
25 can only speak for myself, but I didn't believe

1 there was sufficient evidence to support what the
2 Department of Energy had proposed.

3 And then I noticed, I saw an article
4 that you had just right after that, a FERC order
5 rejecting the DOE NOPR. You wrote an e-mail to
6 the assistant secretary for fossil energy at the
7 Department of Energy, and said you were going to
8 write a report to rebut that -- rebut FERC on that
9 point.

10 And then you issued -- NETL, your lab,
11 did issue a report and I think then PJM had some
12 serious concerns about the validity of some of
13 that.

14 So my point is: Where is the evidence;
15 where is the record? Especially, I think you
16 suggested evidence in the record. You suggested
17 that really -- instead of talking about
18 reliability, you were talking about price. You
19 said price would increase if we were to become too
20 reliant on natural gas and less reliant on coal
21 and nuclear. So where's the evidence on
22 reliability? Because I'm still waiting to see
23 it. I haven't seen a lot of it presented to the
24 Commission yet.

25 MR. BALASH: Well, I don't know what's.

1 been presented to the Commission. But I'd just
2 comment that with respect to PJM, we've had a
3 long conversation with them over the past few
4 months. But I am an economist, so I view high
5 prices as an indication of scarcity.

6 So, therefore -- and in eastern PJM,
7 during the bomb cyclone, when prices reached \$96,
8 a million BTU; in the Algonquin area in New York
9 when prices reached \$140, a million BTU; and then
10 the New England hub was over a hundred dollars, a
11 million BTU; that's an indication that the natural
12 gas is not available.

13 I think that the degree to which the New
14 England generators were nearly out of oil and
15 unable to receive natural gas, that they had to
16 rely on emergency shipments of Russian liquified
17 natural gas, is an indication that the gas supply
18 infrastructure is not sufficient to reliably
19 supply the electric power generation sector.

20 That's not saying that there's not
21 plenty of natural gas. As we know, natural gas
22 costs \$3 or less than in Pennsylvania where I am
23 stationed. There's plenty of natural gas. It's
24 whether you can get it around, because, as I
25 mentioned earlier, it serves a number of masters.

1 That is, it has a number of uses, high-value uses
2 in the economy. It has a lot of takers.

3 As a result, these kind of events happen
4 maybe once a year, maybe once every other year.
5 The stress on the system isn't going to be there
6 most of the year. Most of the year the pipeline
7 utilization is fine. It's just in these events.
8 And who wants to pay for the needed capacity? Who
9 wants to pay for the on-site fuel storage just for
10 those kinds of events? That's what we're driving
11 at.

12 COMMISSIONER GLICK: So on the New
13 England situation, if we were to build more
14 pipeline capacity, for instance into New England,
15 we wouldn't necessarily need more coal or
16 nuclear?

17 MR. BALASH: No, but to the extent that
18 you retire coal and nuclear, you increase the
19 stress on the natural gas system.

20 COMMISSIONER GLICK: With regard to the
21 operations of coal and nuclear during cold
22 weather events, you had indicated, and there was
23 some issues with wind, I guess the wind forecast,
24 between January 20th and January 30th. I think
25 it was 2018 -- yeah, 2018, we referenced there

1 was drop-off in wind.

2 And you -- I know in your testimony, you
3 had said, you talked about the reliability of the
4 coal and nuclear plants.

5 But wasn't it a fact that a lot of coal
6 and nuclear plants' capacity got shut down because
7 the cold weather impact, so, in fact, a couple of
8 nuclear plants went down?

9 MR. BALASH: Yes. There was some ice.
10 issues at nuclear plants. The event on the wind
11 I was referring to was 2019, this past January.

12 COMMISSIONER GLICK: So you were talking
13 about in MISO?

14 MR. BALASH: Yes, sir.

15 COMMISSIONER GLICK: Okay. Thank you.

16 COMMISSIONER MCNAMEE: I want to
17 continue a little bit about the reliability
18 issues. I'll start, Mark, I think with you,
19 because I think you made an interesting comment
20 about the issue of capacity problem versus an
21 energy problem, and this goes to the same thing
22 I've been thinking about in terms of reserve
23 margins.

24 For as long as I've been practicing, we
25 always talk about "reserve margins," and what I

1 want to know is, has the way that we have looked
2 at reserve margins changed over time to recognize
3 that the types of resources we have, the capacity
4 and resources operate differently? And we have
5 the intermittent resources.

6 We then also talked about that you might
7 not have the gas, whether because you can't get it
8 from capacity or because there's too much usage.

9 Do we -- has the way we've looked at
10 reserve margins in each of the RTOs; has it
11 changed over time to accommodate the changes, the
12 way the system is actually operating? And, if
13 not, what should we and the RTOs be thinking
14 about, about reserve margins?

15 MR. LAUBY: I'd say that, you know, many
16 of the RTOs and ISOs recognize the issue and have
17 been addressing it in a multifaceted way. I
18 think that there are some basic assumptions that
19 one uses when one starts looking at the one event
20 in 10 years based on the forced outage rates.
21 That -- to ensure you have a sufficient capacity
22 some of those assumptions come into question, and
23 that's why you need to start transitioning and
24 building the tools needed, making sure everybody
25 has those tools to actually answer the energy

1 challenge, rather than just focusing on capacity.
2 Because capacity's not going to get you there
3 anymore.

4 It's certainly an important parameter.
5 It's one of those -- you know, you have to have
6 capacity, don't get me wrong, but you also have to
7 have a sufficient energy or ability to create
8 energy when you need it and make sure it's there
9 to serve the consumer.

10 COMMISSIONER MCNAMEE: That seems.
11 consistent. I was fortunate enough to go out to
12 the California ISO, and they made the observation
13 that they're no longer looking at just peak
14 capacity but net peak capacity because of the duck
15 curve and that when the sun is, you know,
16 trailing off at 5:00, they simply still need the
17 power. So -- and I think that goes also to the
18 regional issues, that what California is dealing
19 with may be different than what PJM is dealing
20 with, may be different than what New England's
21 dealing with.

22 Is there a way that we can help ensure
23 that the different utilities, the different RTOs
24 are thinking about these things properly, not
25 doing a one-size-fits-all standard?

1 Because I don't think that would
2 probably work, but a way that we can encourage and
3 make sure that they're addressing these issues and
4 thinking about what their capacities are.

5 And not having them look at the wrong
6 standard. You know, when we always talk about,
7 you know, reserve margins, oh, we're at 16 percent
8 or ERCOT, you know, maybe they're not enough, but
9 is that really the right standard that everybody
10 should be looking at?

11 MR. LAUBY: Well, I guess, as far as,.
12 from our perspective, we continue the course, we
13 look forward out on performance and we also look
14 forward and see what's happening on the system.

15 When we do see folks that are getting
16 low on capacity, that's still an issue, okay,
17 because you don't have the flexibility in the
18 system you had before. When you have a few units
19 get forced out, and you have a little bit hotter
20 weather than was expected that's going to be an
21 issue, but also, don't forget about and make sure
22 you start looking at expected energy unserved look
23 at different contingencies that might get you into
24 those kind of issues as well.

25 Cold weather, guillotine cuts of

1 pipeline. You know, what are the ramifications of
2 those on your system, and how are you then going
3 to make sure that you have sufficient energy on
4 the system during those time periods as well.

5 COMMISSIONER MCNAMEE: Right. But I.
6 think that gets to one of my concerns is, are we
7 treating all capacity the same or is some
8 capacity different than others, you know? It's
9 okay if you know you can dispatch it tomorrow
10 because you know that the wind's going to be
11 available or the sun, but, you know, if you had
12 like we had in this past winter, where because of
13 the operation characteristics, maybe the wind
14 resources couldn't be used. Of course you can
15 fix the components, but just making sure that --
16 or what California's dealing with is, do they
17 have the right sort of capacity?

18 I'm not saying that they don't. But I'm
19 saying that they're thinking about those issues.
20 And we need to be making sure that people are
21 thinking about, Do they have the right type of
22 capacity?

23 MR. LAUBY: Yeah. Type of capacity, or.
24 type of resources, basically, right, so that in
25 the end when you have certain requirements for

1 energy, you have the right mix to get you that,
2 that energy.

3 COMMISSIONER MCNAMEE: Mr. Gallagher,
4 you had mentioned earlier that -- that we're not
5 necessarily addressing certain regional issues.
6 I believe that was in your testimony.

7 Do you have any examples of those, where
8 you think that we're not addressing the proper
9 regional issues, and we should be doing something
10 different?

11 MR. GALLAGHER: Yeah, I'm not familiar
12 with what you're saying, Commissioner.

13 COMMISSIONER MCNAMEE: Unfortunately,
14 writing down my notes, I recalled you mentioning
15 that there's certain times when we're not
16 addressing particular regional issues because
17 we're focused on national issues. I know you
18 support, generally, national standards.

19 But do you know of any issues where we
20 should be focusing on regional?

21 MR. GALLAGHER: Yeah. I think the
22 comment I was making was in terms of the
23 consistency, which is a challenge; it's not
24 necessarily a question of standard -- the
25 standard being national or local. It's that the

1 situation we walk into with each company that we
2 work with can be very different. So it's almost
3 a microcosm of that whole problem.

4 So it requires, especially in the CIP
5 area, a lot of flexibility. It requires that my
6 staff and the staff of all the regions keep their
7 credentials up, so they're current with the latest
8 technology, and that's a real challenge for us
9 because you get stale if you're not careful with
10 that.

11 And it requires being adaptable. And it
12 requires a good partnership with the entities that
13 we're working with. So we try to be very
14 proactive with that. And we have a very active
15 assist program, where we will work with entities,
16 even before they make the investment, if that's
17 useful to them. And we'll try to work with them
18 to find a way that's secure and compliant.

19 So I apologize if I confused you with my
20 earlier comment.

21 I don't believe that there's anything
22 that we're not paying attention to or the debate
23 about national versus local is harmful. It's just
24 that consistency is always going to be something
25 that we're chasing in the CIP world, and I just

1 want us to put it in the proper context.

2 COMMISSIONER MCNAMEE: That we need
3 new approaches to address risks?

4 MS. STERLING: The context of that
5 comment was that just always saying "we need a
6 standard" may not be flexible enough or timely
7 enough to address new risks, so we support many
8 of the efforts that NERC and the regions are
9 involved with right now.

10 The EMP task force is a good example.
11 The intermittent resource task force is another
12 good example where we're able to quickly get task
13 forces together to look at these new risks as
14 they're changing quickly, because the pace of
15 change has increased.

16 You know, when I started as a young
17 engineer, you know, change wasn't -- it really
18 wasn't changing and we were all integrated
19 utilities and things were pretty stable for a long
20 time. And things have changed quite a bit since
21 that time.

22 I will tell you that Mark and I are
23 cochairing a subcommittee now to look at how are
24 we structuring our technical committees so that
25 they are nimble and able to address these -- these

1 issues on a nonsiloed, quick way, so that we can
2 quickly put together a working group or task force
3 if the need arises.

4 And that's what I meant by that comment.

5 COMMISSIONER MCNAMEE: That's very
6 helpful. Thank you.

7 COMMISSION CHAIRMAN CHATTERJEE: We've.
8 got about 15 minutes left on the panel, and so I
9 think at this time, unless my colleagues have any
10 further followup, I was going to turn it over to
11 Staff to see if Staff wanted to engage with our
12 panelists.

13 MR. DODGE: Sure. Thank you very much.
14 I have a question about the annual state of the
15 reliability report and actually a couple
16 questions related to that.

17 And, you know, I recognize that there's
18 change in resource specs, and I guess the
19 question -- first part of the question is, what
20 changes does NERC plan on doing, or regions plan
21 on doing with the analysis associated with the
22 report? And this also kind of ties with one of
23 the questions one of the Commissioners had asked
24 as well: Do you envision changes in the metrics
25 that you're using the report to actually gauge the

1 reliability of the electric system going forward
2 as well?

3 MR. LAUBY: Yeah. I think it's a good
4 question. And as we look forward, and I'll
5 look at two timeframes: One, for example, if we
6 were to look ahead of long-term reliability
7 assessment. We have been doing number of
8 things at NERC to -- to improve our ability to
9 see what's happening based on the changes in
10 resources, frequency response, looking out five
11 to ten years, based on the mix that we -- the
12 information that we get -- what does that look
13 like, probabilistic assessment, so we start
14 getting more stochastic.

15 So we can start addressing some of the
16 energy issues and challenges there. So we're
17 looking at those kinds of augmentations to the --
18 to the LTRA, so that we can get a better view of
19 what, really, the risks look like based on the
20 changes to resources.

21 Now, on an ongoing basis, of course, we
22 do gather a lot of information with our ADD
23 Systems, and we have been improving those as well,
24 as you probably know.

25 We have added wind collection, now

1 solar-information collection. So we're continuing
2 to gather -- we're even looking at batteries here
3 down the road -- gathering more information about
4 their performance, because that feeds your
5 stochastic processes.

6 I mean, historical performance is no
7 guarantee, yada, yada, but it gives you an idea of
8 what the performance has been, and if you project
9 on the future, I know technology does change, but
10 you have an idea of what -- how to measure the
11 stochastic nature of the system in the future. So
12 that's some of the things we're looking at.

13 You know, load forecasting's a big deal.
14 We're also looking at what are the tools
15 industry's going to need to make sure they can
16 address these reliability issues, and how do we
17 get those tools in the hands of industry. What's
18 the best way to pull those kind of collaborations
19 together, so I think that's kind of the big one
20 that we've been kind of focused on.

21 MR. DODGE: So just a follow-up question
22 on that. This goes back to, you know, typically,
23 when we do the summer assessments and the winter
24 assessments, NERC looks at the capacity margins
25 and what the capacity-margin levels are.

1 And there's a lot of talk today about we
2 need to look more at the energy and what the fuel
3 resource is, and how many megawatt hours of energy
4 we can actually supply over a period of time based
5 on different resource mixes.

6 With a change in resource mix of the
7 generation fleet that's taking place, do you plan
8 on any change as to the reliability assessment to
9 dig into that more and actually put some specific
10 metrics in place to measure that?

11 MR. LAUBY: Yes. Yes.

12 MR. DODGE: Do you have any more details
13 in terms of --

14 MR. LAUBY: Of course, as you know,
15 we're a collaborative organization. We're working
16 with our regional-entity colleagues and of course
17 industry to identify what do those metrics look
18 like, and what kind of data we can get so we can
19 start pulling together the kind of measurements
20 going forward?

21 MR. LAUBY: We're looking for hourly.
22 information, and -- and, you know, what kind of
23 metrics would make sense to measure energy on a
24 forward-looking basis. It will be a stochastic
25 process, through.

1 MR. DODGE: I'm just going to make the
2 point, Andy, that we've got three really
3 interesting hotspots in the country right now
4 that are challenging most everything that
5 everybody in this room thinks about how an
6 electric system should be designed and operated.
7 California, right, has a very different resource
8 mix, highly dependent on solar, natural gas,
9 retiring baseload generation.

10 So we've got a little laboratory there
11 on kind of the issues surrounding that transition.

12 In Texas, you know, we were looking at
13 reserve margins that any one of us would scratch
14 our heads and say there's no way in hell they can
15 keep the lights on and yet they do, through the
16 way the market has worked, the way they've
17 incented generation performance, even through a
18 scorchingly hot summer last year.

19 So there's something in the soup there
20 that we need to understand that challenges how we
21 think about things. And then Gordon Van Welie up
22 in New England constantly finds another rabbit to
23 pull out of his hat to keep the lights on when any
24 of us would look at that situation and say it's
25 got to break.

1 So I think in addition to just kind of
2 continuous improvement around the report, one of
3 the things I'd like to see us do is to start to
4 really dissect these three laboratories and
5 understand what's really going on there that
6 should challenge the rules of thumb that we all
7 carry around in our head, you need to have a 15
8 percent reserve margin; you need to have this kind
9 and that, so on and so forth. Because it's
10 different; right? And the innovation that we're
11 seeing occur in these market areas predominantly,
12 because that's where these issues are epicentered,
13 there's really some understanding there that I
14 don't think we've baked into all of our thinking
15 around reliability.

16 And I think this is going to be a
17 learning curve for us for a period of time, and
18 we're kind of committed to stay on top of that.

19 MR. BROWN: Does anybody else have a
20 response to that question? Tim?

21 MR. GALLAGHER: I think it's a great
22 question, Andy. And I think there's a real danger
23 in trying to apply what we use today, what we've
24 used during the course of our careers to
25 tomorrow's system.

1 We've all acknowledged the system is
2 changing around us. Look no further than
3 resilience. When you and I were doing this stuff,
4 we had to be resilient against weather, storms,
5 highly-anticipated load growth, equipment failure.
6 We didn't have to think about being resilient
7 against coordinated, as Commissioner McNamee said,
8 intentional, multi-vector attacks. So things are
9 changing around us. We have to look for new
10 metrics, be open-minded, be innovative about it,
11 and not just fall back to what we used to do.

12 I tell my staff, we can't load floor
13 away everything anymore. The game has changed on
14 us. This is a great question. It's something we
15 all have to work collectively on.

16 MR. CASHIN: And I would agree with what
17 folks have said.

18 But one other piece, I think, that kind
19 of occurs to me, is that, you know, in a sense,
20 NERC's data collection is somewhat in its infancy.

21 I guess I would suggest, and kind of
22 what goes with that, you know, I think of baseball
23 statistics. There are things now that people look
24 at that for years they missed and what really
25 changed that was the fact that there was one

1 gentleman that came in, and started to communicate
2 well about the numbers as opposed to just focusing
3 on them in a siloed manner.

4 You know, I guess it kind of plays off
5 what Nick said, you know, communication is an
6 important piece. And I guess I would probably
7 suggest it's not as if I'm throwing that burden to
8 NERC, because I think it's a burden for industry
9 as well as the Commission to consider, I think,
10 with that as we go along. And the other piece of
11 that is, you know, I thought I heard some real
12 best practices coming out of Jim with respect to
13 Texas and other regions. And yet, they might be
14 market best practice, you know, because of that
15 division of reliability and markets, I hope that
16 those don't get lost, and are not communicated to
17 people if, indeed, those are things that people
18 from other parts of country can benefit from.

19 MR. DODGE: Okay. Thank you.

20 David?

21 MR. BALASH: I have a comment.

22 COMMISSIONER MCNAMEE: Oh, I'm sorry.

23 MR. BALASH: I have a comment. That's
24 okay. Just quickly.

25 I think the concept of net peak needs

1 more investigation, and not necessarily -- it
2 won't coincide necessarily with the peak on any
3 system. Whether it's a day or week and a year, or
4 a month and a year so that bears further
5 examination, because that makes one concentrate on
6 what resources are there ready to serve the system
7 at that time.

8 MR. DODGE: Thank you. David?

9 MR. ORTIZ: Yeah. Hi, there. I have.
10 two questions, one about the E-ISAC, then another
11 about the threshold and criteria with respect to
12 creating standards.

13 First, regarding the E-ISAC, you know,
14 within the budget and over the past few years,
15 consistent with the strategic plan the E-ISAC has
16 put together, significant investments that have
17 been put into that organization, and -- and, Jim,
18 you highlighted some innovations you've made
19 including an All-Points Bulletin with similar
20 activities.

21 I don't intend any critique, but I think
22 one thing would be helpful to illuminate for a lot
23 of us who don't get insight into the day-to-day
24 workings of the E-ISAC in so much as we might get
25 insight into other aspects of NERC, is tell us a

1 little bit about how the E-ISAC takes in
2 information, analyzes it, and disseminates it, in
3 particular how it works with its agencies and its
4 members.

5 And then also, I would like
6 Ms. Sterling's insight into how your members
7 engage with the E-ISAC and derive value from the
8 work that it's done.

9 MR. ROBB: And I have all of five
10 minutes to respond to that.

11 MR. ORTIZ: I have one more question,
12 too.

13 MR. ROBB: I'll give you the snapshot,.
14 but I'll extend the invitation. You should come
15 over and spend some time with the E-ISAC and
16 spend some time with the staff. I know a number
17 of the Commissioners have, and I think some
18 others have. And I think you'll get a better
19 sense for the day-to-day there.

20 But the important thing for the E-ISAC,
21 one, the relationship with the government partners
22 is absolutely critical, because they hold the
23 intelligence that -- that we use to help inform
24 the activities that we get out to industry.

25 And so it's important for that

1 organization to have strong trust-based
2 relationships with DOE, with DHS, with the NCEC,
3 right, increasingly the Department of Defense.
4 And so we focus a lot on -- on that relationship,
5 that series of relationships so that we're in the
6 information flow around -- around, you know,
7 threats as they evolve and become understood.

8 Yet, one of the premier programs that we
9 operate on behalf of industry is this program we
10 call CRISP, which is a passive monitoring of
11 enterprise systems for I don't know how many
12 companies we have in the program, but it covers
13 about 75 or 80 percent of meters in the U.S.

14 And it allows us to, in concert with the
15 DOE and the national labs, understand
16 inbound/outbound Internet traffic so we can find,
17 you know, if there's untoward or unintended
18 communications with China, with Russia, with the
19 Netherlands, which turns out to be an interesting
20 place for a lot of people, because the Internet
21 laws allow people to come through that angle.

22 And the E-ISAC has developed an amazing
23 statistic. They can take classified information,
24 identify it through CRISP, declassify it, and get
25 it inside out to the industry in 24 hours. That's

1 a pretty amazing accomplishment.

2 So that's an example of what they do.
3 We also take, have voluntary information-sharing
4 programs with industry that can come through
5 something as simple as an e-mail or a telephone
6 call, portal postings on the secured portal.

7 The analytical staff there will
8 triangulate, see what's going on, try to see if
9 there's one-off events, if we start to see
10 patterns, right, that we can then kind of alert
11 our government partners to an issue and/or
12 industry, depending on what -- what would be
13 required.

14 And then the real challenge for the
15 E-ISAC, and we heard it from Nick, and we hear
16 this every day, is taking information that we get
17 and figuring out, when do you get it out. Because
18 sometimes it's more valuable for the chief
19 security officer to get a faint signal than it is
20 a fully baked action plan.

21 So one of the things that we're
22 struggling with, with our advisors from industry
23 on the E-ISAC is, what should our threshold be for
24 alerting folks to an issue, and how well defined
25 does it need to be?

1 And the feedback we tend to get is give
2 us more sooner, right, because their chief
3 security officers will be looking at information
4 from the E-ISAC plus the room sources, and they're
5 in a better position to integrate that in some
6 cases than we are.

7 Our goal here is we're never going to
8 be -- I think as Jennifer said -- I don't think
9 we'll ever be a one-stop shop, that we'll be the
10 only source of intelligence that any decent chief
11 security officer is going to use. Our aspiration
12 is to be a critical part of that chain.

13 And I think to the extent that we can
14 take the programs that we've developed like CRISP,
15 you know, find ways to extend that to a broader
16 set of entities. And one of our aspirations in
17 working with DOE would be to create a similar-type
18 program for operating technology so we can
19 understand what might be going out in the
20 operations of the system, and those would be great
21 advances.

22 And the E-ISAC plays really, kind of, an
23 important intermediary role, if you will, between
24 industry and government, because we can sanitize
25 and disguise information so that it's not

1 attributable to any particular entity.

2 It's a whole range of things. You
3 should come visit.

4 MS. STERLING: So as you know, our
5 industry is committed to the success of the
6 E-ISAC, and that's why industry executives have
7 used, you know, really, their valuable time in
8 working with NERC to develop a multi-year plan to
9 invest more resources in the E-ISAC, to improve
10 the information sharing, to make sure that it's a
11 timely basis.

12 Jim's right; we -- our companies
13 interfaced with a multitude of different entities:
14 Government, local, state, the E-ISAC, but the key
15 is making sure that we all believe that the E-ISAC
16 can play a valuable and needed role in helping us
17 synthesize all of the information that we're
18 getting from different sources. And so we
19 participate actively on a number of levels.

20 MR. ROBB: I make one other, just,.
21 comment before you ask your next question, David.

22 The other issue is, I think what the
23 E-ISAC has been able to do that has been -- that
24 we have high hopes will prove to be very valuable,
25 is we forge relationships with other critical

1 sectors; right?

2 So we have a relationship with the
3 downstream natural gas sector, and they sit at the
4 same facility that we do.

5 We've created a relationship with the
6 water E-ISAC, with the multi-state E-ISAC that
7 serves a lot of public power entities, the oil and
8 natural gas E-ISAC. So it also can become a focal
9 point for cross-sector collaboration as well.

10 Because if something's developing on the
11 natural gas system, that's as important for the
12 electric sector to know as something developed
13 within a sector itself. So that's one of the
14 other areas that we're trying to expand our reach
15 horizontally, as well as vertically.

16 MR. ORTIZ: Thanks. Given that it's
17 actually exactly 11:00, I'll stand down on the
18 rest.

19 COMMISSION CHAIRMAN CHATTERJEE: Thank.
20 you, all. We will reconvene at 11:15 for Panel
21 2. Thank you.

22 (Off the record.)

23 COMMISSIONER MCNAMEE: We're going to
24 start now, the panel to talk about Cloud-Based
25 Services, and virtualization. In this important

1 issue, it deals with the opportunities that
2 technology provides. It also, obviously,
3 provides new challenges and new risks, so I look
4 forward to hearing -- hearing the statements.

5 And we'll also have some interesting
6 questions for you, I'm sure. I think you're
7 first.

8 MS. MAHAN: Of course. Hello,.
9 everybody, thank you so much for having me today.
10 My name is Ashley Mahan, and I am the acting
11 director of the Federal Risk and Authorization
12 Management Program.

13 So it's an absolute delight to be here
14 today, but what we are focused on is cloud
15 services and technologies and cyber security. So
16 exactly when the government is looking to use
17 these cloud technologies, how is our information
18 being protected in these environments, and that's
19 what FedRAMP sets out to do.

20 So every cloud environment that does
21 process, store, transmit federal information is
22 required to go through this authorization process
23 within government.

24 And we particularly apply to
25 infrastructure as a service, platform as a

1 service, and software as a service. Thank you.

2 MR. JACOBS: Good morning. I want to
3 say thank you for the opportunity to be here
4 today as a panelist, and as a new person to the
5 industry, I will be honored to address the
6 Commission.

7 My name is Antiwon Jacobs, and I'm a
8 director of IT security at SMUD, and also the
9 chief information security officer. I'm also here
10 on behalf of the APPA and the LPPC today.

11 The APPA and the LPPC supports the
12 Commission's efforts to encourage the evolution
13 and the potential adoption of cloud services and
14 virtualization.

15 With FERC and NERC support, registered
16 entities will finally be afforded the opportunity
17 to decide if leveraging these new technologies and
18 services are appropriate for their own
19 organization.

20 Industry is uncertain if they can be
21 leveraged while cloud-based service offerings
22 continue to increase as vendors are moving more
23 and more of these services to the cloud.

24 The APPA and LPPC recognize that with
25 them comes a greater need to understand associated

1 security risk and compliance obligations. It is
2 important that the electric industry, the entire
3 NERC enterprise, and FERC recognize that while
4 virtualization and cloud services are related, the
5 barriers to adoption of each are different.

6 Many entities use cloud service
7 providers to manage a variety of business
8 processes outside of power systems and power
9 operations to increase visibility into system
10 operations and security, improve systems
11 availability, and reduce resource requirements.

12 If done with care, cloud solutions can
13 reduce risk, increase flexibility, and improve
14 security posture of the bulk electric system.

15 Thank you again and looking forward to
16 the questions from the Commission today.

17 MR. ROSENTHAL: Good morning. Thank.
18 you, Commission, for this opportunity to speak to
19 you on cloud services. These are opportunities
20 that can transform our industry and make our
21 systems more reliable, resilient and secure.

22 Cloud services are tools to solve
23 problems no different in regard to servers,
24 databases and software, tools we use every day.
25 It's important to recall that there was a time

1 when each of these technologies was new, untested,
2 and not considered industry standard.

3 Today, it is difficult to imagine how we
4 could do our work effectively and efficiently
5 without these technologies. I believe this is a
6 lens through which we can view cloud services.

7 At MISO, I spent eight years as a
8 director of IT infrastructure prior to my current
9 role as director of incident response system
10 recovery. Having the responsibility for all
11 servers, network, storage, desktop, telecom
12 systems at MISO for eight years, means I
13 understand the importance of reliability and
14 security.

15 I've also lead NERC drafting teams,
16 including last year's CIP-8 Incident Reporting
17 Initiative, and my current drafting team which is
18 focused on cyber system information in the cloud.
19 It's no longer a question of whether cloud
20 services has a place in industry, rather, the
21 question is when.

22 Major software vendors have moved
23 quickly from a cloud-first to a cloud-only
24 mindset, and that tells us that older non-cloud
25 technologies upon which we rely on today will not

1 be supported indefinitely. Our challenge is to
2 shape how cloud services are intended, and to our
3 industry's core mission of reliability and
4 security. FERC and NERC both have a role in this
5 effort.

6 Cloud services can mean different things
7 to different people, the National Institute of
8 Standards and Technology has a solid definition,
9 and they've defined the essential characteristics
10 of cloud service to include the following.

11 On-demand, broad access, resource
12 pooling, rapid elasticity, measure services.
13 Business definitions informs these comments.

14 In addition to reliability and security,
15 cloud computing offers other benefits to our
16 industry, including redundancy, resiliency, and
17 recovery of data systems. The rapid scalability
18 of these services allows organizations to flex to
19 meet peak needs.

20 With the right securities in place,
21 cloud services provides -- providers can respond
22 rapidly to an evolving threat environment. Under
23 these services carries some concerns, for example,
24 ensuring availability of the system is vital.

25 As grid operators and utilities, we

1 understand and strive for 100 percent
2 availability. We must work to ensure that the
3 industry can safely and reliably navigate and
4 transition to these cloud services. Two concerns
5 typically dissuade the industry from considering
6 cloud services, the first, how do we securely
7 manage best cybersystem information in the cloud?

8 And second, how do we securely and
9 reliably manage best cybersystems in the cloud?
10 The first -- the first concern is with information
11 management, while the second is more challenging
12 as it touches on how we move our critical systems
13 to the cloud, and maintain physical security,
14 cyber security, and reliability when we do so.

15 We in industry and our regulators must
16 consider how regulatory requirements adapt to such
17 a rapidly evolving set of changes and how we
18 continue to innovate and enhance reliability,
19 resilience, and security in our system.

20 There's no longer a question of whether
21 cloud services has a place in the industry. The
22 question is when and how cloud services will work
23 in our industry. The industry would benefit from
24 a focused attention by the Commission to advance
25 the ability of companies to appropriately

1 incorporate and leverage the economic reliability
2 and security benefits of a cloud computer.
3 Technologies and innovations are outpacing NERC
4 standards development, especially in NERC CIP
5 space.

6 We recommend the Commission further
7 engage industry and complete key cloud solution
8 providers and developers in one or more technical
9 conferences to clarify issues and direct timely
10 industry action to establish a way forward with
11 changes to CIP standards, specifically to
12 accommodate cloud services. Thank you.

13 MR. BALL: Good morning. And thank you.

14 I'm Michael Ball, and I'm the chief
15 security officer for Berkshire Hathaway Energy.
16 It's a privilege to be here today to talk about
17 this important topic.

18 When it comes to cloud computing as it
19 relates to how we operate our business, not only
20 as a business systems but also our operational
21 systems, you know, there is no question that cloud
22 is not only a part of the fabric of the way we
23 manage technology today, but it is clearly a path
24 to the future as well.

25 So the discussion is going to be

1 important. And I think three basic premises that
2 I would really, really focus my discussion on
3 today. The first one just simply that, you know,
4 cloud solutions are upon us today, and all of our
5 you know, enterprise businesses in the corporate
6 IT arena, if you're working with third parties,
7 you are oftentimes working with third parties that
8 are, in fact, utilizing a cloud service.

9 We are, in an -- at a time when cloud
10 services are unclear, in terms of the
11 relationships we have. How well do our third
12 parties manage these. These are all part of the
13 discussion that we need to have relative to this,
14 but it is on us today.

15 In our organization, we are very
16 conservative about how we embrace it, and I'll
17 talk a little bit more about that, but I think
18 it's important to realize that we have to be
19 excellent; we have to excel in our ability to
20 leverage and manage cloud-based and virtualization
21 technologies. The second part of that is really
22 is you cannot outsource risk.

23 Oftentimes, service providers will come
24 to you with the concept of this is a more secure
25 platform.

1 This -- we're going hear about services
2 that have tremendous security opportunities well
3 above what we may have in our own enterprises.
4 But it is not the third party; it is not the
5 service provider that provides the security. It
6 is us as the entity. We are accountable.

7 I am accountable for making sure that we
8 deploy cloud-based technologies in a secure and
9 reliable manner, so that is going to be essential
10 in the way we do our business.

11 You know, I think that is where we
12 inherit significant risk as well, because the
13 question is, if I can assert to you that I manage
14 a very -- our environment and our services in a
15 secure manner, can I assert that the third parties
16 are doing the same when they leverage the cloud?
17 And that's a very difficult conversation. It's
18 very difficult to prove that, and we need continue
19 to evolve our capabilities and space and put
20 expectations on those third parties, but we own
21 the risk, so it's a central part of that.

22 And then, thirdly, and lastly, really,
23 we need to look at, when we -- relative to
24 standards that, you know, the way they're defined.
25 Right now, the NERC CIP standards are very

1 specific around assets, but as we transition into
2 cloud-based solutions, this is not an asset-based
3 solution. It's a complex network of assets that
4 work together as a system.

5 And so how does the language, in terms
6 of our standards, apply to us when we want to
7 evidence our compliance to a particular standard?
8 So that is where we have a tremendous opportunity
9 to partner -- the Commission has a tremendous
10 opportunity to partner with industry on how do we
11 tackle the view of -- how do we make sure that we
12 secure these assets?

13 How do we demonstrate we can secure them
14 when we've leveraged them where third parties are
15 a significant part of the equation? So that's
16 just what I see as our challenge. It's a great
17 opportunity though for us to tackle, and certainly
18 look forward to additional conversation around the
19 topic. Thank you very much for the opportunity to
20 be here.

21 MS. TRUHE: On behalf of PPL Electric
22 Utilities thank you for inviting for me to
23 participate in the FERC Technical Conference.
24 PPL serves approximately 1.4 million customers
25 spread across 10,000 square miles in Central and

1 Eastern Pennsylvania.

2 I'm proud to say that we've won 27 JD
3 Power Awards for providing top-quality service to
4 our residential and business customers. PPL
5 believes in incorporating new technology,
6 increases reliability, and meets customers'
7 changing expectations. Our company has researched
8 and implemented new technologies including
9 virtualization and private cloud for non-BES
10 services as well as data analytics for productive
11 maintenance, and we are seeing benefits.

12 As new technologies are implemented, we
13 must remain vigilant to respond to the
14 ever-changing cyber and physical threats against
15 our industry while we are committed to meeting the
16 NERC reliability standards; we see them as only a
17 minimum requirement. Our focus is on reliability
18 and security, and, subsequently, we expect to
19 exceed the compliance requirements.

20 We want to continue implementing new
21 technologies. The new technologies can provide a
22 step-level increase in daily operations, such as
23 faster security patching, more robust access
24 models and immediate scalability. If used in a
25 secure manner, these technologies can have major

1 benefits. Selecting the most cost-effective
2 technology with appropriate security models is
3 beneficial for our customers.

4 At the same time, cost recovery for on-
5 and off-premise infrastructure must be considered.
6 We support the NERC reliability standards that set
7 a security standard without limiting
8 implementation options. Developing standards and
9 enable new technologies without major changes will
10 be a win for the entire industry.

11 Emerging technologies should be
12 evaluated for their impact to reliability,
13 security, and our customers. Manage service
14 providers have a role in our success or failure as
15 the industry moves off premise with
16 infrastructure, platform, software, and security
17 as a service.

18 The industry needs the partnerships from
19 the MSPs. Clear roles and responsibilities for
20 the various risk areas is critical. PPL supports
21 a model of independent third-party assessments and
22 recurring monitoring to provide assurance of
23 services including the security posture to both
24 the registered entity and the ERO.

25 Similar to the independent testing for

1 completeness and accuracy of financial data under
2 the Sarbanes-Oxley Section 404, the ERO could
3 perform sampling or rely upon independent
4 assessments and certifications of the MSP security
5 programs. PPL recognizes that there are still
6 unknowns that need research and collaboration.
7 Embracing emerging technologies is required to
8 meet the fast-paced changes in the industry, and
9 the external forces affecting our industry. We
10 are mindful of the process changes that are needed
11 as well as the need to understand and address the
12 new risks.

13 We look forward to partnering with the
14 ERO, FERC, and other stakeholders to build and
15 maintain the secure power grid to meet the
16 customer needs of today and tomorrow.

17 MR. SOUTH: Good morning. Thank you.
18 very much for the opportunity to talk on behalf
19 of Amazon Web Services on this very important
20 topic with all of you. My name is Michael South.
21 I lead the security and compliance for the AWS
22 public sector across the Americas.

23 Rather than starting off with talking
24 about AWS and our capabilities and services, I'd
25 like to share with you my actual personal journey

1 to the cloud from a security professional
2 perspective.

3 So I spent 25 years in the U.S. Navy,
4 where I led the operations of networks and data
5 centers within Europe. I was a CIO for Japan, and
6 I was the lead for cyber security for the Navy in
7 Asia.

8 In that role, I managed traditional data
9 centers and networks and a very stringent and
10 strict security posture, similar to what regulated
11 entities see today.

12 When I left the Navy, I went to the city
13 of Washington, DC, where I was a deputy CISO, a
14 chief information security officer, for the city
15 with a strategic focus of government's risk and
16 compliance. When I arrived, the city was starting
17 to move to the cloud.

18 The DC Healthcare Exchange, which was
19 the city's implementation of the Affordable Care
20 Act was going into AWS. While I had used services
21 such as Dropbox on a personal level at a
22 professional level with my security background,
23 understanding, you know, the threats are out there
24 from the very mundane to nation-state, I was
25 completely against the city moving to the cloud.

1 We had just about every type of
2 compliance requirement within the City had to be
3 met, FERPA for schools, CIGAS for police
4 department, PCI for credit cards. You name it,
5 pretty much existed within the city. I was very
6 adamant against moving to the cloud. However,
7 being a security professional, I prided myself in
8 not being in the department of no.

9 I took it upon myself to learn to try to
10 figure out what the cloud really is and what it is
11 not, because it's a very nebulous term. There's a
12 lot of misinformation out there, and there's a lot
13 of labels slapped on products that can be very --
14 a little bit misleading as to what really is the
15 cloud. So I tasked myself and my staff to really
16 learn about what the cloud was, and how we can
17 achieve our security objectives in the cloud and
18 meet our compliance requirement.

19 It didn't take us long for us to
20 actually figure out that, yes, we could really
21 achieve all of that, some of the services, some of
22 the technologies might be a little bit different,
23 but we could actually achieve those same results
24 within the cloud.

25 It also highlighted a couple of things

1 that we weren't expecting. We had gotten to the
2 point in our on-creme environments that over the
3 last decade we've gotten kind of used to how
4 things are the reality of the situation.

5 And what the cloud started highlighting
6 for us were there were significant improvements
7 that we were not expecting. The first was
8 visibility.

9 So when you look at your top CIS top 20
10 control, controls one and two is inventory of your
11 network, your hardware and software. That's a big
12 challenge in today's on-creme environment, and it
13 kind of goes against the paradigm where if you
14 physically own your servers, you physically
15 control your data centers that somehow you have
16 greater visibility.

17 But in today's virtual world, that
18 really doesn't hold water anymore, and then from
19 there, the resiliency. You'd be surprised the
20 number of critical applications for military,
21 cities, governments, and so forth, that would live
22 in one server stack and one data center. If
23 there's a failure, then that service is now down
24 for whatever the mission is, and that's really
25 unacceptable. And so we've started seeing the

1 reliability, and resiliency of the cloud as being
2 quite significantly different and something that
3 we weren't expecting.

4 And the last thing, really from a
5 security operations perspective, is the ability to
6 automate. When you -- the only way we were able
7 to keep up with the cyber security threats of
8 today is to be able to automate remediated
9 actions.

10 A human, as great as they can be, as
11 smart as we can be, we cannot keep up with the
12 number of attacks and events that are occurring in
13 our environment to do the research and do the
14 mitigating actions. We've got to be able to
15 automate to be able to scale, and keep up with
16 those threats.

17 COMMISSIONER MCNAMEE: Thank you all,.
18 and thank you all for being here, and for taking
19 your time to join us, and provide this
20 information.

21 The one thing that I think happens is we
22 look at the use of technology, we keep on hearing
23 about all the threats with technology, and we
24 sometimes don't focus enough on what the benefits
25 of the technology is.

1 We'll get into the threat issues, but
2 I'd like you all to talk a little bit about -- a
3 little bit more about what you see the benefits of
4 virtualization and cloud computing is, not just
5 from a security standpoint, but just a benefit for
6 the utilities and for those who use them and for,
7 ultimately, cyclical standard rate pairs, any of
8 you can choose to answer that.

9 MR. BALL: I'll take an initial cut at.
10 that. Certainly a good question because when we
11 look at the types of cloud services that are out
12 there, we see a lot of opportunities, not only to
13 leverage it, but it's a real enabler.

14 In our case -- you know, we have -- one
15 of the great opportunities to take data from
16 disparate locations, to aggregate that, to be able
17 to do, you know, big data analytics.

18 And cloud-type solutions are really big,
19 significant enablers of that, where we might have
20 had to have, you know, very localized data points,
21 and be able -- how do you do that on premises and
22 load your networks up and try to gather that?

23 We've found that, you know, we've been
24 able to extract data, not having a cloud presence
25 within, or operation within our controlled

1 environment, but being able to extract data out,
2 then aggregate it, and then be able to do the
3 analytics. And it looks -- it allows us to look
4 at our asset base. It's performance; how can we
5 optimize it, you know, the operation of that. I
6 think that leads into our ability to have
7 consistent, more reliable energy generation.

8 So I think these are good -- good ways
9 to leverage that technology and being able to
10 aggregate, again, data from very disparate,
11 disparate locations throughout our various
12 networks. We cover roughly 18 states, so, anyway.

13 MS. MAHAN: I'll just add from my
14 standpoint. So, you know, one of the insights
15 that I've gathered in this role over the past few
16 years is that industry is constantly researching
17 and developing innovation in looking to apply
18 security to their technology.

19 This their craft, right, this isn't an
20 afterthought for them, and so if there is a way
21 that we can harness this innovation in the cloud,
22 ensure and understand from a transparency
23 standpoint how our information's being protected,
24 we don't want to recreate the wheel internally
25 within our own organizations; right?

1 So if we can establish that process,
2 which FedRAMP is an enabler of, of understanding
3 how our data's being protected, how it's being
4 maintained in these environments, and the constant
5 vigilance that these largely industry providers
6 are providing, that could give us some kind of
7 reassurance; right, that our information is
8 safeguarded appropriately within these
9 environments?

10 MR. JACOBS: I will add to that as well.
11 I think I see there's some benefits there in
12 leveraging the expertise of these service
13 providers, the cloud service providers, and I
14 think there's also benefit to actually leveraging
15 some of the services that they offer in terms of
16 security monitoring -- and let me back up. And
17 to security monitoring and compliance.

18 Right now, I think there is challenges
19 with the data piece, and taking that data and
20 being able to do something with it, from an
21 analytic standpoint and staff is consumed with
22 that. I think the power of the cloud brings the
23 opportunity for us to do some of those things for,
24 say, for example, the ECUMS and the PAC systems to
25 do some of the event monitoring.

1 There's also an opportunity for that
2 data piece for the BES cyberinformation for us to
3 leverage the cloud for storage and being able to
4 manage that across the entities is very easy.

5 MR. ROSENTHAL: And I'd like to go ahead
6 and add to that, too. And I'm going to take a
7 non-cyber view on this. So one of the benefits
8 that we see, right now the Commission process at
9 MISO is one of the longest processes that we
10 have. It takes quite a long time to provision
11 servers and get them ready for use.

12 So one of the things that virtualization
13 does, it allows us to do a quick turn on that and
14 build from templates pre-hardened that are ready
15 to go immediately. The cloud's also an enabler
16 for that.

17 There's also another piece that is big
18 and that is from the recoverability perspective,
19 when you think about virtualization, a virtual
20 machine is really just a big file with a
21 configuration applied to it. And so when you want
22 to actually do a recovery, it makes it very simple
23 and very quick.

24 As a matter of fact, the CIP
25 requirements, the CIP 9R2.3 last year which

1 basically said you had to operationally test your
2 backup and recovery process within every 36
3 months, what we found was recovering our virtual
4 machines was so simple. It was so fast because we
5 could recover a file and apply a state to it, and
6 we were back up and running.

7 Where when we actually had to recover
8 our physical servers, it took a significant amount
9 of time and sometimes we failed. So we had to
10 reinvent our process. So there's some benefits
11 that virtualization and cloud offer that are
12 beyond just the security model.

13 MS. TRUHE: I'd like to add that there.
14 is a -- there are resource constraints from an IT
15 and cyber security perspective. We've seen the
16 numbers where there's a shortage of qualified
17 candidates, and if the entire industry is
18 competing for those same resources, and many of
19 them want to go to the -- you know, to the Google
20 and to the Amazon and to the snazzy places and
21 not to the utility industry, you know, we're at a
22 loss. And going to the cloud, using
23 virtualization can help address that issue.

24 MR. SOUTH: I'd like to start with
25 virtualization.

1 The fact is hardware fails. It will
2 always fail at some moment in time. And when you
3 have a critical application tied to hardware, then
4 you're going to be relying on when that hardware
5 is repaired and/or replaced which is sometimes can
6 take an even longer time period.

7 With the ability of virtualization, as
8 Mr. Rosenthal highlighted, you're able to take
9 that file, that virtual server, and you're able to
10 restore it on any piece of hardware that you have
11 available or that you have within the cloud within
12 a few minutes, okay.

13 So that, right off the bat, is a big win
14 for that disaster recovery. But taking that a
15 step further, when you're able to build that
16 application on resilient infrastructure where you
17 can have a single application spanning multiple
18 data centers, so whether it's a server failure or
19 a full data center failure, you're able to load
20 balance across that, so your application and your
21 customers, you know, never see an outage. And
22 then within seconds, the actual infrastructure
23 provides a self-healing opportunity so that when a
24 server fails in one data center, or a whole data
25 center fails, everything is load-balanced over, it

1 self-heals.

2 It starts spinning up new servers to
3 replace the failed server and then redistributes
4 the load again. So it's self-healing.

5 This allows you to shift from a reactive
6 disaster recovery risk model, to a proactive
7 resiliency risk model; right? So you never get
8 risk down to zero, but you're going to be able to
9 mitigate much more of that risk on the front-end
10 rather than on the back-end, and rely on backups.

11 COMMISSIONER MCNAMEE: Let me follow up.
12 on that point, is that as more and more of the
13 industry moves to using -- using the cloud, are
14 there multiple -- you know, are there multiple
15 data centers that have the same information or
16 share the same information, so that if one data
17 center goes down, you're not going to be wiping
18 out the information necessary for a whole group
19 of utilities to operate versus just one using
20 their ability to operate?

21 MR. SOUTH: Yes, sir, that depends on
22 the services you specifically want to use.

23 So within AWS, we have over 160
24 different services. So one, for example, is our
25 S3, which is our simple storage service. That's

1 your object store, that's where you can put files
2 into.

3 When you submit a file into S3, what we
4 call an S3 bucket, think of like a hard drive, but
5 we call it a bucket. When you submit that file
6 into a bucket, it actually is distributed across
7 at least three different data centers within the
8 region; okay?

9 So within that, in addition to that,
10 that file's actually what we call "sharded," so
11 it's actually split up into chunks across multiple
12 hardware platforms within that. So, for one, if
13 somebody -- we can go into a whole other
14 discussion about our physical security, but if
15 somebody was actually to get a hard drive, they
16 still wouldn't actually have access to that data.
17 They would only get a piece of that data, and with
18 the way it's sharded, it would be unintelligible
19 for them.

20 And so, again, so there's three copies
21 within that region so that when you actually -- if
22 lose the whole data center, we don't lose
23 anything, that actually is presented back. We
24 don't actually lose that data.

25 So S3 has a durability of eleven 9's, so

1 that's 99., and then another 99 percent
2 durability, as far as not being able to lose that
3 data.

4 Now, as far as your virtual servers,
5 what we call EC2 instances, EC2 is our elastic
6 cloud compute, that's the service that we have
7 that provides the virtual servers.

8 EC2, if you only have the one EC2
9 instance, and that's one server that's going to
10 physically be in one data center, you're going to
11 want to architect your applications so that there
12 are actually multiple, at least two, if not three,
13 in different data centers.

14 When you're ready to do that with AWS,
15 you select what we call an availability zone. An
16 availability zone is a logical fault isolation
17 zone. And so this is how our data centers are
18 grouped.

19 Within each availability zone is at
20 least one data center. But there are oftentimes
21 many more within that availability zone. So that
22 if we lose a data center, again, we have low
23 balancing services spanning the abilities on the
24 data centers, so you don't actually lose your
25 application.

1 So, again, it varies depending on
2 service. Some are inherent; you don't really have
3 to do anything other than turn it on and use it.
4 Others you have to specifically architect for
5 that.

6 COMMISSIONER MCNAMEE: That's helpful,.
7 and that goes, then, to the second part, and that
8 is, Mr. Ball, you made the observation that you
9 can't outsource -- outsource the risk. How
10 should we look at, you know -- clearly Amazon and
11 others have already thought about different
12 risks, and so they offer services that help
13 mitigate those risks.

14 But how do we ensure that the utilities,
15 the participants are not outsourcing that risk and
16 just relying -- to make sure that we are having at
17 least a good minimum standard to make sure that --
18 that the services that are purchased from -- from
19 cloud services, that they're sufficient in order
20 to protect, ultimately, the system?

21 MR. BALL: So I might just comment on
22 that. Certainly, Mr. South really mentioned a key
23 word in the service offerings from Amazon is that
24 it's how you architect it.

25 And that goes back to, you know, in the

1 entities that -- that look for services, you need
2 to make sure that you have adequate architect
3 folks that are highly skilled in cloud -- cloud
4 solutions, that know how to architect -- how to
5 architect the solution, such that the work-free
6 organization -- how it integrates with the
7 organization.

8 These are fundamental -- the fundamental
9 aspects of it. So number one, I would just say
10 that, you know, just really supporting what --
11 what Mr. South was saying, is that you just have
12 to architect it well in order to get the benefits
13 that can be offered through these services.

14 And that's not just -- you know, in
15 terms of managing risk, it's not just
16 architecture, but it's how do you implement it?
17 So, and how does it integrate into your
18 organization? How does it -- how is it
19 administered, you know, because you -- you still
20 have a responsibility as an entity to administer
21 that -- that relationship or the service.

22 So, again, is -- if I'm looking at a
23 company, I'm looking at what is their framework,
24 what is the framework they use in terms of
25 resources and standards that they apply to those

1 third parties and how do they manage, not only on
2 a day-to-day basis, but how do they verify? So
3 that's -- that's probably looking at an entity,
4 it's going to be making sure they have a very
5 good, solid foundation there.

6 COMMISSIONER MCNAMEE: And this will be
7 my last question, then my colleagues can ask
8 questions. But to that point is, is there
9 anything that we, as the Commission, should be
10 doing, that NERC should be looking at; should
11 there be CIP standards in order to make sure that
12 everybody that's in the energy industry is
13 meeting a minimum standard for trying to get that
14 architecture to make those procurements that meet
15 at least a minimum standard or at least force
16 them to think about it? Should we be doing
17 anything?

18 MR. SOUTH: If I can, real quick. I
19 think I have two quick thoughts.

20 First, is the large CSPs like us, we're
21 being audited almost every day of the year by
22 third-party auditors. You know, companies like
23 Ernst & Young and Coalfire.

24 And so there are no real new controls
25 out there. All right. So all the controls,

1 whether NIST, ISO, they're worded a little bit
2 differently, but they exist, and we're being
3 audited to those almost on a daily basis.

4 And so we provide those third-party
5 audit reports to our customers. So you can
6 actually trust but verify everything we say. You
7 can see the specific controls that we've
8 implemented and how we've been assessed against
9 those controls.

10 So whether it's against a SOC 2, a PCI,
11 FedRAMP under the federal, you can actually see
12 how we're doing and how we're assessed. So I
13 think there's an opportunity to leverage those
14 existing industry and international standards, and
15 those audit reports as a way to take a look at
16 what controls you're inheriting and how we are.

17 And the second thing is as the critical
18 infrastructure sector, the NIST cyber security
19 framework, we have a white paper, and we've mapped
20 our services to the various subcategories of the
21 CSF to help our customers understand if they use
22 the CSF as -- for the organization as a whole, so
23 they can see where AWS services map in and how
24 they can be used to support those various
25 subcategories.

1 So now you don't have to look at the
2 cloud as being something so unique and different;
3 you've got to try to figure out how to manage it
4 and how it fits in.

5 We can provide that mapping already for
6 you as well.

7 MR. JACOBS: Hi. I would just like to.
8 add that I feel that when you go into -- when you
9 leverage a cloud solution, you actually have to
10 look at it as an extension of your infrastructure,
11 and you have to take ownership
12 and manage that relationship with the cloud
13 service provider.

14 Industry can echo, it can echo that;
15 industry can leverage external certification and
16 accreditations to gain some risk assurance, that
17 those controls are implemented that are -- are
18 directly related to our CIP requirements.

19 I know that the requirements don't
20 specifically address cloud and virtualization, but
21 the requirements there do translate across to
22 those different external accreditations.

23 MR. ROSENTHAL: And I just want to
24 support that. I want to say that, you know, where
25 can you help, FERC or NERC, you know, from an

1 endorsement perspective of the accreditations.

2 Help us be able to move that forward more

3 quickly.

4 We know that from a risk perspective or,

5 I guess, I should back up and say from a fine

6 perspective, the registered entity is on the hook

7 from a CIP perspective. That's pretty black and

8 white. And I don't think you can deflect or -- or

9 put that risk onto the -- to cloud provider, but

10 one thing that you can do is help us understand

11 that the cloud provider, it does have a good risk

12 framework, and they're managing that.

13 And then through contracts and things

14 like that, we can help draw out some of that

15 language, but I think through the endorsement, it

16 will really go a long way.

17 MR. BALL: I would just add to the -- to

18 the good dialogue. I think one area, also, of

19 focus is just as we look at advancing our

20 standards, it's really about encouraging, you

21 know, bringing industry together, you know,

22 updating or enhancing language, that can account

23 to some of the nuances of this type of

24 technology.

25 For example, if you just look at the

1 existing CIP standards, there are things that just
2 make it very difficult, CIP 002, in terms of asset
3 definition. You know, how do we apply an
4 electronic security perimeter to a cloud
5 implementation?

6 How to -- you know, all of these are
7 very relevant to a lot of implementations we're
8 going to have today. The question is how do we
9 have this other -- this other aspect of technology
10 enablers that we are, you know, we are poised to
11 embrace in an increasing manner?

12 So I think just creating a platform for
13 that discussion that would advance our standards
14 is going to be about the best thing we could do.

15 COMMISSIONER LaFLEUR: Thank you very
16 much. Really interesting discussion. And this
17 is not a topic that I know that much about. We
18 had a lot of jokes on my team about what kind of
19 stupid questions I could ask about backing up my
20 phone to the cloud, but I hope I've advanced
21 slightly beyond that.

22 It was just interesting hearing the
23 answers to the question on the benefits of using
24 the cloud and virtualization, and especially, Mr.
25 South's experiences at the city because we

1 obviously don't want to deprive the people who
2 rely on the bulk electric grid of getting the
3 latest technology. This kind of comes up in the
4 5G discussions this afternoon, too. Yet, we also
5 want to make sure it's properly protected; the
6 standards aren't supposed to be there to hinder
7 people doing the best thing.

8 So I just -- I think I am going to start
9 by boring in a little more on Commissioner
10 McNamee's question. This is the second year in a
11 row that this has come up at the tech conference.

12 If I remember correctly, SPP brought it
13 up last year, the need to update standards for the
14 cloud. But we haven't gotten any standards
15 filings or directed any changes to the standards
16 that I'm aware of.

17 And Mr. Rosenthal, in your prefile
18 testimony, you said that there's a SAR drafting
19 team working on CIP modifications. Should we --
20 should we expect something to be coming in? I
21 mean, how do we best unpack this? Because they
22 were not put in place to keep people from doing,
23 you know, what's best. How -- should we get
24 formally involved?

25 I know that one of you mentioned a

1 workshop or -- but are -- are there standards that
2 are ripe for updating, we just haven't identified
3 them? Or what should -- how are we going to get
4 there?

5 MR. ROSENTHAL: So I'll go ahead and.
6 address that. So I had the honor of chairing the
7 CIP-8 drafting team last year, and we had, for --
8 for the Commission, you know, it was passed on
9 Thursday, and we had a six-month window that FERC
10 gave us to get that done.

11 And having that window, having that
12 tight schedule, really drove us to deliver a
13 good-quality product.

14 COMMISSIONER LaFLEUR: And so has that
15 been filed with us now in the --

16 MR. ROSENTHAL: Oh, you mean the CIP-8;
17 you mean the -- the modifications to CIP-8 --

18 COMMISSIONER LaFLEUR: Yes, I'm sorry.

19 MR. ROSENTHAL: -- just was approved.
20 last week. So -- so that six-month window that
21 came with the FERC order helped us a lot. It put
22 a lot of additional pressure on us.

23 COMMISSIONER LaFLEUR: And I don't --
24 you're talking the supply chain; right?

25 MR. ROSENTHAL: No, no, no. This is

1 incident reporting.

2 COMMISSIONER LaFLEUR: Oh, okay. I'm
3 sorry.

4 MR. ROSENTHAL: Incident reporting. No,
5 that's okay.

6 COMMISSIONER LaFLEUR: I don't know all
7 the --

8 MR. ROSENTHAL: I'm sorry. I --

9 COMMISSIONER LaFLEUR: I know the words.

10 MR. ROSENTHAL: On the incident
11 reporting.

12 COMMISSIONER LaFLEUR: Yes, but that was
13 one we directed in response --

14 MR. ROSENTHAL: Correct.

15 COMMISSIONER LaFLEUR: -- to an earlier
16 filing and gave a deadline. This one, I don't
17 know there's any directives out there.

18 MR. ROSENTHAL: That's exactly my point.
19 So right now, we have a SAR; right? We have a
20 request that's actually been driven by industry
21 as opposed to through the Commission to actually
22 do something. And in this case, it's about
23 updating the standards so that we can put BES
24 cybersystem information, or the information
25 that's the crown jewels for a lot of our systems

1 in the bad hands can hurt us; right? IP address,
2 system information, network maps.

3 And so that SAR was driven by industry.
4 So the team is spinning up right now, we're going
5 to start our meetings -- we've started our
6 meetings actually already. We'll most likely be
7 authorized by NERC here in the late July time
8 frame.

9 And then we're going to be on about a
10 six- to nine-month turnaround to get that done.
11 But one of the things where you can really help is
12 I'd like to see FERC -- I'd like to see the
13 Commission drive towards enabling cloud, so --

14 COMMISSIONER LaFLEUR: So, like, issue a
15 directive to update standards?

16 MR. ROSENTHAL: Correct. I kind of joke
17 about it. Sometimes it's like as I grew up, I
18 knew that I had to clean my room, but it wasn't
19 until my parents told me clean your room was I
20 cleaning my room regularly; right?

21 So I think that that can put a little
22 bit of urgency, and also kind of time box it,
23 because if you look at what's currently in flight
24 for virtualization, those standard modifications
25 have been in flight since 2016. And that's a long

1 period.

2 COMMISSIONER LaFLEUR: Well, that's very
3 helpful. And your answer, also, kind of teased
4 out another thing I wanted to ask about that.

5 A lot of -- and this is consistent with
6 both the direction I think FERC is going and the
7 direction that NERC is going. A lot of our work
8 in the general reliability and security area is
9 increasingly risk based and kind of premised on
10 different forms of risk.

11 So on the cyber security standards, we
12 have low, medium, and high assets in the physical
13 security, there was a tiering of the most
14 high-risk substations, and looking at protecting
15 different things at different levels.

16 And I'm wondering if that tiering of
17 risk and protection is appropriate to this area
18 and just kind of a simplistic analogy, like when
19 you get on an airplane, you know, you wear your
20 diamond ring or whatever on your body, you don't
21 check it in your luggage. If you have medication
22 that your family needs, it's, like, in your
23 carry-on.

24 But other things that you might very
25 well not like to lose because you'd have a

1 terrible vacation if you lost them, you check them
2 because they are less important.

3 Are there some things, just a much
4 smaller category that should not go to the cloud,
5 and other things it's okay to go to the cloud, or
6 are we ultimately getting to a place where
7 everything is going to be up there, and the kind
8 of idea of having some things that you don't, that
9 you keep on-site is kind of my old world?

10 MR. ROSENTHAL: Sure, I'll go ahead and.
11 address that first. As you look at the risk, we
12 really do need to evaluate what should go to the
13 cloud first. So as I mentioned in my opening
14 remarks, we need to be very careful and very
15 deliberate when we're actually moving things like
16 SCADA and energy management systems to the cloud.

17 That's going to take some time before we
18 can actually tease out and understand what a --
19 what a good security framework will look like, and
20 an operational framework will look like.

21 But there's a lot of things that as you
22 look at the different services that we have to do
23 up to that -- that level of operational support
24 that we could move to the cloud.

25 So I don't know that I'd call it low,

1 medium, high, as we think of it in CIP language,
2 but I think from a risk perspective, there's
3 things that we absolutely should be thinking about
4 moving there, you know, as quickly as we can.

5 COMMISSIONER LaFLEUR: Mr. Jacobs?

6 MR. JACOBS: I'm sorry. Thank you. I.
7 would like to add to that. I think the way that
8 I heard that, there are some things I echo, I
9 don't think it's the time now to start thinking
10 about moving the ECUMS or the packs or BES to the
11 cloud. I think it's opportunities, because
12 the -- the opportunity by cloud produces some
13 type of latency, for example, that could have an
14 impact to the system.

15 However, I think there's opportunity to
16 look at the monitoring capabilities, the BES
17 information, because the impact of losing insight
18 into that information is -- is not as impactful.
19 So I think that's a good starting area for us to
20 consider.

21 COMMISSIONER LaFLEUR: Isn't it a
22 volumetric issue, too, that as people just get
23 more and more and more big data with all their
24 additional points of information and communication
25 with their customers, that we more

1 than need to rely on these technologies, or --
2 yeah.

3 MS. TRUHE: Yes, data analytics is more.
4 suited for the cloud. And to answer your first
5 question, I don't think I'd want to take anything
6 off the table right now.

7 I mean, ECUM, the -- you know, putting
8 your EMS in the cloud would not be my first
9 choice, but from a phasing perspective, you know,
10 moving your, your data, your BCSI into the cloud,
11 you know, moving long-term planning into the
12 cloud.

13 Learn with that, and then move on to
14 your packs and your ECUMs. I think -- I think,
15 you know, you can see it laid out from a -- from a
16 strategy perspective, but I wouldn't want to take
17 anything off the table at this point.

18 MR. BALL: I think I would, perhaps, add
19 to the discussion from the perspective that when
20 we talk about the cloud solutions, and, of
21 course, it's a fairly nebulous term I think we
22 need to look at it -- it's a technology enabler.
23 We're talking about, you know -- you know, fixed
24 servers or more virtualized servers or cloud-type
25 services.

1 These are just a tool that allows us to
2 enable and manage technology. The question is,
3 is, what information is residing on it, how do
4 we -- what is the framework by which we manage it?

5 So I think the key is -- I think
6 stepping away, and I've seen this, you know,
7 evolve over years, where we kind of get focused on
8 a cloud, what is work -- what will work or what
9 will not, and what will or what won't work in that
10 environment in terms of like what data should or
11 should not go.

12 And I think we need to step back and
13 look at as just simply another technology. And
14 then the question is, are we adequately
15 instrumented to manage that technology?

16 Are we adequately managing the
17 relationships that are inherently part of it?

18 So I think that becomes key, and then
19 when we talk about risk, it's what information,
20 what is the -- what is the output, what is the
21 service, what is the impact if we lose it or it's
22 exposed? I think that becomes a real important
23 premise by which we -- we manage forward.

24 COMMISSIONER LaFLEUR: I mean,
25 obviously, this is the electric group, so it has

1 the special importance, but I mean, I just think
2 society's expectations and understanding of what
3 we put on the Internet and what information we
4 allow to be shared in that way has just changed
5 so dramatically, so quickly.

6 And which leads to my final question.
7 To the extent, to whatever extent the mandatory
8 reliability standards, the CIP standards are the
9 problem in, in any way hampering the electric
10 industry's ability to fully utilize cloud
11 computing and virtualization.

12 There -- the nuclear plants and the
13 high-voltage grid are the only two parts of
14 critical infrastructure that have those mandatory
15 standards.

16 So what are other critical
17 infrastructures doing in terms of cloud computing,
18 where they don't have these standards? Are they
19 ahead of electricity? I mean, you know, water and
20 gas, and financial services and banking and
21 healthcare, there's all kinds of what we would
22 consider critical data out there.

23 And has that -- are there things we can
24 learn from them in this area? I guess it's not a
25 question for the electric company folks. I'm

1 sorry.

2 MS. TRUHE: I had a recent conversation.
3 with my CIO, and he was at an all-CIO meeting in
4 Philadelphia, and he said he was one of few who
5 did not have his main applications in the cloud.
6 He was talking to the financial
7 industry, and they said, you know, we've been --
8 we do trillions of dollars of banking every day in
9 the cloud; you can -- you can make it work, you
10 know, was their advice.

11 So I believe, you know, we can make it
12 work; we need to be careful; we need to be
13 judicious; we need to plan, but we can make it
14 work.

15 COMMISSIONER LaFLEUR: Maybe learn from
16 some of those.

17 MR. SOUTH: So we're seeing all critical
18 infrastructures using the cloud in some way,
19 shape, or form. In my experience, the financial
20 sector is probably the most mature and advanced,
21 so we have banks and public -- for public record
22 already Capital One is all in AWS.

23 So when you look at the banks and the
24 financial institutions, look at FINRA as what
25 their government mission is, their most critical

1 application is in the AWS.

2 You know, looking -- just looking for
3 that -- that fraud activity within exchanges. And
4 so we're seeing it across the board, and it kind
5 of goes back to my point earlier: There's no --
6 there's no unique controls; right?

7 Everybody's kind of reformed back to the
8 same security controls. You're just kind of
9 leveraging what people have already learned, like
10 you said, to leverage in that area.

11 What we're seeing from healthcare,
12 manufacturing across the board. We have partners
13 that have distributed energy resource management
14 and demand response systems, actually completely
15 built inside AWS is providing services to
16 utilities customers.

17 So I think there's great opportunity to
18 leverage those lessons learned and just applying
19 within this industry.

20 COMMISSIONER LaFLEUR: Well, this has
21 been really helpful. It sounds like there's two
22 sets of work. One is the standards and how they
23 have to be updated. But the second is then as we
24 think about how we monitor, audit everything
25 else, not reinventing the wheel, which -- but

1 learning from some of the places where that's
2 already happening. Thank you very much.

3 COMMISSIONER GLICK: I just have a
4 couple questions. Some of mine were already
5 asked, but I want to start with Mr. Rosenthal,
6 but also expand on it to others of you as well.

7 Just wondering if there are tools, or
8 maybe you can describe some of the tools that
9 have -- that are developing to examine the impact
10 of, you know, the cloud computing, but also on
11 virtualization on the grid under reliability of
12 the grid and security of the grid.

13 MR. ROSENTHAL: Can you be more
14 specific.
15 about "tools" when you ask? I want to make sure
16 I answer that question correctly.

17 COMMISSIONER GLICK: Well, just, I mean,
18 how -- I guess to put it more succinctly, how --
19 how -- how do we -- how do we from the
20 Commission's perspective, from NERC's
21 perspective, from everybody else's perspective,
22 how do we evaluate what are -- how are we going
23 to evaluate the impact of -- of cloud computing
24 and virtualization on the reliability of the
25 grid?

1 MR. ROSENTHAL: I have to think about
2 that.

3 COMMISSIONER GLICK: Okay.

4 MR. ROSENTHAL: Anybody on the panel
5 have any thoughts?

6 COMMISSIONER GLICK: Anyone else?

7 MR. BALL: You know, just trying to --
8 to -- to reflect on the question, you know, I
9 think a lot of -- of what we have talked about
10 relative to use of cloud and some of the enabling
11 capabilities it brings to the table, I think it's
12 really not so -- it's indirect.

13 And what I mean by that is we have to
14 manage our assets effectively. And we have to be
15 able to make sure they're optimized, that they're
16 operating effectively, that they continue to run.
17 We understand where they may be likely to fail,
18 and how are we able to manage that so that the
19 reliability of the service we provide to, you
20 know, our customers remains consistent.

21 And I think -- so, leveraging the types
22 of analytics, kind of going back to a comment I
23 made earlier, being able to do that, and apply
24 that to how we manage that infrastructure has been
25 very valuable.

1 So I don't know if that gets quite to
2 the question, but I think it gives us a value
3 statement towards how are we managing our
4 operational systems and leveraging the technology
5 to do that.

6 COMMISSIONER GLICK: Moving on, I just
7 wanted -- Mr. Jacobs, in your testimony you
8 mentioned -- you talked about vendor
9 accreditation. And I recognize that's a good.
10 best practice, and so on. I was just wondering
11 if you could elaborate on what the government can
12 do to help the -- help the government is
13 providing, I guess, maybe through FedRAMP and
14 elsewhere.

15 But what a government can do more in
16 terms of vendor accreditation. We talked about it
17 a little bit earlier in the earlier panel about
18 from the supply chain perspective, but
19 specifically as it relates to cloud and
20 virtualization.

21 Is there other things that we, the
22 government can be doing that it's -- that they're
23 not doing now?

24 MR. JACOBS: I think that the gov -- so.
25 I -- I just want state, I've come -- I've come to

1 this industry from the Department of Defense,
2 where I was a consultant with Booz Allen
3 Hamilton, to the Department of the Navy,
4 specifically for like, the last, probably, eleven
5 and a half years.

6 And FedRAMP is one of the external
7 accreditations that they endorse. I think Ashley
8 can speak to that a little bit more, but they also
9 are leveraging the cloud for different unique
10 instances as well. Private cloud, for example.

11 I think leveraging an external
12 accreditation is probably a good practice in terms
13 of understanding risk assurance because what goes
14 into that is almost similar to what happens for an
15 audit.

16 That accreditation is dependent upon an
17 independent audit of their control implementation.
18 And at any given time, that provider should be
19 able to give you some assurance that that entity
20 has met those controls that have been implemented
21 on that system and how effective they are.

22 There is other external accreditations
23 as well. We're talking about different
24 industries. I know at SMUD, we also have a firm
25 policy on when we go into these types of

1 relationships for our business applications that
2 are, cloud-provided; we have a standard that we
3 look at the systems' and organizations' compliance
4 SOC 2, type 2.

5 That's also another certification that
6 is independently audited for the controls,
7 implemented, and the effectiveness of them.

8 COMMISSIONER GLICK: Mr. South, you had
9 mentioned earlier that you are audited
10 practically on a daily basis by the big
11 accounting firms and so on.

12 Is there any role for the federal
13 government in that, or do you think that's -- from
14 a private sector perspective, that's sufficient?

15 MR. SOUTH: My recommendation is to.
16 leverage the industry's audits and frameworks, so
17 it's a SOC 2 and PCI, because they're effectively
18 doing it today, and we try to -- even though I
19 say that, because we have over 80 different
20 international frameworks and standards that we
21 comply and that we're being audited to. We try
22 to limit the actual number of audits because, of
23 course, you know, we don't want, you know, a
24 thousand people running to our data centers for
25 audits when they're all looking at the exact same

1 thing; right?

2 And so that's why the third-party audit
3 system is really that -- that best practice where
4 you get the result, you get that assurance, but
5 without us losing control and security of our
6 services and data centers.

7 COMMISSIONER GLICK: And, Ms. Mahan, I.
8 don't know if you had a comment on what FedRAMP
9 is doing with regard to that.

10 MS. MAHAN: Oh, yeah, no. Thank you so.
11 much. So I just want to touch a little bit about
12 the FedRAMP process, if you wouldn't mind. Just
13 to set a little context.

14 So we are known for our cyber security
15 rigor in the standards that our vendors meet.
16 There are currently 156 vendors that have a
17 FedRAMP authorization, and we are focused on
18 baselines in terms of the low information,
19 moderate information, and high information.

20 And so, for instance, we see about
21 80 percent of our FedRAMP-authorized cloud service
22 offerings, are at least that moderate. And just
23 to kind of dive a little deeper into that, there's
24 325 unique security requirements, everything from
25 disaster recovery, contingency planning, incident

1 response, access control encryption. Again, kind
2 of reiterating that cyber security rigor
3 associated with this.

4 As well as a very comprehensive audit
5 done by a third-party assessment organization,
6 which we call 3 PAL. And in that audit, they
7 literally go through, over, for the moderate
8 baseline, 1,200 different unique test cases to
9 ensure that however our vendors are saying that
10 they are complying with these 325 requirements,
11 that they are, through technical tests, through
12 interviews, through examining this information.

13 Because in government, it's important
14 that before we put our information in technology,
15 we know exactly how it's being secured and locked
16 down, but not only that, that we have evidence,
17 right, that it is being done that way as well.

18 So that's kind of the premise of this
19 authorization, and the beauty about it, with
20 cloud, and I'm not sure if the -- the committee
21 here has discussed this previously, but when I'm
22 at GSA, and I'm using a cloud product, and then I
23 have a friend over here at FERC using the same
24 one, our information for the most part is
25 protected the exact same way; right?

1 And so that gives us the ability to
2 prescribe kind of one unified standard to the
3 vendor committee to adhere to, to test, to have
4 those audit. And then to be vigilant and show us
5 continuing progress, continuing transparency, and
6 how they're maintaining that security posture.

7 That, me at GSA, I can look at it and
8 issue something called an authority to operate.
9 And my friends over at FERC can issue the same
10 authority to operate as well.

11 So it gives the vendor community a lot
12 of, one, transparency, and what the requirements
13 are. But also, it's do-once, use-many-times
14 approach that creates efficiencies from a
15 government standpoint in working with industry.

16 So, you know, I know that you all have
17 the CIP, and I know that there has been some
18 efforts to cross walk that with our FedRAMP
19 baselines, there could be some really neat
20 synergies there, you know, between what we require
21 from a -- from a FedRAMP standpoint that a lot of
22 vendors adhere to now, to what the CIP standards
23 are requiring -- what CIP standards required.

24 And I wanted to just see if David or
25 anyone else on the panel had any further research

1 into that.

2 MS. TRUHE: I wanted to say I really
3 like what Ashley's saying. I heard the word
4 "Transparency," that is so critical to success.

5 The relationship, you know, between the
6 registered entity and the cloud service provider
7 and the auditor is essential. It's -- we -- we
8 have to make sure that we don't have, you know,
9 that "Wizard of Oz" situation where there's, you
10 know, somebody behind the curtain and is just
11 saying "trust me." You know, "something's
12 happening, and I'm sure you'll like it."

13 There has to be that relationship where
14 we know, you know, what is going on that the --
15 you know, whether it's daily or -- but very
16 frequent monitoring and assurance that our data is
17 secure, that the service that we've purchased, you
18 know, is available. That -- that is what is
19 necessary, you know, we as a company, we've
20 embarked on -- managed service providers over the
21 years. The contract is just the beginning.

22 And, you know, you -- you don't want a
23 contract to fail, but you have to go into it
24 knowing that it could, and so you have to have
25 everything in place, you know, that -- that

1 frequent monitoring, that assurance on a -- on a
2 recurring basis to know.

3 The controls, I agree, the controls are
4 the controls, you know, there's -- there's no new
5 nifty control that's going to give you more
6 assurance. But you need to know that those
7 controls are operating effectively on a -- on a
8 recurring basis, and if they're not, you know, you
9 wanted immediate notice, and I think also if
10 you're going to get out of a contract, I want to
11 know that my data's purged.

12 You know, I don't want to have to worry
13 that it's out there forever. You hear the saying
14 you know, "Once it's on the Internet, it's there
15 forever."

16 We have to know that that's not the
17 case, because then we're, you know, we're at risk
18 forever.

19 MR. BALL: If I could just add one item.
20 to the conversation on that. You know, I think
21 the accreditation, going to something that is
22 recognized as a security practice and be able to
23 measure the service providers against that is
24 a -- I think is an essential foundation.

25 I think that's important. It's what I

1 would look for, in terms of, is this company
2 working with the company that has a culture and a
3 practice that reflects the kind of security
4 posture we want to see?

5 I would add, though, that as well as the
6 major organizations can provide the services, it
7 still -- it relies on me as an entity.

8 You know, they can build the best house,
9 they can build the most secure, you know, doors,
10 but when they hand me the keys, do I lock the
11 doors and do I manage that effectively?

12 There are two parts to that equation,
13 but I think the foundation of accreditation, who
14 am I doing business with, is fundamental.

15 MS. MAHAN: I can't stress the.
16 importance that Michael just mentioned, in that
17 it's customer responsibilities. So in moving to
18 the cloud, the cloud service provider is going to
19 do a lot for you from a security standpoint, but
20 there is a distinct role, a distinct security
21 line item that the agency, right, or the customer
22 is still on the hook to do.

23 And so with this FedRAMP process, we
24 make sure that our vendors, you know, disclose
25 that to customers; right, to agencies on what that

1 security line item is that the agency is still
2 responsible for.

3 So a recommendation from my end is to
4 make sure that those are also, if you are
5 considering moving to the cloud, especially with
6 this type of data, make sure that the customer
7 responsibilities are also flushed out because you
8 could be introducing a lot of risk, or, you know,
9 risk to your environment, if -- if that's not
10 taken care of.

11 MR. SOUTH: I'd like to add, if I could,
12 real quick to one -- Ashley's first point was
13 when you look in at the CIP language, a
14 recommendation is one at the higher level, kind
15 of, you know, start, you know, from the desired
16 end state and work your way back from the desired
17 end state to security objectives to the
18 desired -- to the required capabilities to meet
19 those objectives. Try to stay clear from
20 prescriptive technical guidance, but there's an
21 opportunity to if and where you need that, to map
22 that to FedRAMP, because they're already there.

23 They are adjusting as need be for that
24 space. So then that way your -- your policies can
25 still be met, your security objectives can still

1 be met, that through, you know, a mechanism that's
2 a little bit easier to be maintained. And also to
3 the point of what we called a shared
4 responsibility model, and that's true. It's true
5 today in your on-creme environment.

6 In your on-creme environment, you have,
7 usually, a data center team or a network team, an
8 application development team. And every team is
9 relying on every other team to do -- to manage
10 their section properly, and secure it properly and
11 that doesn't change with us.

12 So there is a shared responsibility, and
13 we're very clear as to what we're responsible for,
14 those services, and then we provide those services
15 and best practices and guidance to help our
16 customers meet their end of that responsibility of
17 their business model for whatever it is that their
18 desired security outcome must be.

19 COMMISSIONER GLICK: Just to finish up.
20 It's a somewhat related matter. Ms. Truhe, in
21 your testimony, you talked about
22 Sarbanes-Oxley-type approach to independent
23 third-party assessments.

24 How do you see that working with the
25 NERC standards requirements process?

1 MS. TRUHE: Reliance on an existing
2 framework, be it a NIST or, you know, someone
3 mentioned earlier that the NATF is developing
4 cyber security criteria for supply chain, I mean,
5 let's face it, going to a cloud supply chain may
6 not be covered by CIP-13 right now, but for
7 entities that are going to include everything in
8 their cyber security plan, you know, it would
9 already be part of it.

10 I believe that the -- the controls are
11 baked into their process. Michael spoke to that,
12 the certification is given. You get the
13 third-party assessment testing those controls, and
14 that's similar to what you get with the
15 Sarbanes-Oxley. You have general computer
16 controls that are looking typically at financial
17 systems in that case.

18 COMMISSIONER MCNAMEE: Well, thank you.
19 Does Staff have any questions?

20 MR. DODGE: Thank you, Commissioner
21 McNamee. I have just a couple questions. I want
22 to followup on a question that was asked earlier.

23 And the question is, you know, are we
24 aware of, is anybody aware of any other critical
25 infrastructure industries that are used in the

1 cloud, and how they're used in the cloud?

2 When I think of critical infrastructure
3 industries, I'm thinking about, you know, water --
4 waste water, natural gas, oil pipelines, chemical
5 plant processes. So the question is: Are there
6 any other critical infrastructure industries used
7 in the cloud, and how are they used in the cloud?

8 And then the subsequent question would
9 be: Are they used in the cloud for critical
10 processes, critical control processes, and I guess
11 I'll start with --

12 MR. SOUTH: So there is not one critical
13 infrastructure industry that we don't have
14 customers in using AWS. Okay?

15 To the extent of that, and, exactly -- I
16 don't have that information right now for you, but
17 I do have one case study that's actually public,
18 so NL in Europe is using our AWS cloud and our IOT
19 platform, where they are monitoring, they're
20 adjusting, metering data and information from over
21 500,000 components out in the particular territory
22 in Europe back into AWS. So they're actually
23 using our IOT platform, bringing that data in, and
24 then doing the data analytics in that, and that's
25 e-mail.

1 So I know that's one particular case
2 study for -- you know, a related industry to
3 yours, but we have customers across every sector
4 that's using us in some way, shape, or form.

5 MR. ROSENTHAL: And I just want to say,.
6 I think it's a great question. It's something I
7 don't think that we thought about. But I think
8 that trying to look at other industries and
9 actually looking at what their loads are that
10 they're putting in the cloud to make sure it's
11 critical. Because right now, I mean, we have a
12 lot of services for my company that are in the
13 cloud but they're not critical, right.

14 We're hosting our web engine, things
15 like that, right, or external website, so, you
16 know, understanding, you know, what other critical
17 infra -- industries are doing would help kind of
18 guide and shape, you know, what our next steps
19 would be. So I think that's something that we
20 should definitely look at.

21 MR. SOUTH: I kind of mentioned already,
22 look at Capital One, which is all public
23 information. They're entirely in AWS. So it's
24 not just one mission-critical system, right, so
25 we do have -- again, I don't know about, you

1 know, particular energy sectors, or some sectors
2 but in other critical infrastructure, we have
3 some that actually have their most critical
4 applications and services in AWS.

5 MR. JACOBS: And I will add, just based.
6 on my experience with DOD. I know the Department
7 of the Navy is leveraging cloud. Again, I don't
8 know to what extent in terms of "critical." I
9 know that the way that they look at risk is also
10 entirely different. There's a conversation
11 between security engineering and system
12 engineering, and the impacts of functionality in
13 the way and out of different security controls
14 and implementation.

15 So I know it's a different picture of
16 how they look at risk as well.

17 MR. SOUTH: Thank you. And I just want.
18 to share a little bit of background with respect
19 to my opinion.

20 And that is, you know, in my own
21 personal opinion, you know, storage of data on the
22 cloud's fine. Storage and processing information
23 longer term is fine. But as you get to real-time
24 control processes, I just have some challenges,
25 difficulty about using the cloud for that.

1 And I had heard earlier, I think one of
2 the panelists actually indicated that they may be
3 receptive to actually using the cloud for
4 SCADA-type applications and control-type
5 applications. I'd like to learn more about that.
6 I'm not sure exactly who said that.

7 MS. TRUHE: I'm not ready to go there
8 tomorrow.

9 MR. DODGE: Okay.

10 MS. TRUHE: And I think I phrased it in
11 that I just wouldn't take it off the table today.

12 I think sometimes in my concern with the
13 CIP standards is they're written -- they limit us
14 at times. And they, I think due to, you know,
15 work -- there's a focus on compliance, like, how
16 will I be assessed to this, as written? As
17 opposed to how can be I secure? Is the standard
18 promoting a true security standard, or is it
19 telling me how I have to do something?

20 And so it's in that vein that I don't
21 want to take -- I'm just saying I don't want to
22 take anything off the table today.

23 Do I see that happening in five years,
24 no. Ten, I don't know, but not tomorrow.

25 MR. ROSENTHAL: And I want to echo what.

1 Brenda said, that, I don't think that we're ready
2 today, but we don't want the CIP requirements and
3 standards to hinder us from looking at that,
4 because I know being on drafting teams how long
5 it takes to make those changes. So let's be
6 really thoughtful as we go through and we look at
7 what cloud looks like.

8 You know, when you think about cloud,
9 there's different deployment models, public,
10 private, hybrid, community, things like that that
11 actually offer different levels of protections and
12 things like that.

13 So as we look at our standards, let's
14 factor that in and not take it off the table, but
15 I don't think we're ready.

16 MR. SOUTH: I'd like to add. I like
17 that approach. We acknowledge that there are
18 times where just the latency requirements -- so
19 from my understanding, you have a four-millisecond
20 round-trip latency for trip and transfer for an
21 electric grid. And so today that really can't be
22 met.

23 However, within our data centers within
24 the region, we are achieving sub-two-millisecond
25 latency across, between our data centers within

1 the region. So we're able to do that internally
2 today.

3 There could be a time in the future
4 where something becomes available where that
5 sub-four-millisecond round-trip latency could be
6 met; right. So I think by, again, having those
7 objectives and capabilities rather than very
8 prescriptive technical limitations will be very
9 key in that.

10 COMMISSIONER MCNAMEE: Thank you very
11 much. I just want to ask David Andrejczak if he
12 has any questions.

13 MR. ANDREJCAK: If you will indulge me.
14 Thanks, Andy. I worked in electric utility for
15 24 years, and one thing I learned is we are
16 really risk-adverse. We don't like taking
17 chances.

18 Brenda, I think you pointed out that
19 your folks were not, like, where everyone else is
20 at that point, as far as the cloud computing.

21 I'm just kind of curious as to should
22 the Commission be encouraging cloud computing
23 through, like, standardization, not standards, but
24 through standardization of what would benefit the
25 industry in itself?

1 MS. TRUHE: What I've seen sometimes is.
2 when new standards are, you know, in the process
3 or after they're approved, there's a lot of
4 concern over what's the enforcement date, you
5 know, how long is it going to take a company to
6 get ready. And so I tried to think, you know,
7 what would help people move along, maybe you
8 could have -- there could be multiple standards
9 enforceable at the same time.

10 There may be companies that want to stay
11 on Version 5 and 6, because they don't want to
12 move off -- off -- you know, they want to stay on
13 premise.

14 There's other companies that want to
15 move quickly. They could early adopt a standard.
16 They don't have to wait for the enforcement
17 period. So that, to me, would be something to
18 pursue.

19 MR. ANDREJCAK: And I'm really more.
20 towards what are the things the industry should
21 be looking at, the electric utilities, gas, as
22 far as, what kind of information should they be
23 running with and utilizing on cloud, as opposed
24 to what they're currently doing?

25 In other words, are there benefits to

1 industry for sharing that type of information or
2 getting on the same platform?

3 MS. TRUHE: I think, kind of like, it
4 may be similar to the CRISP program.

5 But if you have a lot of different
6 companies using the same cloud service provider,
7 and you had security appliances deployed, you
8 could almost be crowd-sourcing certain types of
9 information. And then a potential, you know,
10 breach or a -- you know, attack or data loss, it
11 could be seen, that, you wouldn't see it when
12 you're doing your own thing.

13 I think that's -- you know, I can't
14 speak in detail on that, but it's something we've
15 been thinking about internally.

16 MR. BALL: I'd like to address that.
17 question because I think it's an interesting one
18 about whether we encourage a particular, you
19 know, whether the Commission encourages maybe a
20 focus on technology, or, you know, I might take a
21 little bit of a different view on -- you know, I
22 think what I think would be helpful is to enable
23 industry to -- to adopt what works for them, and
24 I think by doing that is allowing in the
25 construct of standards, the ability to embrace,

1 where it makes sense, a solution set, a
2 technology solution set.

3 It may or may not be a cloud
4 implementation, but I think right now, you can
5 look at the existing standards and see where it
6 actually prohibits us from doing that. And where
7 it prohibits us, that's where we have an
8 opportunity for, I think, the Commission to focus
9 on "can we enable it?"

10 And then if you enable it, then we, as
11 industry, can actually innovate and work with our
12 partners to move forward. Where we would, right
13 now, we won't entertain the conversation because
14 we know we can't either comply or we can't provide
15 evidence of compliance.

16 So that would be my position on that.

17 COMMISSIONER MCNAMEE: Great. Well,
18 once again, thank you all. It was very
19 informative. I know for me, I think similar to
20 Commissioner LaFleur, I'm not always the most up
21 to date on technology but learning about this and
22 having more detail and you all's expertise was
23 very helpful. So thank you.

24 We will adjourn until 1:30, and look
25 forward to seeing everybody.

1 (Whereupon, a lunch break occurred.)

2 COMMISSIONER MCNAMEE: In this third
3 panel, we're going to be talking about
4 Reliability Coordination Seams, and there's
5 obviously a number of seams issues that have been
6 arising, particularly in the West, but,
7 obviously, there's issues that go throughout the
8 country. And we really appreciate each of you
9 being here to help enlighten us a little bit
10 about that, explain what's happening, some of the
11 challenges, maybe some best practices.

12 And with that, why don't we start with
13 Mr. Subakti.

14 MR. SUBAKTI: All right. Good
15 afternoon, my name is Dede Subakti. I am
16 currently serving as director for Operations
17 Engineering Services in California. So first of
18 all, thank you. Thank you for having us here.

19 Today, I really want to just discuss
20 three items. First, I would like to give an
21 update where we are with regards to California
22 ISOs. As you all know, that's starting July 1st,
23 coming Monday, the California ISO will commence
24 providing the reliability coordinator function,
25 the RC functions.

1 Really, as the California ISO, the
2 California entity as well as in our state,
3 Northern California, and we kind of call ourselves
4 the RC U.S. for these purposes.

5 We did receive our certification. We
6 went through certification process with NERC and
7 WECC. We did receive our certifications to
8 provide the service for July 1. We are ready.

9 As a matter of fact, we put all our
10 tools under production systems last week and
11 earlier this week, on Monday, and that's part of
12 the reason they allow me to go out of office. And
13 I'm here now because we're actually already good
14 to go, and production system and tools, everything
15 is ready to go.

16 And once that's done, we will extend our
17 service area for RC footprint to the other be
18 other BA, TOP opening within Western
19 Interconnections for November 1, and that will
20 basically include about 40 BA, 40 TOPs in the
21 Western Interconnections for November 1.

22 Now, for that particular purpose, we
23 do -- we are currently going through all our
24 certification process with NERC and WECC, so there
25 is -- there is a certifications visit that's

1 coming up in July 30 in that week, and we will
2 start shadow operations as well in there.

3 As you know, after that, after that
4 November 1 timeframe, Peak reliability, which is
5 the current RCs, will terminate its operation on
6 December 3rd. And we are also getting ready and
7 will ensure that we work together with all our
8 quality care to make sure that we are ready for
9 reliable operations post-December 3rd.

10 So with that, we've been working
11 together with SPP, Alberta, BC Hydro, BCUC, as
12 well as Grid Force. So the two topics that I want
13 to focus on today is talking about the current
14 seams issue, coordinations, and whatnot in the
15 Western Interconnection.

16 In the operations planning, real-time
17 operations, the RC West currently knows that this
18 is a challenge that we have to do, but we do know
19 that there's a need for us to exchange
20 information, being transparent. And these are
21 informations that we need for operations planning
22 and real-time operations, so informations with
23 regard to network model, outage coordination, data
24 operations planning. Those are stuff that we will
25 continue to exchange and will build

1 infrastructures to be able to exchange that
2 informations in the environment where we have
3 these multiple RCs in the Western
4 Interconnections.

5 We have also entered into a coordination
6 agreement of RC West. California ISOs has entered
7 into coordination agreements with Peak
8 reliability for the July 1 operations.

9 We also have entered a coordination
10 agreement with Alberta, with ISO, so that's also
11 done. And we are continuing and working closely
12 with our RC coordination agreement with SPP as
13 well in there. So we don't expect any issues in
14 there. We do know the importance of having the
15 coordinations agreement and whatnot.

16 For us, it's very important to have the
17 use of common tools. So with the use of the
18 common tools and the coordination agreement, we
19 believe that that will be really good and we don't
20 need any additional joint operating agreement.

21 If we do need -- something arise later,
22 we have an oversight committee that is transfer in
23 process, and we could proactively raise that issue
24 to the oversight committee.

25 Moving forward, there is various risks

1 and challenges, but we will perform all tasks. We
2 do want to have a good process for processing. So
3 RC West, we really believe that we would support
4 utilization of performance metrics in some sort or
5 common measures that we could see how Western
6 Interconnection, at least, to continue growth and
7 be better and reliable.

8 So we would probably invite other RCs
9 that are operating in the West to help develop
10 metrics and shape performance for the Western
11 Interconnections, and we'll go from there. So
12 that concludes my remarks, and looking forward for
13 discussions later.

14 MR. REW: Good afternoon. Thank you for
15 the opportunity. I'm Bruce Rew, I'm Vice
16 President of Operations for Southwest Power Pool.

17 SPP's in a unique position when, later
18 this year, we'll be serving as a reliability
19 coordinator in both Eastern and Western
20 Interconnection. SPP has been serving as an RC in
21 the Eastern Interconnection since 1997. Our
22 geographic service territory has expanded from
23 seven to fourteen midwestern states during the
24 last 10 years.

25 Recently, 14 entities in the Western

1 Interconnection have contracted with Southwest
2 Power Pool to begin providing RC services on
3 December 3rd of this year. We also have two DC
4 ties connecting us with ERCOT and coordinate with
5 their RC.

6 SPP provides comments today based on our
7 long-term operational experience in Eastern
8 Interconnection and on our preparation over the
9 past year to begin to provide RC services in the
10 West.

11 SPP's RC experience has shown that
12 communications and data sharing are key to
13 successful coordination with neighboring RCs.
14 Communication starts with identifying operational
15 characteristics impacting both RC areas. This
16 leads to RC-to-RC coordination agreements or
17 plans, joint operating agreements, and other
18 arrangements that provide for direction in
19 real-time operations.

20 Data sharing and establishing the
21 mechanism for this to occur efficiently is
22 critical as well.

23 Real-time operations identifies not only
24 impacts on our system, but allows us to see the
25 conditions on our neighboring RCs that -- and what

1 they're experiencing, which allows SPP to assist
2 as appropriate and as we can.

3 Our neighbors are very diverse and
4 include RTOs with operating day-two markets and
5 market-based congestion management practices, an
6 RC that monitors a single balancing authority, an
7 RC that covers multiple balancing authorities with
8 no organized market, an RC that is connected only
9 through DC ties.

10 So understanding the distinctive
11 operation of each neighboring RC allows us to
12 establish a framework for coordinating appropriate
13 congestion management practices between the two or
14 more RCs. While we see each reliability
15 coordinator seem that we have as being unique, the
16 fundamentals of working together to keep the
17 lights on remains the same. I look forward to
18 sharing our RC experience today. Thank you.

19 MS. SEYMOUR: So good afternoon,.
20 Commissioners. I do appreciate the opportunity
21 to participate today in the technical conference
22 and discuss seams issues.

23 My name is Melissa Seymour. I'm the
24 Executive Director of Central Region Member
25 Relations and Seams Coordination for MISO, and I

1 think this panel discussion is both timely and
2 important, as the reliance on coordination with
3 neighbors during emergency events really is
4 increasing, and the West begins to establish their
5 seams processes and protocols.

6 As you're probably aware, MISO shares
7 borders with a diverse set of entities that can
8 have different operating responsibilities,
9 regulatory structures, operating practices, and
10 planning exceptions, and that makes each region or
11 entity unique. Recognizing the challenges in
12 managing the interconnected system along the
13 borders, FERC directed the creation of joint
14 operating agreements, or I call them JOAs, between
15 neighboring entities to address and minimize
16 issues that are related to reliability, efficiency
17 and equity.

18 MISO currently has JOAs with our two
19 neighboring RTOs, PJM and SPP. We also have a
20 variety of other types of agreements with a number
21 of our other neighbors to govern coordination with
22 those entities.

23 And while having these JOAs and these
24 agreements in place with neighbors has proven to
25 be instrumental in maintaining reliability,

1 there's always room for improvement. I'd like to
2 highlight two primary seams or efforts that MISO
3 believes would improve reliability and bring
4 additional value to consumers.

5 The first is enhancing commonalties, or
6 said another way, improving coordination by
7 speaking the same language. We have seen enhanced
8 reliability benefits when we work with our
9 neighbors to establish common ways of doing
10 things, such as communicating during events,
11 through our work with SPP and PJM on the
12 interregional coordination process, or
13 market-to-market process, and in the way we
14 communicate and coordinate outages across the
15 seam.

16 We believe extending the same logic to
17 other seams matters, such as having common
18 definitions of emergencies, having a common
19 understanding of transmission line ratings in
20 advance of a reliability event, and improved
21 coordination for planning and generation
22 interconnection studies across the seam would
23 produce similar efficiencies, enhance reliability,
24 and ultimately benefit consumers.

25 The second seams-related item MISO

1 believes is important is maximizing the use of the
2 existing transmission and generation resources
3 that we have. The inefficient use of existing
4 investment can result in diminished reliability
5 and increased cost to consumers. In MISO's
6 experience, its seam with PJM is the most
7 efficient at maximizing these assets.

8 MISO and PJM practice maximizing the use
9 of the transmission system for all parties by
10 allowing for reciprocal use of each other's system
11 until congestion occurred, and then to manage that
12 congestion through the market-to-market process.

13 The Commission's policy to drive down
14 barriers to trade across RTF seams is complemented
15 by sharing unused transmission capacity, providing
16 more efficient use of transmission at a lower cost
17 and reducing ultimate cost to consumers.

18 However, philosophical differences and
19 how reliability coordinators choose to operate
20 their transmission system can create
21 inefficiencies of the seam. Some entities have
22 fully embraced markets in the maximization of the
23 transmission system, while others take a more
24 historic approach for transmission usage.

25 I've included in my remarks an analogy

1 that can be found based on our highway system. In
2 particular, some interstates are used as a
3 sunk-cost. While taxpayers pay for the interstate
4 from the State any -- anyone can drive across that
5 interstate at no cost, even if you're outside of
6 the state that you paid for it.

7 In contrast, other interstates are toll
8 roads, although the interstate was paid for by one
9 constituency, another who drives across it pays a
10 toll. MISO believes the sunk-cost approach is the
11 most reliable and provides the most benefit to
12 consumers. Not only does it maximize efficiency
13 and the use of existing resources, it allows us to
14 focus on handling issues and emergencies, rather
15 than trying to track down who drove across the
16 road.

17 That concludes my opening remarks, and I
18 look forward to answering questions, and engaging
19 with the panel.

20 MR. BRYSON: Commissioners, good
21 afternoon. So just a couple of brief remarks
22 based on my submitted comments.

23 I think the NERC standards really form a
24 really good minimum basis for coordination amongst
25 neighbors and FERC has long, kind of, encouraged

1 the creation of a joint operating agreement. In
2 fact, I think back to the post-alliance RTO days,
3 when FERC suggested the MISO/PJM JOA, and I think
4 that was close to 15 years ago now.

5 And the early days of the JOA, I think
6 were certainly stressful. There was a lot of
7 issues we had to work through, but one of the
8 things, I think, that I learned from that is all
9 of those problems are solvable. We had a lot of
10 very different regional things that we had to put
11 together into practices, and now we have a JOA
12 that does true redispatch of resources across the
13 border wherever the reliability issue is, and we
14 talk about the economics of it after the fact.
15 And I think that that's a healthy template for the
16 rest of the coordinating -- reliability
17 coordinators or ISOs that have to work through
18 those problems.

19 We have four different JOAs at PJM: One
20 with New York, one with MISO, one with TBA, and
21 then one with the VACAR Carolina companies.
22 They're all different. Some are very detailed.
23 Some are at a higher level. And they're just
24 based on the regional differences.

25 And you know, one of the things, I

1 think, an example where the NERC standards require
2 that you have emergency energy agreements with
3 your neighbors, one of the things that JOAs have
4 done has made that, I think, much more
5 implementable. We've done that before, both with
6 MISO and PJM and New York in the past.

7 Commissioner Glick, you made the comment
8 about JOAs or regions supporting each other in
9 emergencies. And I think the JOAs may -- that's
10 where they have become the most useful, is they're
11 very good in emergency operations. Our operators
12 do the right thing in operations, and we have
13 processes in place to figure out the economics and
14 the equities after the fact, so I think they're a
15 very good example.

16 One of the other -- one of the other
17 things I think that's important about the seams is
18 that -- the coordination of the data. And where I
19 see that particularly in the future coming in
20 is -- and I just look at New York State's just
21 announced very aggressive renewable targets. And
22 there's no doubt in my mind that that's going to
23 have an impact on the way PJM operates in the
24 future.

25 But one of the things I'm very

1 comfortable with is when I just look at the basis
2 for our joint operating agreement and our data
3 sharing, I'm very comfortable that we're going to
4 be able to get together, look at the impacts, work
5 with the states and be able to figure out how
6 we're going to operate through that.

7 The JOAs changed. I mean, we're filing
8 changes to those on a very routine -- we have very
9 routine processes for reviewing them, and I think,
10 in fact, tomorrow, we're filing additional changes
11 to the joint operating agreement between PJM and
12 New York to account for situations that we
13 didn't -- we didn't encounter before, so -- and
14 this is -- you know, situations where we build a
15 new unit and it causes issues in New York and
16 there's, maybe, planning things.

17 And so we had the -- you know, we're
18 going to be filing those changes because we had
19 the opportunity to review and make changes in the
20 future.

21 I think one of the things that's
22 promising about that is these JOAs, I would not
23 describe them as perfect, but I think they're
24 time-tested and they're very good templates, I
25 think, to be used throughout the Interconnection.

1 And I look forward to the discussion. Thank you.

2 MR. STEED: Good afternoon,
3 Commissioners. My name is Asher Steed,
4 representing British Columbia Hydro and Power
5 Authority. I really thank you for the
6 opportunity to contribute to this timely panel.

7 I'd like to provide some background
8 about BC Hydro, including our contributions to the
9 continued reliability of the Western
10 Interconnection as Peak RC is winding down, as
11 well as our own efforts to establish the RC
12 function. And then I will share a perspective as
13 well in addressing some of the issues associated
14 with establishing new RCs.

15 Just for some background, so BC Hydro is
16 the largest utility in Western Canada, with 12,000
17 megawatts generating capacity, over 12,000 circuit
18 miles of transmission, and serves over 4 million
19 people. We are responsible for provincial
20 resource demand balancing. We also are a
21 transmission operator, transmission service
22 provider.

23 We're well connected to both the U.S.
24 and Alberta, long history of coordination with our
25 neighbors, and we take an active role within

1 industry at NERC, WECC, and as well as the
2 Northwest Power Pool.

3 Throughout 2018, with some uncertainty
4 surrounding the RC function, BC Hydro considered
5 the options really that were available and
6 determined that it was in the best position to
7 provide RC service for our province. And in last
8 September, we submitted our application to
9 register as reliability coordinator.

10 We are working to ensure we have the
11 capabilities in place to support that function for
12 our area and also to effectively coordinate with
13 the other RCs.

14 Our regulator is the BCUC, the British
15 Columbia Utilities Commission, and had ordered us
16 to undergo entity certification for the function,
17 and WECC recently led that team. We have that
18 report. That should be in the BCUC's hands next
19 week.

20 Taking a look at some of the background.
21 You know, really, RC, in some form, has existed in
22 the West for over 20 years. In Peak's operation,
23 in my view, and many share this, is that
24 represents really the collective learning and
25 development of industry best practice throughout

1 North America over that time.

2 So there is strong recognition that much
3 of what has been developed by Peak and others must
4 continue in some form to support reliability.
5 We've heard some of that from the other -- other
6 comments specifically around seams issues.

7 So BC Hydro is one of many parties
8 contributing to addressing these issues. And we
9 have a list we've gathered and over 50 specific
10 items that are broadly divided into those items
11 resulting from the creation of a new RC seam
12 between two parties and those issues that have a
13 broader impact, such as the common tools and
14 processes.

15 Briefly, so seams agreements -- we've
16 heard about JOAs and seams agreements from others.
17 This really is that foundational document that
18 lays out the obligations of both parties. In
19 addition, there may be specific procedures beyond
20 that that provide instruction for personnel to
21 coordinate operational activities. We've heard
22 that process is well underway, and we intend to
23 have executed agreements shortly with Peak,
24 Alberta, and RC West from California.

25 We've heard about common tools. Really,

1 in the West, there are a number of common tools
2 that are currently managed by Peak, and we want to
3 see those continued. These include the Western
4 Interchange tool and has curtailment calculator
5 and the West-wide system model. The RC
6 coordination group is in the process of
7 determining how those tools will carry on, and we
8 expect to have an MOU of some kind with supporting
9 funding and governance.

10 And then, lastly, wide-area coordination
11 is something that we'll all be charged with,
12 ensuring that we have a wide-area view of our own
13 systems and those beyond our systems to look at
14 current status and coordinate appropriately with
15 adjacent RCs. We've heard about the WECC regional
16 variance, and so that's something that we're all
17 actively involved in common methodology and
18 monitoring.

19 In closing, really welcome today's
20 discussion, and I'd like to thank you for the
21 opportunity.

22 MR. WHITE: Good afternoon,.
23 Commissioners. My name is Jordan White. I serve
24 as a commissioner on the Utah Public Service
25 Commission, but I'm here today in my capacity as

1 Vice Chair of the Western Interconnection
2 Regional Advisory Body, or WIRAB.

3 As the Commission is aware, WIRAB is the
4 only regional advisory body in the United States
5 established under Section 215(j) of the Federal
6 Power Act, which provides WIRAB the authority to
7 advise FERC, NERC and WECC on bulk electric system
8 reliability matters in the Western
9 Interconnection.

10 Beyond WIRAB's statutory authority, I
11 want to highlight that WIRAB speaks with a united
12 voice on behalf of its members who are appointed
13 the governors and premiers of fourteen states, two
14 Canadian provinces, and a portion of Mexico within
15 the Western Interconnection.

16 WIRAB provides a unique and valuable
17 perspective because, as you know, achieving a
18 common voice in the West is no easy task. With
19 that background, I'd like to briefly highlight
20 WIRAB's perspectives on the future of reliability
21 coordinator service outlook.

22 In 2017, WIRAB commissioned a report
23 that outlined a method to objectively review and
24 assess the reliability and cost implications of a
25 transition from a nearly Interconnection-wide RC

1 to multiple RCs with smaller footprints. The
2 report specifically identified the tools and
3 technologies used by Peak Reliability and the
4 challenges the new RC providers must meet to
5 successfully fulfill their new role.

6 Today, WIRAB is actively observing the
7 transition and certification of the new RCs in the
8 Western Interconnection. I have personally had
9 the opportunity to observe several RC West
10 oversight committee meetings and the RC forums
11 held at the WECC.

12 Thus far, I've been impressed by the
13 high level of professionalism and dedication of
14 the Peak staff and the engaged and thoughtful
15 discussion among Peak and the prospective RCs
16 during this extremely critical transition period.

17 Because WIRAB's primary focus is
18 strategic policy direction, it has encouraged the
19 new RCs to strive for exceptional performance
20 above and beyond compliance with minimum NERC
21 reliability standards.

22 As I'm sure you can appreciate,
23 compliance and excellence are not always
24 synonymous. WIRAB is pleased that some of the
25 tools Peak created, such as the enhanced

1 curtailment calculator and the Western
2 Interconnection model are being evaluated by the
3 new RCs.

4 However, there is one tool that has
5 received less attention, namely, Peak developed a
6 robust and effective set of performance metrics
7 that not only measured how well Peak performed the
8 RC function, but also it measured the quality of
9 information being provided by the balancing
10 authorities and transmission operators.

11 By reviewing its engineering operations,
12 information technology and other practices, Peak
13 was able to move beyond the minimum standards to
14 encourage improved performance among the entities
15 in the West. Peak emphasized that high-quality
16 load forecasting, outer submittals, were both
17 necessary to conduct high-quality next-day studies
18 and to prepare for real-time contingencies.

19 Ultimately, Peak's effort raised the
20 level of performance of all operational entities
21 in the West. WIRAB strongly believes that ongoing
22 monitoring and reporting of RC performance is
23 critical to maintaining and improving the overall
24 level of reliability in the West.

25 We understand from the comments heard

1 today that RC West is developing a set of
2 performance metrics. We applaud that effort and
3 respectfully request the Commission and ERO
4 leadership to encourage all RCs in the West to
5 establish voluntary best-practice performance
6 metrics similar to those developed by Peak.

7 Consistent metrics would also
8 demonstrate whether reliability is diminished
9 during a multi-RC transition. In WIRAB's view,
10 the diminished reliability would be unacceptable
11 for the roughly 83 million people living in the
12 Western Interconnection who depend on a reliable
13 bulk electric system.

14 I appreciate the Commission's focus on
15 this important topic and look forward to a
16 productive dialogue this afternoon. Thanks.

17 COMMISSIONER MCNAMEE: Thank you to each
18 of you for providing those comments and setting
19 the stage for each of these questions. I want to
20 start off with talking about RC West and what
21 CAISO has seen as it's been shadowing it. And
22 have you learned anything?

23 Is there anything that, in this first
24 stage by shadowing that your -- lessons learned or
25 that you're concerned about as you go to the next

1 stage?

2 MR. SUBAKTI: Yeah. So we regularly
3 meet with the other RCs. As a matter of fact,
4 this question was asked of me as well in the last
5 RC-to-RCs coordination's meeting that we had
6 about the lessons learned. And it mentions
7 that -- for us, it's that there's -- the use of a
8 common tool; right? The use of common tools, the
9 use of transparency of that common tool has
10 allowed us to be able to review the accuracy of
11 the tool.

12 So currently right now, there is Peak
13 that is the official reliability coordinators
14 versus RC West that is kind of like shadowing.
15 Now, we have a common tool that has the same thing
16 now that we actually can do an accuracy check
17 within what the Peak does and what California ISO
18 does, or RC West does.

19 We find ourself that having two RCs in
20 there is actually kind of bringing us to a
21 situation where irons shoving irons. We start
22 asking, why did we do it this way? Why did we do
23 it this way? It challenges us, you know, is it
24 that because we've been doing this for 10 years
25 just because that's the way we've been doing it,

1 as opposed to making more performance improvement.

2 So a specific example on that is
3 actually what Melissa talked about, the use of a
4 common rating methodology across transmission
5 owners when we ask the questions, oh, this is one
6 transmission rating that we use. And we said
7 that, well, okay, but we have this other
8 information of this transmission rating that we
9 use. It's actually uncovered a lot of potential
10 efficiency and potential improvement as we have
11 this multiple RC.

12 So I'm actually excited and I'm looking
13 forward to working with the other multiple RCs
14 here to be able to continue that, that environment
15 where we could actually challenge each others and
16 be able to work these things out ahead of time and
17 be able to question each others with regards to
18 getting better.

19 So that's one of the biggest things, the
20 big common thing when we start having these shadow
21 operations where we really kind of have multiple
22 RC amounts in Peak and RC West.

23 COMMISSIONER MCNAMEE: Understood. Now,
24 am I correct that with -- with Peak being
25 dissolved and with the new RCs coming in, is it

1 going to be five seams that are now going to be
2 out West?

3 MR. SUBAKTI: So RC West, Alberta,.
4 BC Hydro, SPP, and potentially Grid Force, yes,
5 you're correct, five.

6 COMMISSIONER MCNAMEE: So you just said.
7 that in your previous answer that there's certain
8 opportunities that having this, it forces you to
9 look at things that you wouldn't look at before,
10 and this is for, you know, for anybody who wants
11 to jump in just because of the experience that
12 you may have had in MISO and PJM.

13 But, you know, what are the things that
14 you're looking for? What are things that we
15 should be thinking about as you're dealing with
16 going to a multi-seam area that just -- what keeps
17 you up at night? Maybe that's a better way to put
18 it.

19 MR. SUBAKTI: Let me start, and then
20 I'll share with the other side. I really like
21 the -- as I hear these comments in there is the
22 data sharing. That's number one. The operating
23 agreement, that's -- either it's a JOA or core
24 operating agreement that allows us to have common
25 tools.

1 I actually came from -- spent a lot of
2 my time with Midwest before I moved to Western
3 Interconnection, so I was in the Eastern
4 Interconnection. Now I'm in Western
5 Interconnection. I've known all these people a
6 lot, for a long time.

7 But one of the things that's unique here
8 in the Western Interconnection is we actually have
9 sets of common tools, and that sets of common
10 tools has allowed us to actually be in the common
11 platform even though there are multiple RCs, but
12 we have these common tools that everybody sees.
13 It's transparent for everybody and allows us to
14 actually operate very efficiently with that so --

15 MR. REW: I think from our initial.
16 experience is that while certainly there are some
17 things in the West that are different, there are
18 some things in the West that are the same as
19 operating in the East as well.

20 And you know, one of the things that's
21 going to be very important with multiple RCs is
22 just a good communication, not only planning for
23 things, but in real-time. And I think when I look
24 back at some of the things we've experienced in
25 the East in, like, January 17th of last year, you

1 know, the real-time operators worked well
2 together, you know, to do what they could do to
3 command each situation and we thought we had good
4 communications going into that event, and we
5 realized that we could improve that and made
6 improvements right after that.

7 I think the same thing here in the West.
8 We'll plan for the good communication, you know,
9 and hopefully we have a process set up that will
10 handle anything and we'll certainly, you know, be
11 able to work through anything that does, you know,
12 come up and that we face, but it starts with the
13 communication side.

14 I think the second thing in the West is
15 obviously the wide -- the Interconnection-wide
16 view that they desire. In order for us to look
17 at, you know, the broad area of Western
18 Interconnection and understand what's going on in
19 other parts that might affect us. And, you know,
20 that is very beneficial and helps us appreciate,
21 you know, where we are, which would be on the
22 eastern side of the Western Interconnection
23 primarily and the Southeast part, you know, what
24 potential impact we would see.

25 So I think both the communication and

1 the data sharing. You know, so far, I'm really
2 pleased with the communication. As I said it
3 before, Peak is doing a great job, really helping
4 us in that transition. You know, the other RCs
5 that we're preparing to take over have been great
6 in the communications, so you know, I think I have
7 nothing but confidence that we'll be able to do
8 that and do that effectively.

9 MR. BRYSON: One of the things that when
10 PJM and MISO first put the JOA in place, I think.
11 there was kind of a general concern that the JOA
12 written and filed was a lawyer document.

13 And one of the things we put in very
14 quick is something we called "safe operating
15 mode." And the whole idea of safe operating mode
16 was the operators had the ability in an emergent
17 situation to declare safe operating mode. And if
18 PJM was declaring it, the MISO operators would
19 just respond and whatever made sense to get out of
20 the emergency, then we would go back after the
21 fact. One of the strongest requirements is that we
22 had to formally come up with a document that
23 looked at the lessons learned and would use that
24 to update the JOA.

25 But that safe operating mode, we don't

1 use it as often now, but we had to use it a lot
2 early, and it gave the operators a lot of
3 confidence that they had the ability to operate
4 that seam in a safe and reliable way. So there is
5 a tool there that I would certainly say from
6 experience that, you know, would offer up to some
7 of the new relationships.

8 MR. STEED: Good comments. And a couple
9 things I would add. So we talked about common
10 tools. And so I think that's, in terms of what
11 keeps me up at night, I think it's ensuring that
12 we have a good strong foundation, each entity,
13 and so as much as that's a -- we talked about the
14 common West-wide model, there's other
15 aspects. There's modeling contingencies, there's
16 modeling the remedial action schemes that each
17 entity has, as appropriate to ensure we can
18 effectively coordinate together. Beyond
19 coordination, I think that's so important and
20 actually something that I like what I'm seeing
21 right now is training and coordination.

22 So we're going through a process of
23 identifying key activities that we want to do some
24 mock table talks on prior to operating and so
25 seeing that carry on.

1 So I think as much as you want to be
2 prepared when something actually occurs, you want
3 to set up your operators for success by having put
4 them through their paces prior to that actually
5 taking place, so that's been a good effort and I
6 think that's something that will be important to
7 continue on as we move through the next year or
8 so.

9 COMMISSIONER MCNAMEE: I have two more
10 questions. First one is, Mr. Steed, I know we
11 have common NERC standards and all, but this is
12 your opportunity; is there something that you see
13 that is happening with your regulators in Canada
14 that you think is a good practice that we ought
15 to be considering?

16 MR. STEED: That's a really interesting.
17 question. I guess maybe for context, I'll just
18 provide a short summary of what happens within
19 our province.

20 So I talked about engagement at NERC
21 WECC. We definitely like to be involved in
22 standards development, and so that's been a key
23 piece that has been important to us from -- from
24 the leadership on. We've expressed that to our
25 regulators. They understand what's involved in

1 standards development.

2 We don't adopt on the same schedule that
3 the U.S. does, so once a standard is -- has gone
4 through the development and approval process, it's
5 considered within our -- within our jurisdiction
6 for implementation.

7 In terms of what I think is good there
8 is -- and we heard about it in some of the earlier
9 panel comments is the challenge of implementation
10 within a -- you know, you've got -- when you're
11 looking at all of North America, there's so much
12 diversity there, it can be challenging to account
13 for the differences in, you know, essentially a
14 blanket approach to implementation. So I think
15 that's something that I like what we do within our
16 jurisdiction, is we give opportunity for
17 essentially a second look at a standard.

18 You know, we've gone through the
19 development process, and then we have to make an
20 assessment of what it really means from an
21 implementation standpoint prior to bringing it
22 into effect.

23 COMMISSIONER MCNAMEE: And my last
24 question is probably a combination for Ms.
25 Seymour and Mr. Bryson, is the discussion about --

1 and I was heartened to hear that the reliability
2 issue comes first, and then about the efficiency
3 and cost, I guess, comes second.

4 Can you elaborate a little bit more
5 about how those two things interact and what the
6 process is when you're making a reliability
7 decision first, and then you're worried about cost
8 allocation or cost issues second?

9 MS. SEYMOUR: Yeah, I think what we.
10 basically do is we look at the systems, sort of,
11 and use each other's system as it's available.
12 So we deal with the money later, basically, is
13 the case. So you deal with congestion, you deal
14 with all the issues that might come up after the
15 fact, and you let the system run as it is so you
16 don't worry about -- with PJM and MISO, I
17 basically don't worry about who's flowing on
18 whose system at a particular time. If there
19 comes to be an issue, we use market-to-market and
20 congestion management procedures to deal with
21 that.

22 So it's just a mechanism. I think it's
23 a common understanding of how we operate the
24 system, and an ability to share both, you know,
25 transmission availability since it's something

1 that -- and we don't look at it as something that
2 we have to charge or reserve in advance.

3 MR. BRYSON: Yeah. And just to add
4 onto.

5 that, it's fundamentally and what we set up is a
6 very good routine practice where we have flow
7 gates across the whole system. And the way safe
8 operating mode kind of got used a lot in the one
9 initial is there was a flow gate we forgot to
10 coordinate on ahead of time, so we would just
11 redispatch on the fly and then figure it out.

12 Now, what we do is, in the months
13 leading up to the real-time operations, we
14 identify those flow gates, we crank them back into
15 the model that figures out the settlements. And
16 so in real-time, if PJM sees that flow gate
17 binding in MISO, we just bind in our EMS, and it
18 flows through the settlement systems. So all that
19 is now, you know, figured out.

20 But, occasionally, operators will find
21 something that wasn't necessarily envisioned in a
22 flow gate definition. And then after the fact, we
23 figure out what that is and put it in the process.

24 COMMISSIONER MCNAMEE: Thank you, all.

25 COMMISSIONER LaFLEUR: Well, thank you.

1 This is a really interesting panel. Welcome to
2 all of you. I especially want to call out on
3 Mr. Steed. I believe that -- I'm quite certain
4 that at every annual reliability tech conference
5 since I've been here, and I think I was here for
6 the first one, we've always had someone from
7 Canada, either from the government or from the
8 private sector, so it does remind us that the "N"
9 in NERC stands for North American, so thank you.

10 I want to start with the West. I feel
11 like I've got so much history with the whole
12 setting up of Peak and breaking up WECC and all of
13 that. So I think Peak and WECC -- and I see
14 Melanie Frye, the head of WECC, in the audience --
15 have done a great job since they were separated
16 and both of them applying the lessons of the 2011
17 Southwest blackout with a whole long list of
18 situational awareness and learning about what's
19 happening everywhere, that has really been very
20 well applied.

21 And my first thought, and I think my
22 second and my third, when I heard about breaking
23 up Peak, which also relates to decisions that this
24 company commission made on funding and all of
25 that, but that's all in the past now, was making

1 sure we sustained those benefits that Peak and
2 with WECC in some cases have worked so hard to
3 get, and I think we've heard about some of them,
4 the modeling, monitoring, metrics. I think I
5 heard other words.

6 So I know IROL 2-5, if I have it right,
7 was filed in May, and I think that requires the --
8 is a regional standard requiring the use of some
9 of the tools. But are there other, either
10 regional standards we need, or things that this
11 Commission has to do to make sure that the things
12 that WECC -- excuse me, that Peak put in place go
13 forward, or is it just a matter of you're working
14 out the MOU and we'll just kind of observe and
15 keep an eye on it and make sure that, you know,
16 it's all fine?

17 And just to choose an analogy -- and
18 when Michael was talking about the joint operating
19 agreement between PJM and MISO, we'd call them
20 together and clunked heads a lot of times to get
21 it as smooth as it is now.

22 Is there something that we need to do,
23 or how can we help ensure that those tools and
24 things that Peak put in place get used?

25 We'll start with Dede, who's not here

1 from the California ISO. It should say RFC West.
2 Just kidding. I learned from reading the
3 testimony -- that was one of the most interesting
4 things in the testimony: California ISO was in
5 your name.

6 MR. SUBAKTI: Yeah, and they don't give
7 me a new card, though, so anyway.

8 But you're right, so I'm actually part
9 of the drafting team for the IROL 2-5. So one of
10 the -- one of the things in there, the main
11 portions of the IROL 2-5 is actually to have a
12 common methodology for both modeling and
13 monitoring. So there's two things in there,
14 common methodology for modeling and monitoring,
15 and that requires the RCs to basically work off
16 from this common model that RC West would actually
17 develop for the whole Western Interconnection.

18 And that also includes in there
19 convenience analysis, situational awareness, and
20 all of those stuff. So, basically, those are
21 items that we want to make sure that we don't miss
22 anything from the September 8th event and lessons
23 learned that we have.

24 Inside of that requirement is also the
25 requirement for exchanging and using the data for

1 operations planning for day-ahead analysis and all
2 those other stuff. So in my opinion, I think that
3 is a very important decision that -- that FERC is
4 going to decide on the IROL 2-5 and the new one as
5 well, basically, and have that implementations
6 date hopefully sooner than later.

7 And with regards to the agreement
8 itself, we actually -- we've actually worked
9 pretty close with neighboring RCs. We've never
10 actually had any problem with this, so the
11 RC-to-RC coordination agreement is moving along
12 really well to support these data transitions in
13 there.

14 The NERC current reliability standards
15 for the IROL 10 actually mandate us to have all
16 the data exchange for our real-time assessment and
17 operations planning analysis, so we believe that's
18 sufficient. So the data exchange agreement that
19 we are doing and the coordinations agreement that
20 we are doing, those actually shape us to actually
21 have this set of common tools that you've heard.

22 Asher's mentioned the fact that we will
23 have a cost-sharing agreement with regards on how
24 we fund this tool.

25 COMMISSIONER LaFLEUR: And that's

1 contractual. I mean, wasn't that part of the
2 problem with Peak? There was no tariff; it was
3 just kind of voluntary to pay?

4 MR. SUBAKTI: Correct. Correct. It's
5 contractual.

6 So the plan right now is basically, the
7 RC West would take the contracts with the vendors,
8 and then we would have an MOU to have a
9 contractual cost-sharing agreement between us.

10 COMMISSIONER LaFLEUR: Bruce?

11 MR. REW: First off, I think Peak has.
12 done a great job, and I'm very complementary with
13 the work that they've done as an RC. And what
14 that provides us, and I think Dede alluded to it
15 in his opening comments, is that we have an
16 opportunity to look at what Peak is doing and
17 understand what they're doing and potentially
18 enhance it.

19 So the minimum I think what we'll get
20 out of this transition is what Peak is already
21 doing and potentially in certain areas identify
22 ways to improve it.

23 COMMISSIONER LaFLEUR: As long as
24 they're consistent, right, because you don't want
25 to improve it on one side of the seam and not on

1 the other side?

2 MR. REW: Yeah, absolutely. And like.
3 Dede said, we've got some common tools, the
4 critical things that we do, and us having
5 operated the Eastern Interconnection, we bring
6 the viewpoint of, you know, what are we doing in
7 the East, what are they doing in the West, and
8 what's the comparison. You know, why are they
9 doing it differently? If they are doing it
10 differently, what's beneficial and potentially
11 make some recommendations to something that they
12 may not have thought of in the West. So I think
13 overall it's very much a positive, and I think
14 what you'd see is that it would be a minimum from
15 what Peak has. And, hopefully, we would find
16 ways to enhance it above where it's currently at.

17 COMMISSIONER LaFLEUR: Commissioner
18 White talked about metrics. And I know, Bruce,
19 you said you're developing metrics.

20 Maybe this is a dumb question. Is there
21 any reason we just can't use the ones that Peak
22 already had and everyone just use them for their
23 piece, or do we need to just reinvent them?

24 MR. REW: Well, first, let me clarify on
25 the metrics. So our operations staff has metrics

1 that they follow, so we look -- at the end of
2 every shift, we look at the metrics of how they
3 did, and it really allows us to compare, you
4 know, the six different shifts that operate in
5 terms of how each one is handling different
6 situations, so we have the metrics that we use.

7 You know, we've looked at the metrics
8 that Commissioner White referred to, and those
9 were more of a public reporting that they put out,
10 and that's something that we could do if that's
11 requested.

12 You know, we looked at the metrics and
13 feel like we're already performing the majority of
14 those metrics, so it would be something that we
15 could, you know, produce and provide and, you
16 know, but I feel like we're already doing the
17 majority of those metrics from our operations
18 plan.

19 COMMISSIONER LaFLEUR: I mean, I don't
20 want to get below the level that I could
21 effectively talk about without looking at the
22 metrics, but it sounds like it's a tradeoff
23 between consistency across the two parts of SPP
24 and consistency across the four or five RCs in
25 the Western Interconnection.

1 Jordan, I'll give you a chance.

2 MR. WHITE: Yeah, and I was going to.
3 mention -- first of all, I just want to clarify
4 that, you know, WIRAB's ask is really not another
5 standard. You know, certainly at this point,
6 what we're really hoping is for a management
7 posture among the RCs to really kind of step up
8 to the plate and kind of elevate the discussion
9 about reliability in Western Interconnection.

10 Are Peak's metrics the absolute
11 fundamental, you know, right way to go? Not
12 necessarily. I don't think from our perspective,
13 we think that. We do think it's a good starting
14 place.

15 COMMISSIONER LaFLEUR: Because they
16 exist?

17 MR. WHITE: Yeah. And we do think
18 there's value in some consistency. With that, we
19 recognize that there needs to be some
20 flexibility. And what we're looking for, again,
21 is for discussion, and this is maybe a
22 conversation starter among the RCs about what the
23 best practices are. I mean, certainly, you know,
24 our Canadian partners probably have perspectives
25 and value to add in that discussion, etc.

1 So that's kind of what we're looking at
2 right now. Again, not necessarily another layer
3 of potential standards of enforcement. We're
4 trying to figure out a way to potentially look at
5 some carrots rather than sticks at this point.
6 But, again, that's a discussion that may come up
7 at a different point.

8 COMMISSIONER LaFLEUR: Before I leave
9 the West as an exclusive topic, I just want to
10 use my bully pulpit to say I think Marie and her
11 team have done an outstanding leadership job to
12 be presiding as the thing is unwound and still
13 hold a talent to work on this transition, I want
14 to give them a shout-out.

15 MR. WHITE: Yeah. And if I could just
16 add to that.

17 I'm on the -- the MAC of the Peak, and
18 they are dedicated 100 percent until December 4th,
19 I guess, you know, and I have been very impressed
20 at their level of professionalism and their
21 ability to communicate with the other RCs. So
22 thank you for that.

23 COMMISSIONER LaFLEUR: I want to ask a
24 question that kind of pulls on the West and the
25 East. And I've actually had this debate with

1 Marie, like, well, why do you need one RC? We
2 have a whole bunch of different ones in the East
3 and it seems to work.

4 It seems like we have two different
5 things going on here. In the West, we have had
6 one RC, and now we're dividing it into four or
7 maybe five, if Grid Force stays in place, separate
8 RCs. And in the East, you have all these separate
9 RCs and separate markets and you're working on
10 your seams to work better.

11 And what I had trouble parsing as I was
12 reading the testimony and listening to the
13 testimony, the things that -- well, Michael and
14 Melissa talked about, and Melissa and Bruce, about
15 mark to market, because you have your markets, you
16 have transition planning.

17 How much of those things are things that
18 you do RC -- and two RCs would do, and how much
19 are just having two adjacent markets and two
20 adjacent markets because you're not going to do
21 mark to market -- I'm not sure I could pass a test
22 on exactly what it is, but I'm pretty sure it
23 involves a market, and so it's not going to be
24 like two RCs next to each other in two different
25 countries are going to do mark to market.

1 So how much of that is applicable is my
2 question?

3 MR. BRYSON: I'll take the first shot at
4 that, too. And I think that's a really good
5 question because we have four different borders,
6 and I think we have five different kinds of --
7 it's actually only four, but --

8 COMMISSIONER LaFLEUR: You have BAs and
9 RCs -- all of them.

10 MR. BRYSON: Exactly, And so what we.
11 start out with in fact -- and I don't know if it
12 came out of the FERC requirement for the first
13 JOA or if it's what we developed, but the
14 chapters are outlined in functional areas, and
15 the functional areas really govern what we did.
16 So we took the template from ISO, we went to TBA
17 and said, well, we don't have to worry about the
18 market chapter, but how do we do these things?
19 How do we do outage coordination, transmission
20 planning, emergency operations, data, you know,
21 exchange, and all those things?

22 And we went to New York and we used the
23 same outline, and said how do we do that? We went
24 to the Carolinas. It's the same thing. They're
25 either not applicable or they are, but the basic

1 functions are coordinates and because PJM -- from
2 my perspective in operations, I love the fact that
3 I'm the RC, the BA and the TOP. But I get that
4 that's kind of unusual. It means I can use the
5 same tools for every --

6 COMMISSIONER LaFLEUR: I think that's
7 what all the eastern markets are, ISO; right?

8 MR. BRYSON: Yeah, it's very similar.

9 COMMISSIONER LaFLEUR: Not those three
10 roles.

11 MS. SEYMOUR: We're not a TOP. Neither
12 one of us are TOPs.

13 COMMISSIONER LaFLEUR: Excuse me?

14 MS. SEYMOUR: Neither one of us are
15 TOPs.

16 COMMISSIONER LaFLEUR: Excuse me?

17 MS. SEYMOUR: Transmission operators,.
18 both of us. SPP and MISO, we're just the BA and
19 the RC.

20 MR. BRYSON: So they're not a TOP,
21 whereas PJM is. So we actually find a lot of
22 similarities --

23 COMMISSIONER LaFLEUR: This is how
24 complicated it is.

25 MR. BRYSON: Yeah, it is complicated.

1 COMMISSIONER LaFLEUR: After nine years.
2 It should be like FERC 101 that I'm learning how a
3 few things are, yeah.

4 MR. BRYSON: And we actually find a lot.
5 of similarities between the way PJM operates and
6 the Southern Company operates because they are
7 the RC and the TOP and the BA. But we try to
8 break it down to functional things, you know, the
9 functional things that we have to do, and then we
10 figure out who does that, who has that
11 responsibility.

12 MS. SEYMOUR: And I would just echo
13 those remarks. I mean, we like to take the
14 template that we had when we started PJM and
15 apply it to all of the neighbors, and we look to
16 see -- and I had a -- in the remarks, there was a
17 table in there from ISO that had all the
18 different agreements and all the different -- and
19 it was like a matrix, of is it congestion
20 management? Is it transmission planning?

21 COMMISSIONER LaFLEUR: I saw that in
22 your -- under the checkmarks.

23 MS. SEYMOUR: Yeah. It was the.
24 checkmarks. And those are the things that we try
25 to tick through to see, you know, what do we need

1 to have in place with TBA, with Southern Company,
2 with folks that aren't -- and even though it
3 might not be market to market, it might be better
4 congestion management. It might be market to
5 nonmarket.

6 Those might be things that we're looking
7 at in the future, so I think there's opportunities
8 there, even if you don't have two markets to do
9 something very similar across the border.

10 MR. REW: Yeah. I agree with what was.
11 said. I mean, the market-to-market interaction
12 is essentially the economic aspect of the
13 reliability part where we would try to relieve
14 that economically. And if we can't do that, then
15 we're going to use reliability coordination tools
16 that we have in place to manage that congestion
17 reliably. So that, like you said, if we have a
18 market to market, we can do that. If we don't,
19 then we're going to use the fundamentals of the
20 RC tools.

21 COMMISSIONER LaFLEUR: Well, the safe
22 operating mode is a reliability, I mean.

23 Final question, it's kind of small, but
24 it's kind of been nagging at me. What is the
25 status of the separate Grid Force RC?

1 I mean, is that -- it's not certified
2 yet, so is that something that -- I guess I'll
3 come mainly to you, Dede, right, because that's in
4 the middle of your RC, and I -- we had this
5 conversation. Just seems something to keep an eye
6 on.

7 MR. SUBAKTI: Sure. Right. So I'll
8 start and I'll let Bruce add to that.

9 So we have been working with Grid Force,
10 and Grid Force has been at the table with the
11 RC-to-RCs process.

12 Our understanding is that Grid Force has
13 a -- submitted their certifications, certification
14 request and package to WECC and NERC, and they are
15 going through the certification process as we
16 speak. And the target date for the Grid Force RC
17 certifications -- sorry, not for certifications --
18 operations is actually the same date of the Peak
19 reliability wind-down, which is December 3rd.

20 COMMISSIONER LaFLEUR: And are they
21 going to be their own BA, or are they somebody
22 else's BA or --

23 MR. SUBAKTI: So, yeah, so Grid Force is
24 currently -- Grid Force as a company has multiple
25 BAs, but the Grid Force BA itself is a BA and

1 it's going -- right now, it's part of that
2 certification to bids on RC.

3 COMMISSIONER LaFLEUR: Bruce, I thought
4 it was surrounded by RC companies, but maybe I'm
5 wrong. I should get my map, but, yeah.

6 MR. REW: So some of the Grid Force BAs,
7 a couple of them will be in our RC.

8 COMMISSIONER LaFLEUR: Oh, it's still
9 more complicated.

10 MR. REW: Yeah. And there's a couple of
11 the Grid Force BAs that are going to be their own
12 RC, and those are the ones that are in
13 Washington.

14 MR. SUBAKTI: That's correct. So Grid.
15 Force Energy Management Service, I think that's
16 the company name. The Grid Force companies
17 actually have at least, I believe it's four
18 different BAs within that. Two of them's going
19 with Bruce, and one of two of them is actually
20 going to go its own RC, so --

21 COMMISSIONER LaFLEUR: Well, Grid Force
22 isn't here to speak for itself, but I would just
23 urge that, although it looks small on a map,
24 there be a lot of attention to that seam or
25 whatever. I mean, it's like they're one big

1 seam, right, because they're little Munchkins and
2 the donut everywhere.

3 Does that translate? Do other people
4 say Munchkins, or is that a New England thing?
5 You know, I mean, Dunkin Donuts is everywhere now.

6 All right. Thank you.

7 COMMISSIONER GLICK: I'm starting to get
8 hungry now.

9 So I wanted to kind of start with the
10 West as well and then move on to the other, to the
11 Eastern Interconnect.

12 But with regard to the West -- and I
13 want to kind of pick up where Commissioner LaFleur
14 had asked a couple minutes ago. I have a
15 different variant of the question.

16 But -- so she pointed out that the West
17 obviously up until now has had one RC and the --
18 then there's a different bunch of RCs in the
19 Eastern Interconnect. And I understand why, after
20 Peak was breaking up and some people went to
21 the -- some people didn't want to go with
22 California, some people wanted to save money and
23 thought they could do something differently, so
24 that's why we have, maybe up to five RCs coming
25 up.

1 But isn't it -- I know we don't
2 necessarily have control over this, but wouldn't
3 it be better -- it strikes me that you're just
4 increasing the risk, even if you have all these
5 seams agreements and they do everything properly,
6 wouldn't it be better from a reliability
7 perspective to have one RC in the West?

8 MR. SUBAKTI: Do you want to try that?

9 MR. REW: So my perspective on.
10 everything is there's a pro and a con to it. And
11 I think if you look at a single RC, obviously the
12 pro is you don't have communication, you don't
13 have a seam, you have the ability to look at it
14 all on your own.

15 But I think the con are some of the
16 things that we've talked about. One is that, you
17 know, with multiple RCs, you have multiple eyes
18 looking at it. You know, it gives you the
19 opportunity to ask the question of the neighbor,
20 you know, what are you doing about this? This
21 looks a little risky, or this looks like it might
22 challenge reliability. I think that is a benefit
23 you get with multiple RCs.

24 The other thing I think I'll bring up as
25 an example is the January 17th in 2018, that was a

1 wide-area issue and it affected four RCs. So we
2 had four RCs, you know, working on that concern
3 that we had over that event.

4 Just think, if that was one RC, that
5 would've been really challenging to have the
6 resources and the ability to manage that
7 widespread problem area, so I think there's a
8 value by having multiple RCs and being able to
9 have that conversation during difficult times, to
10 bounce ideas off of each other, because that's one
11 thing that does occur, like, between us and MISO.

12 If we have a concern on a seam, you
13 know, the operators talk to each other, you know,
14 what do you have for options? You know, what can
15 you do to help me? And so on.

16 So that's the value that you get with
17 multiple RCs that you don't get with a single one.

18 MR. SUBAKTI: So just my experience, I
19 came from Midwest. And back then, you know,
20 Midwest, MISO, is a big footprint. We have one,
21 two and whatnot. In reality, we have multiple
22 control center. We have 80 peoples, you know.
23 It's like, it's huge.

24 And I think at the end of the day,
25 similarly, when I moved to Western Interconnection

1 and I look at Peak, it's great, one big thing, and
2 September 8th event and there was a talk about the
3 fact that staffing people, because at the end of
4 the day when we get into emergency, there's a
5 limit on how much a person can do or two person
6 can do, but there's the benefit of having that
7 common tool and all this other stuff.

8 So moving forward, what I'm hoping, what
9 we're trying to achieve, is having this common
10 tool, having this same set of eyes, same set of
11 tools, but then we have more people, that way that
12 we could actually have the benefit of having both
13 environment, where each RC in the West have the
14 same common tool, have the same eyes to be able to
15 see it, but then now you actually have more eyes
16 to be able do double-check and second guess. I
17 guess the word "second guess" not probably good.
18 But challenge ourselves and ask the question, it's
19 like, are you seeing what we are seeing?

20 So that's what we're after, is using the
21 common tool, but having multiple eyes to actually
22 look at that.

23 COMMISSIONER GLICK: Commissioner White,
24 do you have anything there?

25 MR. WHITE: Yeah, I mean, I would.

1 certainly say that your point is well taken, that
2 was certainly a consideration, you know, the
3 early days of this discussion, moving away from
4 Peak, you know.

5 You know, from my perspective, I guess
6 what I would say is once the decision was made, we
7 quickly had to move through the stages of grieving
8 quick and focus on the future.

9 The fact of the matter is that on
10 December 4th, there's no going back. Peak will no
11 longer be operational, and so, you know, WIRAB,
12 again, we're closely monitoring it. We have a
13 high level of confidence. But, again, I think
14 Nick Brown asked this morning, we're in just this
15 extremely critical stage, you know, it's mission
16 critical for the RCs just to -- for communication,
17 communication, communication. So that's all we --
18 that's all we can do. And I don't know beyond
19 that what I can say.

20 COMMISSIONER GLICK: Yeah, I understand
21 there are three reserved sharing groups within
22 the WECC right now.

23 Does anyone know if there are going to
24 be any -- a situation where a reserve sharing
25 group is going to be some in SPP West and some in

1 the ISO?

2 MR. SUBAKTI: Yes.

3 COMMISSIONER GLICK: Given that, is
4 there -- what kind of relationships, what kind of
5 agreements are in place to deal with real-time
6 operations of those members, if you want to
7 dispatch those reserves?

8 MR. SUBAKTI: Sure. So let me go back a
9 little bit to give the history.

10 So the -- even in the current
11 conditions, right, so there's Alberta's
12 reliability coordinators, Peak is the reliability
13 coordinator, and the Northwest sharing group is
14 actually -- already include Alberta, so there's
15 already procedures and agreement to that.

16 So what we do is we basically take the
17 same procedures and agreement and expand it. So
18 we work with SPP, BC Hydros, and RC West and
19 Northwest Power Pool, to actually look at all
20 those agreement that is in there.

21 Northwest Power Pool is actually heavily
22 involved with our -- our RC-to-RC agreement and
23 coordinations with regard to reserve sharing
24 group. We actually have one, and I'll let Asher
25 talk about it because he has more direct

1 involvement. But there's a real-time working
2 group that's actually specifically talking about
3 the reserve sharing.

4 MR. STEED: Yeah. I guess I sat at the
5 Northwest Power Pool's operating committee and
6 reserve sharing group committee for a number of
7 years, and, actually, I guess in hindsight, it
8 was -- it predates -- my involvement predated
9 Peak. It would've been in the WECC RC days.

10 And so as much as, you know, what we're
11 looking at is Northwest Power Pool will actually
12 encompass four RC areas in the future. As Dede
13 says, there are procedures in place. And the
14 BAs -- I think what's been key on the reserve
15 sharing groups is the -- kind of two fronts. The
16 BAs are very engaged in that reserve sharing group
17 and actually actively bring in the RCs to say,
18 Hey, we want to make sure that this continues to
19 work, because for the BAs, the reserve sharing
20 group is fundamental to their operation, and
21 really for the RCs, likewise, it definitely will
22 be.

23 So as -- I don't have really much more
24 to add there. I think it just -- it's a
25 recognition. This is what we're working towards,

1 and the benefit that we see must continue on, so
2 ensuring that level of engagement sustains is
3 really crucial, so --

4 MR. REW: Commissioner Glick, I'd just.
5 like to add that right now in the Southwest Power
6 Pool reserve sharing group, we have participants
7 that are outside of the SPP market. They're in
8 the separate BAs, separate RC. And, you know, we
9 handle that very efficiently in terms of the BA
10 scheduling. If they lose a unit, we dispatch
11 into them, vice versa.

12 So we looked at that on the western side
13 being the same situation. We'll work with the
14 BAs, understanding where they're going to get
15 their reserve sharing if there's a contingency,
16 and then what their obligations are, both
17 importing and exporting as a participant in that.

18 COMMISSIONER GLICK: Does anyone else
19 have anything?

20 MR. BRYSON: And just in the Eastern
21 Interconnection, we have very similar, we have
22 PJM participates in two reserve sharing groups
23 that are outside of our reserve obligations, and
24 stuff; so we figured out a work to way through
25 it, so it's a solvable problem.

1 COMMISSIONER GLICK: That's a good
2 segue, moving onto the Eastern Interconnect.

3 And what little I do know about seams
4 issues, I know that the joint operating agreement
5 between MISO and PJM is always held up as a model
6 of how to work well together between regions and
7 how they provide significant benefits.

8 And I understand at least with part of
9 sharing contract path capacities provision of the
10 JOA in particular -- and maybe, Ms. Seymour, if
11 you can talk about a little bit about how that
12 might have helped during some of your Peak events,
13 especially extreme weather like in January of
14 2018.

15 But, also, I'm also curious about how it
16 might help with if you had similar arrangements
17 with other regions that surround you.

18 MS. SEYMOUR: Sure. Yeah, our agreement
19 with PJM is a little bit different than the other
20 seams, like you mentioned. We basically have a
21 couple things that are different.

22 One is we do have a capacity sharing
23 provision of the joint operating agreement that we
24 both agree enables us to use each other's systems.
25 I talked a little bit about that earlier.

1 We also have a no-through and outright,
2 which helps, so there's no right between MISO and
3 PJM. So the combination of those things, we -- as
4 Michael mentioned, I mean, we -- we flow power
5 more during emergencies, we flow power across each
6 other's system. I think during January, you were
7 importing quite a bit to us, 6,500 megawatts. I
8 mean, so we do that in an emergency situation.

9 I think that common understanding just
10 gives us the ability to have flexibility to deal
11 with an emergency in the moment and not worry
12 about the financial pieces of it until after the
13 fact. And I think that's really where we benefit
14 from that on that seam, that we can benefit from
15 it on other seams as well.

16 COMMISSIONER GLICK: What are the
17 challenges with reaching those same type of
18 agreements with other regions?

19 MS. SEYMOUR: I think it's a
20 philosophical difference. I mean, we'll talk
21 about SPP and MISO having a conversation about
22 that. I mean, we have philosophical differences,
23 and I talked about that in my analogy around the
24 use of that capacity sharing provision. We have
25 it in both JOAs. We see it differently. And

1 it's just one is a sunk-cost and the other is
2 use -- pay for use of the system.

3 It -- you know, the philosophical
4 differences manifested themselves, of course,
5 through FERC proceedings and others into the
6 agreement we have today across the north and the
7 south, and it just makes it a little more
8 complicated and a little more tracking.

9 One of the -- one of the things that
10 happens now is if we have an emergency situation
11 where we have one of our transmission owners that
12 will flow across the border accidentally onto
13 SPP's system or they have a transmission light
14 out, they pay for that unreserved use, for
15 example, if they go onto that system. Whereas the
16 opposite isn't true on MISO because we have a
17 different interpretation of that capacity sharing
18 provision.

19 So those are differences that manifest
20 themselves and make it a little less efficient.

21 COMMISSIONER GLICK: So along those same
22 lines, you pointed out in your testimony, which I
23 thought was an excellent discussion about
24 transmission line ratings. And I think you
25 pointed out, when there's a disagreement between

1 MISO and a neighboring region, you have to use
2 the most conservative line ratings.

3 So how did that impact the cold weather
4 event in January of 2018?

5 MS. SEYMOUR: Right. So I would say
6 just backing up to, I think, this lack of
7 understanding. We talked about it, talking the
8 same language was a real big -- I mean, a big
9 issue, kind of, in general in January, back in
10 January 2018.

11 We talked about communications being --
12 but it was really understanding what each other's
13 talking about and going -- and on your
14 transmission line ratings, we would go to the most
15 conservative, necessarily, rating depending on
16 what that rating was on whoever's transmission
17 system was having the issue.

18 And I think it's just an understanding,
19 it's not having the same ratings necessarily
20 across both footprints or even within your own.
21 But I think what we learned was it was important
22 to understand where we were so that we were making
23 the right decisions in the moment on reliability,
24 both from emergency procedures and how we called
25 emergencies and what we talked about during the

1 emergency, and then what those line ratings were.

2 So they did play an important role, but
3 I think the bigger picture -- it's really the lack
4 of awareness or common language within the
5 timeframe that drives you to the least common
6 denominator when you have those conversations.

7 COMMISSIONER GLICK: Mr. Bryson, have
8 you had a similar experience with some of your
9 neighbors?

10 MR. BRYSON: Yeah, and it's interesting.
11 because I remember in the early days of the JOA,
12 we've done this with New York as well, one of the
13 ways that we've solved some of those language
14 problems is we sent operators -- not engineers,
15 not lawyers. We sent operators to go sit in the
16 other control room during these operations,
17 particularly during cutover operations, and they
18 would come back to us and say that's not what
19 they're talking about, and so that helped us work
20 some of those things out.

21 So I would encourage every opportunity
22 to do that in the seams and exchange the people
23 who are on the floor making the decisions as much
24 as possible, and I know you've done that to some
25 extent as well, particularly in the parallel

1 operations.

2 But, certainly, I know -- and what I
3 think about our seam with New York is New York,
4 for being a single state, has more regulatory
5 impositions on them than I think any other state.

6 They have the Power Authority. They
7 have NPCC, who has their own set of regional
8 standards.

9 So when we're creating a flow gate and
10 trying to figure out -- we had to come up with,
11 you know -- there was not a good apples to apples.
12 We had to come up with a way we'd say if we're
13 going to find the flow gate, let's figure out a
14 way that we're both talking about the same thing,
15 but we've worked through it with our JOA with New
16 York, so --

17 COMMISSIONER GLICK: Ms. Seymour, you
18 want to comment on that at all?

19 MS. SEYMOUR: I was just going to
20 mention one thing.

21 What's really important that we talked
22 about is sometimes in the moment, you know, you're
23 creating these joint operating agreements and you
24 think you have all the best intentions, even the
25 operating procedures that we have under our

1 agreement and they're very -- and they're very
2 good in the moment.

3 But when you go into an emergency
4 situation, I think it highlights the importance of
5 that enhanced communication or that coordination.
6 And it really is speaking the same language
7 because if you're on a system and you're calling
8 an event, it means something different to me than
9 it does to SPP because it's not apples to apples.

10 So, you know, we have gone through after
11 September -- or January 17th in 2018, we spent a
12 year working through that with SPP, TBA, and
13 Southeastern RC. And I think we've come to a good
14 place, but you know, even talking about the West,
15 I think you've got to think about, you're not
16 going to get everything right the first time, so
17 it's going to be important to keep those
18 conversations going after the fact and do a lot of
19 lessons learned.

20 COMMISSIONER GLICK: Commissioner
21 LaFleur mentioned earlier in the day about the
22 likelihood of more extreme weather conditions,
23 and some of those are obviously polar vortexes
24 and other cold weather events, obviously heat
25 waves. So it just strikes me that one of the

1 things we need to consider and work on, and I
2 think obviously you all are working on, is making
3 sure the regions work better together and have
4 the right commonalties, And so on as we suggest,
5 so it's a very interesting issue.

6 COMMISSIONER MCNAMEE: Before going to.
7 potential questions from the staff, one thing I
8 have noticed in this conversation, which was
9 heartening, is that there seems to be a universal
10 agreement that don't rely on the lawyers to figure
11 out how to manage a crisis. So I wholly
12 endorse, and applaud you all for having such good
13 judgment as a lawyer.

14 So does Staff have any questions?

15 MR. ANDREJCAK: I'll throw one out.
16 there. This is truly a seams issue that crosses
17 Panel 2 and Panel 3, but with all the data
18 sharing, how does cloud computing lend itself to
19 any efficiencies?

20 MR. BRYSON: It's interesting. I was
21 on -- in fact, Bruce and I were both on the
22 Search Advisory Panel to DOE, and this
23 conversation came up. And I think there was a
24 guy there who worked with the National Security
25 Agency that told us, we're using it, get over it,

1 which I thought was interesting because, you
2 know, we are using cloud computing for
3 back-office-type stuff. We're not quite there.

4 But one of the things that -- in fact,
5 New York ISO talked about it on the panel was
6 they're using it for some of their planning
7 applications because it gives them a lot more
8 ability to share data between applications and do
9 calculations faster. They're -- and it may be
10 particularly for seams-type things, that may be an
11 opportunity. I know we're not there yet, but --

12 MR. DODGE: Most of my questions have
13 been answered, but I just have a couple
14 questions.

15 My first question's actually for Dede
16 and Bruce, and maybe you can just talk a little
17 bit about your involvement in each other's RC
18 certification process.

19 MR. SUBAKTI: So on the first -- we
20 call -- we've been calling it the first phase,
21 which is the July 1 phase, we actually had the
22 people from SPP that came over, a couple of
23 people from SPP came over and participated in
24 our -- in our certification process.

25 And we are actually -- actually not

1 quite RC West, but the California ISO's directors
2 of real-time ops and others is actually going to
3 be part of the certifications for the SPP portions
4 in there.

5 MR. REW: Yeah, like Dede said, we had.
6 two staff that went out there for the duration of
7 their certification. Our certification is --
8 begins August 14th, and you know, they'll be
9 participating in that.

10 MR. DODGE: All right. Great.

11 So then I have one followup question and
12 that is I understand that Peak, you know, had this
13 master model of all the remedial action schemes in
14 the Western Interconnection. And I also
15 understand that a large number of the remedial
16 action schemes actually span multiple RC
17 footprints.

18 So what efforts are you taking to ensure
19 that the remedial action schemes are actually
20 planned for and operated correctly in real-time,
21 and you're taking into account into your
22 operations when the remedial action schemes
23 actually span multiple RCs?

24 MR. SUBAKTI: Sure. So part of planning
25 to implement that new IRO 2 standard, the regional

1 variance, we have a full belief that the
2 commission's going to approve it anytime soon
3 here, but as part of that, we're actually -- we've
4 actually moved ahead and actually work on that
5 common model and common methodology.

6 So the common model is being worked on
7 and then the common methodology is being worked
8 on. I'm actually personally leading that effort
9 for the whole Western Interconnections, and -- and
10 part of that is actually the exchange of the
11 remedial action scheme data, all of this
12 automation stuff that's data and also on how to
13 model it, what to model it, how to exchange those
14 data.

15 So we have engineers from my shop,
16 Bruce's shop, everybody's, Asher's shop.

17 And -- and we basically get into an
18 agreement on how we want to exchange it, and how
19 we make sure that we continue to do that. And
20 WECC's holding us accountable, and every time we
21 have that certification process, they ask that
22 question, show me. I want to see it. How does
23 that work? And, for us, in the RC West or in
24 California ISO is because we have been part of
25 this Western Interconnections.

1 Our real-time tool, our real-time
2 continued analysis is already made up for that, is
3 already set up for that. Out of the 200-and-some
4 remedial action scheme that we have in the Western
5 Interconnection, it's about a third of that is in
6 California to begin with. So we're very familiar
7 with that.

8 So what we do is we just expand that,
9 and our technology allow us to just expand that,
10 to do that. But for the other RCs they are also
11 working through it and we have this -- this group
12 that has -- that has continued to do that.

13 But just to add to that, we're actually
14 moving forward with the new reliability standard,
15 with the new PRC 12 that is going to come into
16 effect in 2021, I believe. Those are the new
17 standards that FERC approved. In the Western
18 Interconnection because we know that it is
19 important, we're actually planning to do that
20 ahead of time in the 2020 time frame. And I'm
21 also, like, chairing that under the umbrella of
22 WECC, so there's a good coordinations between WECC
23 and the RCs to implement this common RAS database
24 modeling and whatnot, so --

25 MR. DODGE: Bruce, anything to add?

1 MR. REW: No, I think Dede's covered
2 most of it. Like he said, he's leading that
3 effort in the West and you know, we're working
4 through understanding and appreciating each of
5 those RAS schemes better there.

6 MR. DODGE: Okay. Thank you.

7 David?

8 Anyone else from FERC staff?

9 MS. WIERZBICKI: We heard a lot of.
10 discussion about the West-wide tools and metrics,
11 and I was curious if the East, with all the
12 different RCs over the years, has developed
13 similar type of East-wide tools or metrics, or
14 if there are areas where all of the RCs could
15 learn and develop common tools and metrics that
16 might be useful.

17 MR. BRYSON: So I know -- and I can't
18 speak for all of the eastern RCs, but I don't
19 think we used any common tools. We use -- one
20 of the things we've created is interfaces between
21 the tools, so we define data sets and allow the
22 tools to talk to us.

23 So we might have, for instance, a module
24 of our securities constrained economic dispatch is
25 the M to M piece with MISO. So that's -- it's not

1 a whole tool that we all use together, but we've
2 created interface tools that really talk between
3 them so --

4 MR. SUBAKTI: Maybe I'll add to that a.
5 little bit. This whole process has actually been
6 very interesting to me because it's -- I came
7 from the Eastern Interconnections, moved to the
8 Western Interconnections, get to know everybody
9 that I get to know 15 years ago, again.

10 One of the -- one of the bigger tool in
11 the Eastern Interconnection that's commonly used
12 is for transmission loading relief, right, this is
13 the NERC, IDC, TLR for whatever is in there.

14 In the Western Interconnection, we have
15 that common tool that we call an Enhanced
16 Curtailment Calculator, which is really just the
17 same thing.

18 The TLR and the ECC is actually even the
19 same vendor. So what we've actually been working
20 out is actually trying to do a comparison between
21 the eastern and the western and trying to figure
22 out what is the best practice.

23 So we've been in contact with people
24 with PJM, MISO, SPP, and to actually have these
25 common discussions about what could we learn from

1 each other. So this is actually an exciting time,
2 at least for me, to be able to do that comparison,
3 what is the best for northern America, and Canada,
4 too?

5 MR. BRYSON: And, Mary, that's actually.
6 a good point. There is a NERC set of tools -- so
7 those, I guess you would say are common. But I
8 think those are almost tertiary tools from an
9 operator perspective so --

10 MR. REW: Yeah. Those tools are almost
11 more data sharing, in terms of what are the
12 flows, and what are -- what's going on in the
13 system, rather than doing calculations.

14 MR. WHITE: I guess I'll make the point
15 that -- you know, I'm not sure what they do in
16 the East. But I think one thing that's a little
17 bit unique, at least what Peak did, was it's not
18 just the metrics of the RC and the performance
19 according to their pillars. It's really about the
20 quality of the data provided by the BAs and TOPs,
21 because, really, the one distinction I could make
22 with the Eastern Interconnections is because of
23 the dynamic nature of the operating limits, you
24 know, we're only as strong as our weakest link.
25 So I think that's one of the critical, kind of,

1 distinctions is that data quality.

2 MR. SUBAKTI: Maybe if I can add to
3 that. Let's go to the metrics discussion, I
4 really like that, because, you know, we could get
5 better as long as we know where we are right now.
6 And we want to try to be better.

7 In Peak's -- actually, I think
8 Commissioner White talked about the fact that
9 there's a public metrics that shows on the public
10 itself, but there's also metrics that Peak's
11 actually currently sending back to each individual
12 BA and each individual TOP on how those BA giving
13 the data, the quality of the data that the BA is
14 giving.

15 And then there's also metrics, like
16 Bruce was talking about on how Peak do their
17 operations itself, so it's kind of like a three
18 different metrics that's in there.

19 And as I've talked with Peak, we would
20 like to do the same in the RC West. We would like
21 to have publicly available metrics, but there's
22 also -- there's more kind of like confidential,
23 and how good your BA is doing, and internal
24 metrics for us, like what Bruce was talking about.

25 COMMISSIONER LaFLEUR: I wanted to ask

1 one more question, which picks up on some of what
2 I was talking about before. When I was comparing
3 and contrasting the West with the -- where we're
4 trying to work out the seams of the RCs in the
5 East with the market tools, of course, that
6 overlooks the fact that the California ISO has
7 many of the companies that are going to be buying
8 RC services from you are in the energy and
9 balance market, looking potentially at the
10 enhanced day-ahead market, and SPP has talked
11 about selling market services in the West.

12 I guess starting with Dede, could you
13 comment on how those complement each other because
14 I assume if you're doing, you know, capacity
15 sharing through the energy and balance market
16 that, I would think, complements your RC function
17 over the same footprint. And it seems like
18 there's a potential, as markets grow more in the
19 West, to get some of those same synergies or --

20 MR. SUBAKTI: Sure. Yeah. There are.
21 actually two things that are very good that end
22 up having that markets and the RCs together.
23 Number one is the ability to do a look-ahead.

24 And this is actually something that we
25 strive to be providing a better enhanced service

1 for our RC footprint, is the ability to do a
2 look-ahead. Because right now, with -- if you're
3 just doing the RCs, all data that you're getting
4 is just the forecast data and the real-time data.
5 Whereas, if you're doing the market and the RCs --
6 now, when I do the market, I'm doing and
7 committing a unit ahead of the time, in the day
8 ahead, in the hour ahead.

9 So even with that look-ahead as of
10 Monday, we put a look-ahead ability.

11 It's not just real-time assessment, now
12 we have a look-ahead assessment, a day ahead, hour
13 ahead, the next couple minutes and all this.

14 So that's one of the most efficient
15 things that's great about having that be combined.
16 The other one is -- you know, this is going back
17 to methodology -- common language. In the Eastern
18 Interconnection, we call this congestion
19 management.

20 In the Western Interconnections, we call
21 it -- this is an SOL exceedance mitigation, a
22 mitigation of thermal overload. They're all the
23 same, but it's different language. So being able
24 to mitigate potential SOL exceedance or limit
25 exceedance in the Western Interconnection, that's

1 what we call it instead of congestion management,
2 it's more efficient when you're doing it through
3 the market because it's an economic dispatch
4 solution.

5 COMMISSIONER LaFLEUR: They're tools.

6 MR. SUBAKTI: Because that's what a tool
7 is. So right now, California ISO and EIM, the
8 market itself, has this security kind of dispatch.
9 That allows us to relieve that thermal overload or
10 relieve that limit exceedance in a more efficient
11 manner.

12 For those people who don't -- who are
13 not part of this market, then we would have to do
14 it more of the curtailment method, and that's why
15 we have the Enhanced Curtailment Calculator.

16 COMMISSIONER LaFLEUR: So you're going
17 to be running an RC where many of the people, and
18 seemingly more all the time with the Bonneville
19 announcement, are coming -- are also buying market
20 services from you, but some are not. So that's
21 another -- not exactly a seam, but distinction
22 you have to manage?

23 MR. SUBAKTI: Right. So just like all
24 the combination, California ISO itself, it's a
25 BA. We're a BA, we're TOP, we're a market

1 operators, but California ISOs now have an RC, but
2 our RC footprint is not necessarily the same, so
3 that's true.

4 MR. REW: Commissioner LaFleur. I would
5 just like to add, you know, one of the things
6 that we see that markets do is they really bring
7 a tighter operation to the multiple BAs. You're
8 doing that five-minute dispatch in real-time,
9 you're coordinating that. You're looking at
10 flows. Like Dede said, you're doing the security
11 constraint economic dispatch, you know, on a wider
12 area. So it really brings operations tighter
13 together.

14 And, you know, like we talked about
15 earlier, that's a tool that's used before some of
16 the other reliability tools. So it really
17 enhances your operation by adding markets and
18 making it more efficient.

19 COMMISSIONER LaFLEUR: But sitting in
20 Little Rock, you're going to be doing that in two
21 different things; right? I mean, I know there's
22 a couple DC ties, but you're not -- you're going
23 to be running this market in RC, and then a
24 separate, I would say computer -- but I mean, a
25 separate -- platform for the West because it's not

1 like a one big; right?

2 MR. REW: Sure. We'll have staff,.
3 wherever they're sitting, they're dedicated to
4 looking at reliability services in the West or
5 market services in the West. So that will be
6 their focus area, and they will be looking at the
7 real-time calculations and making decisions based
8 on that.

9 COMMISSIONER LaFLEUR: Thank you.

10 Did someone else have anything? Yes.

11 MR. WHITE: First of all, thank you for
12 that question. As chair of the Western
13 ELM Body of State Regulators, my feelings were
14 hurt that we weren't going to talk about EIM in
15 terms of reliability, so thank you.

16 I just wanted to comment, you know, we
17 talked a lot about net power cost benefits of
18 potential market solutions, but that's really
19 something that not discussed a lot, which is the
20 reliability benefits the EIM provides and I just
21 want to commend FERC Staff they did white paper, I
22 think it was 2012 or '13, that really did a
23 detailed kind of discussion of what the potential
24 reliability benefits provided by EIM were so --
25 again, I just wanted to add onto that, and thank

1 you for that question.

2 COMMISSIONER LaFLEUR: Well, I know
3 Travis Kavulla teased some of the FERC
4 commissioners who have departed and in their
5 farewell letters talked about the imbalance
6 market, so I'm not -- don't plan to take any
7 credit for it whatsoever.

8 But I do think it's one of -- the
9 evolution in the West is one of the most exciting
10 things of the last decade without a doubt. So
11 thank you for your efforts, and your colleagues.

12 COMMISSIONER MCNAMEE: All right. If.
13 there aren't any more questions from anyone, we
14 really appreciate you all being here. Obviously,
15 these issues are vitally important. What's
16 happening in the West, to echo Commissioner
17 LaFleur, is really exciting to see what's
18 happening. But can't forget the fact we don't
19 see the issues that you all are managing things
20 well, and the rest of the country, the rest of
21 North America is a credit.

22 And it's something that, obviously, we
23 always have to be aware, be watching, be vigilant
24 about, but it's important.

25 I'm glad that we do these things at the

1 technical conference because that helps make
2 everybody aware of, you know, what's going on
3 behind the scenes, in a sense. So thank you very
4 much.

5 We finished a little bit early. We're
6 going to reconvene at 3:30 in order to be
7 consistent with the notice that we provided to the
8 public for timing, so give more time for people to
9 check their e-mails and everything else, so we'll
10 reconvene at 3:30.

11 (Whereupon, a break was taken.)

12 COMMITTEE CHAIRMAN CHATTERJEE: All.
13 right. Before I welcome our final panel of the
14 day, I want to thank Commissioner McNamee for
15 holding down the fort, much appreciated.

16 Also, want to note very briefly, we've
17 got a slight change on this final panel. Our
18 panelist from Southern Company was unable to join
19 us today, but I do want to thank her for her
20 thoughtful testimony, and it's much appreciated.

21 Finally, I want to welcome a special
22 guest, Chris Anderson, the chief operations and
23 emergency management official at the FCC. Chris
24 is an incident management and infrastructure
25 protection expert with almost three decades of

1 government, military, and private sector
2 experience. He is currently the FCC's chief of
3 operations in emergency management.

4 In that role, he is responsible for the
5 Commission's incident management activities,
6 including the management of two operation centers,
7 the FCC's national security coordination, and
8 continuity of operations in government programs.

9 So welcome, Chris, and thank you for
10 being here.

11 And with that, I will turn it over to
12 our panelists. Thank you.

13 MR. BROZEK: Thank you.

14 Commissioners, thank you for the
15 opportunity to join this panel today.

16 My full opening comments have been filed
17 and are available to review. In the interest of
18 time, I'd like to explain why I'm here and what
19 the industry and the customers they serve need
20 from you.

21 Prior to joining Anterix, formally
22 pdvWireless, I spent 30 years in the utility
23 industry. Most of that time, I was responsible
24 for communications networks and infrastructure. I
25 have lived through the challenges utilities faced

1 during that time.

2 I've passed several NERC reliability
3 audits, where I was the first witness followed by
4 vegetation management. The entire reliability
5 audit is built upon these two key principles;
6 utilities trim trees, and they have resilient
7 communication capabilities between the reliability
8 coordinator, transmission operators, and balancing
9 authorities. The audit cannot continue unless
10 these requirements are met.

11 Clearly, you recognize the importance of
12 reliable communications for electric service
13 reliability, which is, of course, the topic of
14 this conference.

15 Private communication networks continue
16 to be the best solution to support the safe and
17 reliable delivery of electricity. While the past
18 was dominated by fiber and microwave, the future
19 is broadband wireless networks built on the global
20 LTE standard.

21 I joined Anterix to deliver on that
22 mission. Today, we have a once-in-a-generation
23 opportunity for critical infrastructure providers
24 to deploy private wireless networks that meet
25 their reliability, resiliency, performance, and

1 most importantly, cyber security requirements.

2 A network the utility decides where
3 coverage exists, when upgrades are performed, what
4 devices can connect, and that it can be isolated
5 from the Internet. Put simply, utilities need
6 full control of these critical communications
7 networks. My fellow utility professionals agree.

8 In a recent FCC filing, Southern
9 California Edison, one of our nation's largest
10 utilities stated, "The electrical utility industry
11 in this country is now at a historic threshold.
12 The telecommunications, methods, equipments, and
13 networks of the 20th century are no longer up to
14 the task of meeting 21st century climate
15 conditions and security threats.

16 "Not to mention the increase in
17 complexity of administering the interconnected
18 grids that make up the nation's electrical
19 infrastructure. SCE views the current proceedings
20 as holding nothing less than the potential to have
21 a defining once-in-a-generation impact on the
22 ability of utilities to continue to deliver safe
23 and reliable power to their customers for decades
24 to come."

25 What the utility industry and the

1 customers they serve need is FERC's leadership to
2 press the Federal Communications Commission to
3 move urgently to make licensed spectrum, including
4 900-megahertz broadband spectrum, available to
5 meet utility industry's critical data
6 communication needs. Thank you.

7 MR. BRUMMOND: Good afternoon. I'm
8 J.P. Brummond, vice president of business planning
9 at Alliant Energy, a midwest utility of about a
10 million electric customers and about 400,000
11 natural gas customers located in Iowa and
12 Wisconsin.

13 I want to thank you for the opportunity
14 to be here today on behalf of the Edison Electric
15 Institute and for providing this forum to discuss
16 the challenges our industry sees, with the Federal
17 Communication Commissions' proposed policy changes
18 regarding access to the 6-gigahertz band and the
19 potential impact such changes would have on the
20 reliability of the electric grid.

21 My remarks today will focus on the
22 challenge that our industry faces due to the
23 growing interdependence of the electric as well as
24 the communications infrastructure.

25 EEI and its members have long supported

1 broadband deployment throughout the United States,
2 the deployment of broadband should be balanced,
3 however, with the need to maintain safe, reliable,
4 and cost-effective electric infrastructure, which
5 depends on protecting our private wireless
6 networks from harmful interference.

7 When I first started working at Alliant
8 Energy, I had the privilege to work in a control
9 center where we controlled our system frequency.
10 This was before MISO but as I'm sure you know,
11 electricity's generated exactly when we need it,
12 and I was just fascinated to see how our -- as a
13 frequency would change, a large generator would
14 trip off, these control systems, in seconds, would
15 send out signals to our generators across Iowa and
16 Wisconsin, and they could respond to those
17 frequency changes. That's changed a little bit
18 with MISO.

19 MISO's the one now technically
20 controlling the frequency, but we still have these
21 control systems. They're still sending the set
22 points to our generators, and our generators are
23 providing information back to MISO. And I bring
24 this up because it's these communications that are
25 the ones that we're talking about.

1 These are the communications that are
2 using these private wireless networks over the
3 licensed 6 gigahertz network.

4 Building on that a little bit more, when
5 I was -- in this control room, it's a locked room,
6 so not only do you need to get into the building,
7 but you also need to get into the room. It's very
8 secure. The software systems are in a server room
9 that is locked away from the larger server room of
10 our company. So it is also very secure.

11 It's sending messages out into the
12 field, as I noted. They have similarly locked
13 down facilities that are getting these systems, so
14 I bring this all up just to mention that these are
15 our very critical procedures and the things that
16 we operate. These are the ones that have to
17 comply to a lot of different NERC reliability
18 standards, and these, of course, are the standards
19 that if they're violated, they come with sanctions
20 that can be as high as a million dollars a day per
21 incident. So these are some of the most important
22 things that we do, these operations, and they run
23 over these private wireless connections.

24 Other EEI member companies can also
25 mention a variety of other things that -- and we

1 have the same as well, other uses of these
2 communication systems, including things like
3 responding to hurricanes, responding to wildfires,
4 as well as system protection and just monitoring,
5 and supervising our distribution and transmission
6 systems.

7 The FCC's rule-making contemplates
8 providing unlicensed users with access to licensed
9 spectrum in the 6-gigahertz band. We believe that
10 in its current form, the FCC proposal would cause
11 a level of interference for operation that
12 threatens the safety and reliability of our system
13 to our customers. We do not also see a clear and
14 immediate alternatives to using the 6-gigahertz
15 band to ensure mission critical operations
16 especially in times of disaster.

17 As part of its rule-making, the FCC is
18 examining how to protect incumbent licenses that
19 operate in the band such as electric companies
20 from harmful interference. We see this as a big
21 opportunity. And we urge the Commission to engage
22 with the FCC on these issues that impact great
23 safety reliability, and really the
24 cost-effectiveness of our system to our customers.
25 It's an opportunity for FERC and the FCC to

1 promote interagency coordination and protect the
2 license mission-critical communication systems in
3 the 6-gigahertz band.

4 In conclusion, I really appreciate the
5 opportunity to participate in this forum where we
6 can discuss the role of communication technology
7 as well as policy on the safety and security of
8 our system, and I look forward to discussion and
9 any questions that you have.

10 MS. DITTO: Thank you so much for the
11 opportunity to be here today. My name is Joy
12 Ditto, and I'm the president of the Utilities
13 Technologies Counsel. UTC is the global
14 association representing electric, gas, and water
15 utilities of all ownership types on their
16 information and communications technology needs.

17 UTC was formed in 1948 when electric
18 utilities began to need high levels of
19 communications reliability to underpin the high
20 levels of electric reliability helping to fuel the
21 post-war boom. Such high levels of communications
22 reliability were either not available or not
23 affordable from the traditional telecommunications
24 carriers.

25 So utilities built their own networks.

1 Today, utilities' private communications networks
2 are built of both wireline and wireless
3 infrastructure. Any wireless technology is
4 dependent on spectrum to operate. Spectrum is a
5 naturally occurring phenomena, the access to which
6 is governed primarily by the Federal
7 Communications Commission. The specifics of
8 utilities' communications networks vary.

9 Geography and access can impact the
10 ability of utilities to provision wireline
11 networks, while terrain can impact wireless
12 communications. Utilities' access to
13 interference-free spectrum is limited by FCC
14 policies, hence, utilities combine these network
15 features to create redundancy and reliability.
16 Because every electric utility is expected to
17 provide safe, reliable, and affordable
18 electricity, utilities' communications networks
19 have been built with this top of mind.

20 Utilities use their communications
21 networks for mission-critical functions. As
22 technology evolves, other utility network-use
23 cases will as well. In fact, these networks have
24 truly modernized the grid since the 1980s, when
25 digital communications were commercialized,

1 enabling revolutionary technology like SCADA to
2 become commonplace.

3 If utilities control these vital
4 communications networks, why do we always hear
5 about the interdependencies between the
6 communications and electric sectors? Utilities
7 still rely on commercial networks for some of
8 their functions, like their outward-facing
9 Internet, enterprise, telephones, etc. We believe
10 this combination of private and commercial
11 networks will govern utility communications into
12 the future. But the center of the Venn diagram,
13 where the overlap lies, will get bigger as
14 utilities' communications needs increase.

15 Given this context, I appreciate the
16 leadership FERC has taken to better understand
17 these issues. Because the FCC governs
18 communications policy, UTC is concerned the agency
19 does not consider the special reliability and
20 resilience needs of utilities.

21 Much of the rest of the federal
22 government, FERC, DOE, DHS, the White House,
23 Congress, care deeply about such matters and have
24 worked closely with our sector to improve
25 restoration after major storms, enhance

1 situational awareness, and plan for unexpected
2 events. I don't believe this same focus currently
3 exists at the FCC. For example, in a current
4 proceeding just mentioned related to a critical
5 wireless spectrum band, the 6-gigahertz band, the
6 FCC has so far ignored comments by utilities,
7 railroads, first responders, and others who have
8 urged the FCC to continue to reserve this band for
9 licensed use.

10 Many utilities use the 6-gigahertz band
11 for mission-critical communications on the bulk
12 power system.

13 Licensed use does not guarantee
14 interference-free spectrum access, but it ensures
15 robust mitigation measures for such interference
16 when detected. Opening the band to unlicensed use
17 based on untested technology is an intolerable
18 risk for utilities. In other words, an essential
19 reliability tool is being taken away and might not
20 have a replacement. FERC could help by weighing
21 in, in this proceeding regarding utility
22 reliability expectations.

23 Beyond the specific issue, we hope FERC
24 will continue to take a leadership role in
25 engaging with the FCC to improvement cross-sector

1 situational awareness. For our part, the electric
2 sector will continue to engage with the
3 communications sector.

4 At the end of the day, the smart economy
5 would not exist without electricity, because
6 communications networks require power to operate.
7 As such, shouldn't ensuring reliable electricity
8 be a cornerstone of communication's policy?

9 MR. MARINHO: Good afternoon, .
10 Mr. Chairman, Commissioners, Commission Staff. I
11 am John Marinho, vice president, cyber security,
12 and technology at CTIA. And on behalf of our
13 member companies throughout the wireless
14 industry, CTIA really appreciates the opportunity
15 to participate in this conference today, and to
16 share our perspective on the next generation of
17 wireless technology, 5G.

18 We are optimistic about the 5G future,
19 and I look forward to talking about 5G's
20 revolutionary capabilities as well as its enhanced
21 security and reliability.

22 I also look forward to talking about how
23 5G will impact the energy sector.

24 CTIA welcomes the Commission's
25 engagement on these important topics with the FCC

1 with the wireless industry, and we look forward to
2 enhanced collaboration between the wireless
3 industry and the energy sector, has been mentioned
4 earlier.

5 Today, wireless plays a pivotal role in
6 how Americans live, work, and spend their free
7 time. And yet, 5G will have an even bigger impact
8 for American consumers in the U.S. economy.

9 U.S. wireless providers launched initial
10 5G commercial deployment last year, and wireless
11 companies are expected to invest 275 billion to
12 build out wireless networks, 5G networks over the
13 next several years, creating 3 million new jobs
14 and adding 500 billion to the U.S. economy.

15 5G offers many advantages over 4G,
16 including higher capacity, lower latency, higher
17 reliability, and better security.

18 5G will support 100 times more devices,
19 will be up to 100 times faster and will be 5 times
20 more responsive than existing wireless
21 technologies.

22 For the energy sector, 5G technologies
23 will enable sensors to measure the level of energy
24 output, and report outages.

25 For example, a consumers -- as consumers

1 adopt smart homes, utilities will have access to
2 real-time usage data providing granular
3 information for more efficient loading,
4 opportunities for dynamic pricing, lower cost to
5 collect information via meter readings.

6 5G will also power drone deployment on a
7 very large scale. And drone inspections are
8 expected save energy sites and oil rigs 80 percent
9 over traditional inspections.

10 So my point is, is that while 5G will
11 not only connect everyone and everything, none of
12 these benefits will happen without additional
13 spectrum for wireless operations.

14 CTIA continues to urge the FCC to
15 allocate additional spectrum to support 5G.

16 Wireless carriers need access to low-,
17 mid-, and high-band spectrum.

18 The 6-gigahertz band that's been
19 mentioned previously is specifically in the
20 mid-band, and for the U.S., represents a
21 deficiency compared to the rest of the world. The
22 spectrum should be licensed for flexible use given
23 the licensee's ability to freely innovate and
24 respond with new technologies.

25 Now, we can hardly turn on the news

1 today without hearing about 5G security. The
2 importance of securing the wireless technology
3 supply chain cannot be overstated, but it is
4 important to note that security is the DNA of 5G.
5 5G is the most advanced secured technology to
6 date.

7 CITA and its members are engaged on
8 security issues, and standard-setting bodies and
9 wireless providers within active stakeholders in
10 advancing the NIST cyber security framework across
11 our industry.

12 Finally, the wireless industry is firmly
13 committed to strong, robust, wireless resiliency
14 and recovery efforts. We know that in the face of
15 disasters and emergencies consumers and industry
16 depend on mobile wireless services more than ever.
17 CTIA member companies remain focused on building
18 increasingly resilient wireless networks and
19 accelerating the timeline for restoration of
20 services in any areas impacted by a disaster or an
21 emergency.

22 At the same time, there is more work to
23 be done, and that includes enhanced coordination
24 between wireless and utility stakeholders before,
25 during, and after disaster events.

1 We look forward to continuing the
2 dialogue and CTIA welcomes the Commission's input
3 on this front. CTIA is optimistic about the 5G
4 future, and we look forward to enhanced
5 collaboration between the wireless industry and
6 the energy sector. I'd be happy to answer any of
7 your questions. Thank you.

8 MR. KUZIN: Chairman Chatterjee,.
9 Commissioners, Commission Staff. My name is John
10 Kuzin. I'm here today behalf of Qualcomm, an
11 American company founded more than three decades
12 ago. Our company, headquartered in San Diego,
13 employs 30,000 people worldwide and has grown
14 rapidly along with the mobile phone industry. I
15 believe this is the first time Qualcomm has
16 testified before this Commission.

17 So I'd like to provide a brief overview
18 of our company. Qualcomm is the world's leading
19 supplier of mobile communication chips for
20 smartphones and other wireless devices and the
21 leading inventor and licensor of new wireless
22 technology.

23 We spend over 20 percent of our revenues
24 on R&D. These massive expenditures have led to
25 many transformative inventions including a broad

1 array of mobile innovations relating to 5G.

2 The technologies that we've developed,
3 from 2G all the way to 5G and the chips we've
4 designed to support those technologies depend on
5 one key input that the federal government
6 controls, spectrum. Qualcomm has been an active
7 participant in the efforts by the FCC, NTIA, and
8 Congress to open new spectrum bands for new
9 technology, such as 5G as well as the latest
10 version of Wi-Fi.

11 This includes new licensed exclusive-use
12 spectrum, new unlicensed spectrum, and new shared
13 spectrum opportunities in low bands, below 1
14 gigahertz, mid bands, from 1 to 7 gigahertz, as
15 well as high bands, above 24 gigahertz, bands that
16 until 5G was developed have never before been used
17 for mobile communications.

18 One of the bands that the FCC has
19 proposed to open for sharing between existing
20 incumbent licensed point-to-point fixed links and
21 new 5G and with unlicensed devices is the
22 6-gigahertz band. This band is heavily used by
23 tens of thousands of fixed links, Most of which
24 operate via direct line of sight, point to point,
25 using antennas installed on top of buildings and

1 mountains. Qualcomm and other technology
2 companies are working with the FCC as well as
3 incumbent fixed users of the band, including UTC
4 and its members, to allow new low-power unlicensed
5 devices while fully protecting incumbent fixed
6 users and allowing both to continue deploying
7 services in the band.

8 The 6-gigahertz band supports
9 communication's need of very diverse industries:
10 Energy utilities, public safety, wireless
11 provider, cable providers. These communications
12 are critically important, and we would not be
13 supporting unlicensed use of this band if we did
14 not believe it could not be done without
15 protecting these current incumbent users.

16 Because the incumbent links are fixed
17 and their operational parameters are in a public
18 FCC database, protecting them is relatively
19 straightforward.

20 The 6-gigahertz band presents a great
21 opportunity for new unlicensed 5G and Wi-Fi
22 technologies to support new services, and
23 applications for these incumbent energy utilities
24 and other industries as well as many millions of
25 American consumers.

1 5G technology will use all available
2 spectrum to deliver a new level of wireless
3 connectivity not possible with earlier technology
4 generations, speeds more than 100 times faster
5 with greatly improved reliability and latency as
6 low as one millisecond to support new applications
7 and services including within utility plans.

8 Industrial automation users in
9 particular are very interested in this
10 productivity improvement area. Expensive cabling
11 can be replaced with wireless connectivity and
12 provide easy reconfigurability inside of the
13 plant. For -- for the utility transmission and
14 distribution plant, distributor control, and
15 remote monitoring of assets will benefit from 5G
16 connectivity.

17 Finally, for smart meters, highly
18 reliable 5G-based machine-to-machine connectivity
19 will allow large numbers of customer meters to be
20 connected. Thank you for your time. I look
21 forward to your questions.

22 MR. LOWE: Good afternoon. I am Steve.
23 Lowe, and I lead AT&T's IoT Smart Cities Advanced
24 Solutions Team. I've been with AT&T for 20 years
25 and 10 of that, I have been focused on utility

1 communications. Before that, I was with American
2 Electric Power at their distribution side of the
3 business. It is an honor to appear on this panel
4 related to managing changes and communications
5 technology on the new grid.

6 Utilities have long sought to acquire
7 dedicated private licensed broadband spectrum to
8 help support their needs for dedicated
9 high-performance wireless data communication
10 networks. This has left utilities using public
11 networks or even shared unlicensed spectrum to
12 meet their data needs. The result, operational
13 inefficiencies, low performance, and increased
14 expenses.

15 As a consequence, many utilities have a
16 multitude of purpose-built filled area networks,
17 supporting their operations with their own unique
18 equipment, management tools, and life cycle
19 support requirements. New grid applications,
20 including distributor generation management are
21 driving critical grid communication requirements
22 for essential control, reliability, and security,
23 that current purpose-built FAN typically cannot
24 address.

25 AT&Ts, private LTE networks utilities

1 allows utilities to build, own, and operate their
2 own private LTE Internet of things filled area
3 network, that can be used for a multitude of
4 utility grid applications.

5 This opens exciting possibilities for
6 grid communications, strategies by utilizing
7 standards-based LTE technology, that is ready for
8 mission-critical application duty.

9 This solution offers proven large
10 network capabilities, scalability, and longevity
11 to meet utilities' operational needs while
12 allowing utilities to sunset their purpose-built
13 networks. Utilities are a critical infrastructure
14 industry.

15 Our challenge to improve service
16 delivery and address ever-increasing security
17 threats. Compounding these challenges are the
18 pressures from investors and regulatory agencies
19 to streamline operations and reduce cost. To
20 overcome these challenges, utilities require
21 greater remote monitoring and control in their
22 operations.

23 As a result, they are looking to
24 leverage IoT communications technology to provide
25 these insights to increase the automation of their

1 operations. IoT communications technology enables
2 connectivity to applications like demand response,
3 distribution operation, load balancing, smart
4 meters, and other smart grid applications.

5 With their own private LTE network,
6 utilities are able to prioritize network usage and
7 have a new level of visibility and control,
8 enabling near real-time decisions about grid
9 configuration, outage restoration, system
10 maintenance, and more.

11 Using purpose-built networks, an
12 unlicensed network solution can create
13 vulnerabilities in the applications and are
14 susceptible to outages, congestion, and
15 interference. The dream of utilities owning and
16 operating a highly secure and highly reliable
17 multi-application LTE network is a reality.

18 AT&T's private LTE for utilities bring
19 spectrum, equipment, and services together into a
20 single offering with seamlessly unlimited
21 opportunities. On behalf of AT&T and the IoT
22 Smart Cities Advanced Solutions Team, we
23 appreciate this opportunity to appear before you
24 and look forward to today's discussion on the
25 critical topic of communications for utilities.

1 Thank you.

2 COMMITTEE CHAIRMAN CHATTERJEE: Thank
3 you, all.

4 I will turn to my colleague,
5 Commissioner Glick to kick us off.

6 COMMISSIONER GLICK: Thank you very.
7 much, Mr. Chairman, and thank you very much for
8 being flexible on the timing.

9 I just want to -- you know, this -- this
10 issue kind of strikes me as your classic
11 Washington, D.C., federal government issue, where
12 there's a limited supply of something and the
13 government has to figure out how to allocate it,
14 and there's obviously competing groups that have
15 different interests in the use of that something.

16 I'm curious. The FCC is going make a
17 decision about the use of the 6-gigahertz band.

18 What's the standard the FCC uses? Is it
19 a public interest standard or what is it?

20 MR. KUZIN: You want me to go first? So
21 at its core, it's the public interest standard,
22 right, and then underpinning that is a body of
23 rules. So with regard to the 6-gigahertz band in
24 particular, the FCC is not going to move forward
25 until it is convinced that the incumbent users

1 will not be impacted. They will not move forward
2 unless they're -- they're convinced that there
3 will not be harmful interference to the incumbent
4 links. So that's the threshold question.

5 And, you know, on behalf of Qualcomm and
6 the several companies that we're working with that
7 are hopeful that the band will be opened up for
8 unlicensed use, you know, we're -- we're working
9 with the FCC, we're working with the utilities,
10 we're working with wireless carriers who are
11 incumbents in the band, cable providers to help
12 them understand the various interference scenarios
13 and, you know -- and basically, to make sure that
14 interference does not occur.

15 And it's important to recognize here
16 that all of us have the same common goal. We do
17 not -- we -- those of us in favor of opening up
18 the band for unlicensed have the same goal as all
19 of the incumbents, the utilities, the cable
20 providers, because, look, it's hard to imagine,
21 but we're still at a very early stage in the
22 information age.

23 So if a band is not opened properly;
24 right, if there is interference, it's not going to
25 bode well for that band opening, future bands

1 opening, and it's in all of our interests to make
2 sure that when we move forward, it's done in a
3 careful, considered way.

4 MS. DITTO: So that's -- that's great to
5 hear, and I -- I think one of the things that I
6 would just point out is that, you know, we
7 reached out as UTC to Qualcomm once this
8 proceeding had been initiated just to see what
9 the testing, you know, sort of the mitigation
10 methodology that they're proposing is.

11 We had not been involved, prior to the
12 proposed rule-making being released, in any
13 discussions around what this interference
14 mitigation would be.

15 So we did reach out and we're having
16 really good discussions, I think, now with
17 Qualcomm and others who are interested in opening
18 the unlicensed band. And that's all well and
19 good.

20 But, to date, we are not convinced that
21 this technology is going to provide the
22 interference mitigation that it's being -- that
23 it's, you know, being -- that it said it would,
24 and so I -- I think that while we all have the
25 same -- perhaps, the same goal, the process so far

1 has been one that seems to be presupposed, the
2 outcome seems to have been presupposed.

3 And that is echoed by comments being
4 made by FCC commissioners in public forums. So
5 what we would ask, I think, going forward whether
6 it's in the 6-gigahertz band or other bands that
7 are being proposed to be open for unlicensed use
8 in the name of 5G or other things is that on the
9 front-end, that that outreach occurs about these
10 types of technologies that are new and, perhaps,
11 untested.

12 In our experience, back to your question
13 around the process of the FCC, is typically the
14 FCC does require testing, or there's an element of
15 testing involved when rule-makings are approved.

16 So we would ask that, you know, if they
17 are intent upon going forward with this 6
18 gigahertz rule-making, that we actually field
19 test, not just test in the lab.

20 And I would argue that -- that this is
21 more complicated than just pulling down data from
22 a database. That there are issues with wireless
23 service that are very much field-based, so we test
24 these types of technology, this technology in
25 particular, to determine what the actual

1 mitigation measures are before we move forward.

2 COMMISSIONER GLICK: What's the
3 resistance to field-testing?

4 MR. KUZIN: None. None. We're happy,
5 and we've been working with UTC, its members --
6 sorry, and you know, and many others, you know,
7 who have asked for, you know, meetings, analyses,
8 and so forth. There's no resistance.

9 COMMISSIONER GLICK: Getting back to --
10 so in terms of the -- if there's no resistance,
11 is it a time issue? I mean, how long --

12 MS. DITTO: Yeah, it's a time issue,
13 what we've heard, again, in public statements,
14 has been that this rule-making will move forward
15 perhaps by the fourth quarter of this year. And,
16 again, the outreach occurred sort of after the
17 fact in terms of the process.

18 So I mean, this field-testing is not
19 simple. It's not -- it doesn't happen at the snap
20 of the fingers. You have to -- you know,
21 sometimes it takes months; it takes months, so
22 that's really the issue.

23 So we're happy to hear that
24 field-testing would be something that Qualcomm and
25 others might be open to, but we have to work with

1 the FCC to then see if their timeline can be
2 extended.

3 COMMISSIONER GLICK: So both for you, .
4 Ms. Ditto, and Mr. Brummond, how are you -- how
5 are you engaging NERC in this process? Are you
6 working with -- have you talked to NERC about
7 this? Are they concerned?

8 MR. BRUMMOND: You know, I don't -- I'm.
9 not aware of exactly how we're working with NERC
10 on this. We're, of course, working with UTC.
11 We, of course, have the NERC standards in our
12 mind when we're thinking about these things, as I
13 noted.

14 I'd also note on the field test -- you
15 know, when things are field-tested, from our
16 perspective, a lot of our events, you know, a lot
17 of bad weather events, right, and so things need
18 to work when the conditions are the worst.

19 And a lot of times there's seasonality
20 in that, so a field test isn't just a couple
21 months during the summer, it would have to be
22 during the winter, when it's windy, when it's
23 raining.

24 You know, from our perspective, we would
25 hope that all of those things would be taken into

1 account. So except for the fact that I got to sit
2 next to the CEO of NERC over lunch, you know, I'm
3 not aware of any direct conversation that we've
4 had with NERC.

5 MS. DITTO: We have not engaged them.
6 directly on the 6 gigahertz issue. We certainly
7 have conversations with NERC frequently on cyber
8 security matters and others.

9 COMMISSIONER GLICK: So one last.
10 question. So with regard to -- just to be clear
11 what you're asking -- you've asked -- a lot of
12 that testimony suggests wanting FERC to engage in
13 a dialogue with the FCC, and I know we've talked
14 about it this the past.

15 Are you asking that FERC ask the FCC to
16 delay the rule-making until the field-testing is
17 done? Is that correct?

18 MS. DITTO: I mean, that would be a.
19 great ask. I mean, our ultimate goal is really
20 that this band should be reserved to licensed use,
21 but if the FCC, as it seems, is intent on moving
22 forward to open up the band, I think that would be
23 an acceptable outcome as to -- as to actually get
24 some testing done of this technology, which is
25 called AFC and see if it actually works in

1 practice, and then bring that back to the FCC and
2 say, either it doesn't work or it does work or we
3 need more time to modify it to make it work.

4 So, yes, I think FERC, if FERC would be
5 willing to make that request, that would be a
6 great thing. That would be greatly appreciated.

7 MR. BROZEK: Yes, and in another
8 proceeding we have basically the opposite
9 occurring. In the 900 megahertz proceeding, the
10 relatively underutilized low bands we've talked
11 about, we've talked about low, and mid, and high,
12 this is a low-band opportunity, that we request
13 FERC work with FCC to speed up the process to
14 bring this to market, so that utilities could use
15 it to build private LTE networks.

16 It is a foundation layer that gets them
17 the coverage they need, the performance they need,
18 and, most importantly, the security that they
19 need.

20 Later on, you could come back and build
21 over the top of that, with some of the mid bands
22 and higher bands. But it starts at a foundational
23 level. So, in our case, it's really the opposite
24 of the 6 gigahertz.

25 COMMISSIONER GLICK: I'd like to ask,

1 just quickly, real fast, Mr. Manrinho -- do you
2 have any concerns with us, FERC asking the FCC to
3 consider the request from the Utilities Technology
4 Council, but also the separate request from
5 Anterix?

6 MR. KUZIN: I have no position with
7 regard to Anterix -- but the request to test,
8 testing is definitely within the realm of
9 something that should be done here, but I caution
10 with the fact of testing to, you know, forever
11 and forever, this -- this sample, you know, this
12 condition, this -- and so forth.

13 I think limited field-testing to confirm
14 the viability of sharing is perfectly within the
15 realm of what should be considered and will be
16 done. But, again, I caution against having an
17 18-month test plan that takes one year to define,
18 18 months to carry out, another year to write up a
19 report, and we're in 2024. That's what I caution
20 against.

21 COMMITTEE CHAIRMAN CHATTERJEE: Thank
22 you all for coming to the Commission to talk about
23 this really important discussion, very insightful
24 testimony.

25 At a conceptual level, I totally get it,

1 why interference within the 6-gigahertz band is
2 problematic. I kind of want to get into specific
3 examples, if we could drill down a little bit on
4 particularly what the actual reliability impacts
5 could be.

6 Mr. Brummond, in your testimony, you
7 used the example of reliance generators sending
8 information to MISO via microwave every two
9 seconds.

10 If there were interference in the
11 6-gigahertz spectrum, how would it impact those
12 generators? Would it be just an occasional
13 unsuccessful transmission, or would the impacts be
14 more significant?

15 MR. BRUMMOND: From what I understand,
16 if there's enough interference, it would be
17 significant. We could lose communications. I
18 would hope that, you know, if this happens, we
19 are going to have to watch that very carefully.
20 I would hope that's something that we have to get
21 ahead of, get ahead of and try and figure out a
22 way around it.

23 I mean, it's an unacceptable condition
24 for us to have those -- those signals, frankly,
25 interfered with to the point that they can't get

1 through. So that would have to be something that
2 we would have to watch very carefully, because we
3 would want to get ahead of it, because we can't --
4 these are mission-critical communications for us,
5 so we need to get ahead of them and react to them
6 before they happen, if it's possible.

7 COMMITTEE CHAIRMAN CHATTERJEE: Others.
8 have any thoughts on that, on the significance of
9 it, or you agree pretty much with --

10 MS. DITTO: Yeah. Let me just quickly
11 clarify something about the 6-gigahertz band
12 versus these other bands you've heard about.
13 You've heard about the 2.3; you've heard about
14 the 900 and some other spectrums. So 6 gigahertz
15 has some unique propagation and qualities. So
16 it's not easily duplicated elsewhere.

17 About 20-some-odd years ago utilities
18 were forced out of the 2 gigahertz band, which had
19 very similar qualities in sort of reliability.
20 So, basically, it's almost like a pipe, it can
21 almost take the place of a wireline, a fiber line,
22 so it's a point-to-point situation, microwave
23 situation. So you can duplicate wireline
24 capabilities with this microwave capability.

25 So if you're entering or you're in a

1 situation where you can't lay wireline, you can
2 use this as a replacement. That is not true of
3 some of these other bands, that while there is
4 great interest in them in the 900 -- in the 900
5 for some and the 2.3, they're used for different
6 types of applications for broadband LTE, which is
7 not for this other type of mission-critical
8 application. I just want to be very clear about
9 that. It's not something -- so we can't easily go
10 anywhere else.

11 If these aren't working in the scenario
12 that J.P. mentioned, what are our options at that
13 point? They're not very great. So that's -- I
14 just want to be clear about that.

15 COMMITTEE CHAIRMAN CHATTERJEE: Yes, so
16 you mentioned that in your testimony the
17 significant burden being imposed on utilities, if
18 they're required to switch out of -- switch bands
19 out of 6 gigahertz. Could you just kind of
20 elaborate a little bit on what the specific
21 impacts to utilities and utility customers would
22 be if they were forced to switch bands?

23 MS. DITTO: I mean, I think, again,
24 there's not a lot of options. So what you're
25 doing is really taking a tool out of our toolbox,

1 Sort of a reliability tool, right. So you know
2 that we create redundancies in our system, and
3 it's the same thing with communication
4 redundancy. So the choice in some cases would be
5 to try to lay fiber lines, but that is limited in
6 certain areas. For example, in the West, when
7 they needed -- would need to do that over federal
8 lands or when there aren't rights-of-way.

9 So this microwave technology, again, is
10 a backbone type of technology, that you really
11 can't duplicate, and what my understanding is in
12 the 5G realm, there are other bands that folks
13 could go to, to propagate their wireless
14 technologies in 5G.

15 My understanding is that this band is
16 attractive because the equipment is available and
17 things like that, which is legitimate. But there
18 are other places they can go, if they need, to
19 use -- to have 5G applications and capabilities.

20 We don't have that option. So I think
21 that is the key thing. So in addition to the
22 stranded costs and all of the things that you
23 could envision with having to do away with
24 equipment that we can't use because we can't
25 tolerate potential interference.

1 What are the options then? So, again,
2 laying fiber might be an option, it might not, so
3 then do we just take the risk that our
4 communications are going to be unreliable?

5 So it just -- it sets up a very
6 difficult scenario for us.

7 COMMITTEE CHAIRMAN CHATTERJEE: Thank
8 you for being here, for your leadership on this.
9 issue. Obviously, spectrum is already important
10 to utilities, but with the proliferation of smart
11 meters, distributive energy resources, and other
12 distributive devices, I'm interested in
13 whether -- in how you all expect the use of
14 spectrum to grow and change and whether there are
15 communication issues that we might need to be
16 monitoring.

17 Mr. Brummond, as somebody who's actually
18 operating, I'm happy to start with you and then
19 turn it to anybody else that wants to jump in.

20 MR. BRUMMOND: Yeah. Absolutely. Well,
21 I think there are some general things that are
22 going to -- I mean, just -- I'm just thinking of
23 AI, the use of Siri, 5G, if those things grow,
24 they all increase the need for bandwidth and
25 likely spectrum.

1 So in our heads, we're definitely
2 thinking of that, but just, you know, more
3 directly in our industry, there are a number of
4 things that are going to drive the need for more
5 communications.

6 As you look, there's a big change right
7 now, going from centralized generation to
8 decentralized generation so -- and we're grappling
9 with this; I believe MISO is grappling with this
10 as well.

11 You know, to the extent that we now have
12 a significant portion of our generation as solar
13 generators, distributed through our network, you
14 know, we're going to need to know -- as you know,
15 those are variable, they're not something that are
16 dispatchable, at least you can't dispatch them up
17 above their maximum of the solar capacity at any
18 one time.

19 It makes sense to me that we're going to
20 have communications at a minimum to supervise
21 what's going on with those, but potentially to be
22 able to dispatch them. I know right now wind you
23 can dispatch, you can dispatch a wind unit down,
24 just to be able to control our system.

25 So that's potentially a lot of new

1 communication that could need to occur. You know,
2 today, not a big issue; fast-forward 10 years,
3 that could be a big deal, where you've got, you
4 know -- and I'm just talking about solar panels.

5 You look at electric cars. That's
6 another huge resource, potentially, for us. You
7 know, I can envision having our customers have the
8 option that if the energy market hits a certain
9 price, we can buy energy from their batteries and
10 use them as a virtual power plant, as you've
11 probably read about.

12 If we're going to do that, though,
13 that's a lot of communications, right, that's a
14 lot of, all right, how much energy do we need?

15 What's the right price? Calling on
16 those, seeing what the response is back, that's
17 all of this SCADA-type communications that I'm
18 talking about, the second to second, you know,
19 really controlling the frequency of the grid.

20 So I -- in my mind, I see the need for
21 these types of communications growing just
22 internally for our own needs. And some of that --
23 some of that's, I think, going to be fiber, but
24 we're in a rural area in Wisconsin and Iowa -- it
25 gets to be -- it's just tough to put fiber

1 everywhere. So you're going to be relying on
2 wireless communications for that.

3 And they're just going to be critical
4 communications for us.

5 MR. LOWE: I might add some comments to.
6 that. From AT&T's perspective, I think it's very
7 similar to what we're experiencing in the IoT
8 world, the Internet of things I mean, it's
9 exponentially growing.

10 When I started working with
11 communications with utilities back in 2011, there
12 was a limited number of devices out into the field
13 because primarily they were using wireline
14 technology to communicate to them.

15 Since then, we've seen a significant
16 growth in our communication requirements,
17 including the EMI meters. And then with the EMI
18 meters being that connectivity to the -- beyond
19 the meter into the home, you're going to, again,
20 see a need for additional bandwidth.

21 And I think the technology -- and as I
22 mentioned in my opening statement, today, they
23 have purpose-built networks. And these
24 purpose-built networks only support one purpose.

25 Now they need to start leveraging these

1 networks to be able to support all the other
2 technologies that consumers are demanding that
3 they be able to deliver.

4 This is distributed generation, could be
5 electric vehicles, it could be a lot of things
6 that are happening in the home.

7 So I think that if you look at the
8 growth pattern that AT&T has from an IoT
9 perspective you're going to see something very
10 similar in that trajectory with inside the utility
11 industry, and so there's got to be a
12 communications platform that supports that.

13 I don't really have a position on 6
14 gigahertz. I'm sure AT&T does, but not me. I
15 think that what I would say is that AT&T
16 recognizes the number of devices that utilities
17 are going to need and so we've built a program to
18 be able to support it and using our commercial
19 bands that we have available today.

20 And then we've also been able to
21 incorporate utilities into the first net program
22 as an extended primary user. And then, as Joy
23 mentioned, is that AT&T has a line through work
24 with the FCC to dedicate 2.3 gigahertz to the
25 utility industry to be used by themselves with no

1 conflict or any interference or anyone else.

2 So I think that definitely everybody's
3 recognized that the growth of devices -- it might
4 be even be that we hear some utilities talking
5 about putting a pole tail sensor on every pole.
6 And when you do that, you go from thousands to
7 millions of connectivity and you'll need to have
8 communications to them.

9 Thank you.

10 MR. MARINHO: Mr. Chairman, if I might.

11 COMMISSION CHAIRMAN CHATTERJEE: Yes,
12 sir.

13 MR. MARINHO: Just to -- on behalf of.
14 the wireless industry, a couple points I'd like
15 to make. One is, is that the industry's gone on
16 record through CTIA, in terms of working with the
17 incumbents in the 6-gigahertz band to ensure
18 noninterference.

19 So that's a nonissue for us, and,
20 clearly, we're prepared to consider whatever it
21 take to embrace that approach, because the
22 wireless industry has been around for close to
23 four decades, and almost as long as I've been in
24 the industry, and has always operated on a
25 noninterference basis. And it is something that

1 the industry has a great deal of experience with,
2 as does the FCC in terms of allocating spectrum
3 because the U.S. had already allocated all of its
4 spectrum when 1G, 2G, 3G, 4G and 5G are coming
5 along.

6 And so the FCC has a great deal of
7 experience in terms of how do you deal with these
8 sorts of issues, in terms of incumbents and how do
9 you ensure that you can derive all of the benefits
10 of new technology.

11 You leverage that technology for
12 consumers, for the U.S. economy, for security and
13 reliability, but at the same time, not strand a
14 piece of spectrum either at 6 gigahertz or at any
15 other particular band.

16 The one comment that I would also offer
17 is that I think 6 gigahertz has to be looked at
18 very, very carefully in the context that, within
19 the industry, we refer to it as sort of the
20 Goldilocks band, because while the high band is
21 great for urban centers, the low band is great for
22 rural areas, because of the propagation
23 characteristics, but, unfortunately, the capacity
24 is much lower and doesn't support the kind of
25 latency and capacity requirements that I talked

1 about in my comments.

2 Six gigahertz is really key to, in some
3 sense, providing for all the promises associated
4 with 5G. And if you look at other countries
5 around the world, they've taken action on 6G, and
6 the U.S. is actually behind the curve on that one.

7 And so, again, we're certainly
8 consistent with operating and not in any way
9 representing a threat to the operation of the
10 incumbents in the 6-gigahertz band. But it is
11 something that we do need to move on expeditiously
12 in order for the rollout of 5G to be supported in
13 the U.S.

14 COMMITTEE CHAIRMAN CHATTERJEE: I do
15 want to shift a little bit. You mentioned in your
16 testimony, a number of folks mentioned, the supply
17 chain security as an increased threat, based on
18 just the sheer amount of new equipment, that 5G
19 brings into play, but you, Mr. Marinho, suggested
20 it might not be as big a deal as some people
21 think, because the U.S. tends to get equipment
22 from trusted suppliers in Europe and South Korea.

23 And so I just kind of want to better
24 understand whether 5G is introducing supply chain
25 risks that are materially different from any other

1 communications equipment, or if you truly think
2 that this is not in the industry.

3 MR. MARINHO: So the industry,
4 Mr. Chairman, has a long tradition of dealing
5 with these sorts of risks. And in fact,
6 many of the risks, particularly in the wireless
7 industry, that have been talked about in the
8 press for all practical purposes don't exist
9 within the wireless industry.

10 We work very closely with DHS, and in
11 fact, we work with the supply chain task force
12 within DHS that's addressing this issue.

13 And this is on behalf of the executive
14 order that they're working under to address this
15 whole question of what the risk assessment is
16 across the entire telecom sector, and we're in the
17 midst of doing that assessment right at this
18 moment.

19 Do I think that there will be new risks
20 introduced with 5G? Well, that's always the case
21 with any new technology. Do I think the wireless
22 industry has a track record of not only making
23 security a top priority, but a track record of
24 mitigating -- detecting and mitigating any of
25 those risks? The answer is absolutely.

1 And we take that very seriously, right
2 there, in terms of being at the top of the list,
3 with resiliency and reliability, and security is
4 one of those things that, indeed, we take very,
5 very seriously.

6 But at this point in time, again, we
7 don't see any new risks that are being introduced
8 by 5G.

9 COMMITTEE CHAIRMAN CHATTERJEE: A number
10 of you reiterated the importance of utilities and
11 telecom providers working together to plan for
12 black sky days and coordinate incident response.

13 Obviously, both the electric system and
14 the communication system are very complex. So for
15 both utility and telecom operators, what's the
16 best way to start that dialogue and understand the
17 interdependencies, for example, understanding how
18 a severe weather event or other natural disaster
19 might impact the communication system and how that
20 might impact the grid or vice versa?

21 MS. DITTO: I can take that. I mean, I.
22 think, just to sum up, though, on this 5G issue,
23 which is kind of a similar issue. I think for
24 electric utilities we want to be part of the
25 discussion on the cyber security issues related

1 to the deployment of 5G, and the supply chain
2 issues that may or may not exist.

3 From the beginning, we are still in a
4 rollout of 5G, that hasn't been fully implemented
5 yet. So it would be best for us, I think, under
6 the umbrella of federal processes to be included
7 in those discussions right now. Because I think,
8 you know, similar to my colleagues' support of us,
9 in terms of this interference issue on the 6
10 gigahertz band, we certainly want to win the race
11 to 5G, too.

12 You know, all Americans do, I think.
13 But I think you don't always win the race by going
14 fastest, you win the race by having the best team
15 and by collaborating, and we need to be part of
16 that collaboration, I think, going forward on 5G.

17 But back to, I think similarly with
18 collaboration on resilience and response, you
19 know, the electric sector has a long history of
20 working together, public power, co-ops, investor
21 and utilities.

22 After Hurricane Michael, there were
23 30,000 people deployed to the Panhandle of Florida
24 to restore power, and that's something that we
25 would love to have that kind of on-the-ground

1 collaboration with the wireless carriers and other
2 telecommunications providers.

3 I think that would be a great place to
4 start, kind of ground-up. But from your
5 perspective in the federal government, convening
6 conferences exclusively focused on this, and even
7 if we did it under kind of rubric of the CPAC, you
8 know, so it's under kind of the -- so we don't
9 have to reveal all of our infrastructure, you
10 know, issues that may be detrimental if folks,
11 nefarious folks got ahold of them. Maybe we do it
12 that way. Maybe we convene a joint meeting, maybe
13 we have some joint outputs, something like that.

14 I think better understanding each
15 other's industries and business models is
16 something that is very important as we go forward.

17 COMMITTEE CHAIRMAN CHATTERJEE: Thank
18 you for that.

19 Just one final question. Mr. Brozek, thank you
20 both for your presentation today, and for spending
21 some time with me earlier to walk me through the
22 900 megahertz band, and the differences that we're
23 dealing with here.

24 I just have one question just as a point
25 of clarification. Have you heard any concern from

1 utilities about whether the concentrated ownership
2 of these bands of spectrum could have a negative
3 impact on utilities in their adoption of new
4 technologies?

5 MR. BROZEK: As part of the FCC
6 proceeding, there have been some utilities that
7 have expressed concerns. That's part of the FCC
8 process, and they have a very detailed way of
9 looking into those and making sure that any
10 incumbent in that -- in that 900 megahertz band
11 would not be hindered or prevented from being
12 able to do what they're doing.

13 COMMITTEE CHAIRMAN CHATTERJEE: So the
14 FCC has a process in place that --

15 MR. BROZEK: The FCC has a process and
16 we're actively engaged in it and -- yes.

17 COMMITTEE CHAIRMAN CHATTERJEE: That's.
18 very helpful, thank you.
19 Commissioner LaFleur?

20 COMMISSIONER LaFLEUR: Thank you very
21 much. This is a really interesting panel, and
22 this is not my area of expertise. So I hope my
23 questions are not uninformed. I had to read some
24 of the testimony twice to understand or try to
25 understand what I was reading.

1 I don't know how many of you were here
2 this morning, but I'm finding it interesting to
3 kind of juxtapose this discussion we had on cloud
4 computing and virtualization.

5 Because there the utilities we're
6 saying, FERC, you're holding us back from the
7 future; we don't want to have to have our own
8 dedicated hardware and all, we want to go to the
9 cloud release us from these stupid rules that are
10 keeping us from getting the full benefits from our
11 customers of all of these new technologies.

12 And, here, it feels like on some level
13 the utilities are saying, we want to do it the way
14 we always did it, with our fixed-point microwaves
15 that we own, and we don't want to be part of some
16 wireless network with the whole hoi polloi (ph) of
17 all of the people who are doing wireless.

18 And it's -- we like it our way. And, I
19 guess -- and for very convincing reasons, but it
20 just seems like the march of technology being so
21 fast, I guess my question is: Do you think 5G is
22 in your future, and can you support it on your 6
23 gigahertz, and when 6G comes along, and 7G or
24 whatever, I'll probably be dead -- or maybe,
25 depending on how long this happens, how long this

1 takes, you'll still be saying, no, no, no, our
2 fixed-point microwave is good for us; it's worked
3 since 1950 and we want it now? Or do you see
4 yourself migrating? Like, what's the future here?

5 MS. DITTO: I'll start. Okay. Well, I.
6 mean, I guess the question is: Does the future
7 entail highly reliable electricity? So, you
8 know, technology is benefiting utilities in many
9 ways, in terms of how we have been able to create
10 a more flexible grid, on the bulk power system,
11 but also on the distribution system.

12 So we've seen technology make great
13 strides. We haven't just been doing everything
14 the same way since 1950, in fact, we've embraced a
15 lot of new technologies, but the key aspect is, we
16 have to have safe, reliable, and affordable
17 electricity in this country, and it underpins 5G.
18 It really does.

19 I mean, you cannot do communications,
20 wireless communications without electricity. So I
21 think the question is, how do we kind of marry the
22 two? How do we figure out how to continue to
23 provide highly reliable, affordable, safe
24 electricity while at the same time unleashing some
25 of these technologies.

1 And I -- you know, I think -- I'm not
2 going to really try to get into speaking about the
3 cloud technology, but I will say it's different,
4 where the cloud virtualization issue is, is
5 different from this fundamental mission-critical
6 communications piece.

7 So it's slightly apples and oranges, but
8 I don't want to get too far into the weeds and not
9 be able to answer the question.

10 MR. LOWE: So just a couple of comments
11 on that, that as I've been working with utilities,
12 and I try to sell them AT&T services, I definitely
13 have found from the area them wanting to maintain
14 everything in-house, nothing cloud.

15 I think what I've seen change is the use
16 cases. I think that the use cases have continued
17 to grow, and the requirements for those use cases
18 are a little bit different because if it is
19 critical infrastructure, and it's data-related,
20 and it's something that the utility depends on to
21 do safe and reliable electricity, then I think
22 they're going to maintain control of it, put their
23 arms around it, and need to keep it.

24 I think that if it becomes some of the
25 applications today that they deliver to some of

1 their consumers that are less critical, then they
2 see that the best way to get their best return on
3 investment, operationalize it, is to move it to
4 the cloud.

5 And so I think I've seen that we've been
6 able to provide additional services. I think
7 that -- actually, I believe, a combination of both
8 is what I'm starting to see. And that in some
9 situations, it makes sense to keep it in-house.
10 In other situations, they want to move to a more
11 collaborative situation.

12 COMMISSIONER LaFLEUR: So do you think
13 you'll get to the place where, like, the
14 utilities are using their microwave system for
15 like controlling their power plants, or their
16 transmission grid, but all their communicating
17 with customers, like turn your car battery on and
18 off, with millions of customers, will be
19 wireless or --

20 MR. LOWE: I think that is the vision.

21 COMMISSIONER LaFLEUR: I know it's all
22 wireless, but will probably be a different kind of
23 wireless.

24 MS. DITTO: It's all not wireless.
25 There's some wireline. Yes, I mean, I think

1 that's right.

2 COMMISSIONER LaFLEUR: The 6 gigahertz
3 is wireless, the spectrum.

4 MS. DITTO: Correct, the spectrum
5 aspect, yes.

6 MR. BRUMMOND: I want to be careful,
7 too, my comments, I definitely wanted to show you
8 and try and illustrate just the importance of
9 some of these communications and how they're
10 unique, I think, in that they're being used to
11 control a bulk electric system. And that's a
12 critical thing from our perspective.

13 We're not necessarily, though, trying to
14 say that, you know, this has got to be our way and
15 we don't accept every other way. Really, the
16 message at the end was intended to be a
17 collaboration message.

18 And let's just make sure that if we're
19 going to do this, that it's done well, that it's
20 done right, and that we work together. And I
21 think probably talking together is going to be the
22 biggest thing, that communication is going to be
23 important.

24 And stressing that, I think, you know,
25 perhaps FERC and FCC communication would be

1 important as well, just to ensure that these
2 things are being done just to preserve the
3 reliability, security, and cost-effectiveness of
4 electric systems, so just wanted to point that
5 out.

6 COMMISSIONER LaFLEUR: Well, thank you,
7 I'm glad you mentioned the cost effectiveness,
8 because I guess my question is, let's assume the
9 FCC stays on the path they're on and FERC
10 doesn't -- they meet with us. I'm sure they'll
11 meet with us if we ask them to, they're nice
12 people, but I mean, what if they're pursuing
13 their policy and they keep on it, what will you
14 do?

15 Will you keep using the 6 gigahertz and
16 share it and see how it is, will you go buy
17 low-frequency spectrum from Mike, will you try the
18 higher-frequency 5G, and -- like, I know you had
19 to go from the 2 to the 6 already, you said. But
20 I mean, will you be able to get it, but it will
21 cost more money or --

22 MR. KUZIN: Can I address that? So the.
23 proposal before the FCC -- the proposal that the
24 FCC has put out in it's notice of proposal, making
25 that, it released last fall is to allow unlicensed

1 use of 1.2 gigahertz of spectrum, which is a wide
2 swath of spectrum, while allowing continued use
3 for fixed services by all the incumbents.

4 If they want to put up a new link,
5 great, unlicensed will have to protect that link.
6 So in -- in Qualcomm's view, it's a very good
7 method of sharing where the licensed users can
8 continue to deploy and grow, if they need to put a
9 link from A to B that isn't there or remove one,
10 and unlicensed will operate in the interstices, if
11 you will, to not cause interference.

12 There -- there are some -- some entities
13 at the FCC, including CTIA and its member
14 companies, have -- have identified a plan to
15 segment the band, do unlicensed, like I just laid
16 out, in the lower portion of the band, and in the
17 upper part of the band, have -- have a process for
18 moving the incumbent users out of the band. And I
19 don't -- I don't believe that's something that the
20 utilities are going to be super in favor of.

21 COMMISSIONER LaFLEUR: Where would they
22 move to? A different band?

23 MR. KUZIN: That's part of the issue,.
24 but what's been identified is a slightly higher
25 band. You know, but that -- so there's a lot in

1 the mix. But what's in the FCC's proposal is
2 continued license of fixed service use on the
3 full 1.2 gigahertz, and have unlicensed operate
4 in a mode where it must protect the licensed
5 service.

6 COMMISSIONER LaFLEUR: So is that -- but
7 if the utility need for the spectrum just grows
8 and grows, as they have, instead of, like, just,
9 you know, these big power plants, now they have
10 lots of little distributors and all, will they
11 just kick out more of the unlicensed or --

12 MR. KUZIN: Yes. Yes. That's exactly
13 what will happen. If it grows and grows and
14 grows, unlicensed -- because unlicensed has no
15 legal rights. The FCC rules for unlicensed is an
16 "Unlicensed device must accept all interference,
17 and it has no interference rights itself."

18 So, therefore, if the -- if what you're
19 laying out is if the universe of licensed use
20 grows tremendously and there are these links, the
21 available spectrum for unlicensed must necessarily
22 shrink.

23 MS. DITTO: So here's the thing. When
24 utilities are planning for these critical
25 communications, is it just the threat of

1 interference. If we don't get this interference
2 piece right, the threat of interference from all
3 of these unlicensed, it could be 9 million of
4 them, I mean, millions of unlicensed use -- users
5 could be in this band. And they're supposed to
6 abide by, you know, certain rules when they
7 purchase their device, you know.

8 But are they going to? Are they going
9 abide by those rules? Not necessarily. So we
10 won't know where these devices are. We won't know
11 if interference is going to happen until it does.

12 So that risk -- and I know that this is
13 that high-end type of frequency risk that we
14 always deal with here, EPMs, GMDs, all of the
15 things that FERC is very familiar with.

16 We're expected to address those
17 high-impact, low-frequency risks all the time.
18 Right? And this is probably a little bit
19 higher-frequency risk than to mixed -- not to mix
20 metaphors, but --

21 COMMISSIONER LaFLEUR: Hopefully, we'll
22 see interference more often than a bomb in the
23 upper atmosphere.

24 MS. DITTO: Yeah, and so -- but in the.
25 sense that we're expected to have highly reliable

1 communications on our bulk power systems so that
2 we can have situational awareness --

3 COMMISSIONER LaFLEUR: Yes.

4 MS. DITTO: -- the idea, the idea of.
5 interference is going to have utilities have to
6 call into question using this band at all.
7 Even --

8 COMMISSIONER LaFLEUR: So will they use
9 a different band? Because they couldn't put
10 fiber? I mean, they can't go back to wireline for
11 everything.

12 MS. DITTO: Correct. And that's the
13 question. We don't know that there are -- there
14 are, I mean, there are some bands in a much higher
15 usage that are like 11 gigahertz, I think, and
16 higher that have been identified, but they don't
17 have -- it would take a long time to build those
18 out. So there's -- there's a challenge of length
19 of time to build that out, would that work for us?
20 None of those assessments have fully been made,
21 because when this process was initiated, we
22 weren't consulted at the beginning, so we haven't
23 been planning for and identifying and assessing
24 those other avenues at this point.

25 So I think, again, if the FCC proceeds,

1 the key thing is going to be getting this
2 interference mitigation right and testing it fully
3 in the field.

4 COMMISSIONER LaFLEUR: And how about
5 the 900 hertz band? Is that of interest or --

6 MS. DITTO: It's not a place we can go
7 to do the same things we need to do in the 6
8 gigahertz. It's for different uses. And it can
9 be very helpful for some, and it's already being
10 used by critical infrastructure, but it's not the
11 same type of need.

12 COMMISSIONER LaFLEUR: Well, I don't
13 know if I'm going to be here when it happens, but
14 if there's a meeting with the FCC, I think it
15 would be really important to be very specific
16 about what it is we want, because I just have had
17 a lot of inter-government meetings since I've
18 been in government where there's just kind of a
19 general discussion of the needs of both pieces of
20 infrastructure.

21 And then it doesn't actually affect
22 after the meeting what the people who are really
23 working on what they're an expert on are working
24 on.

25 So I think it would be -- if it's more

1 -- if it's more testing, if it's a certain
2 timeline or whatever it is we want, to what
3 Commissioner Glick was saying, I think we'd have
4 to be very specific, because that's just going in
5 and saying, you know, electricity is really
6 important, and what about this.

7 I mean, those are the kind we normally
8 have, with -- and they -- they're good for
9 building awareness of each other, but you're
10 asking about some pretty specific needs, so I
11 think the more clarity we have of what we're
12 looking for the more effective it will be.

13 Thank you.

14 COMMISSIONER MCNAMEE: I'm going to.
15 continue down the path that Commissioner LaFleur
16 had, and it strikes me here that we use the term
17 "Interference," but I now realize I'm not quite
18 sure I know what "interference" means.

19 Going back to -- you've got a lawyer
20 trying to recall his high school physics idea, but
21 it seems to me with the wave, that can have
22 interference either through something crossing
23 through another wave, or in the spectrum, you have
24 too much usage in there. And it sounds like we're
25 hearing on the one end, that the energy industry,

1 electric industry is going to be increasing its
2 use of the spectrum.

3 You have the desire for telecoms to get
4 into that spectrum. They're also going to want to
5 be using it, so it seems like interference could
6 just be -- at some point -- there's -- there might
7 be too much in there. That's part of the question.
8 The other is, is interference also -- you haven't
9 used all the space, but if things are crossing, I
10 mean, what are --

11 MR. KUZIN: The issue -- the issue with
12 interference is -- it's typically protecting the
13 receiver. So if -- if I'm transmitting from here
14 to here, and I have a certain power level, the
15 power level at the receiver is going to be quite
16 high, but if I am six kilometers away, that
17 signal that I'm trying to transmit from here to
18 here, and that receiver is now six kilometers
19 away, you know, the signal level at that receiver
20 is a lot lower.

21 So the issue is protecting that receiver
22 from unwanted noise, that it's such a level that
23 it disrupts it. So the FCC's definition of
24 harmful interference is interference that disrupts
25 or degrades a service repeatedly. It's -- it's in

1 the FCC rules of what harmful interference --

2 COMMISSIONER MCNAMEE: You mean
3 repeatedly or at all?

4 MR. KUZIN: No. I believe it's
5 repeatedly. Repeatedly cause -- you know, I
6 could -- I could provide it to you after the --
7 I mean causes degradation in service. So if
8 there's -- if there's interference, if it's a
9 blip. Let's say it's just a blip noise, a cloud
10 goes by, a drone flies, an airplane takes off, and
11 it's instantaneous, that's not harmful
12 interference. But if there's a signal that is
13 preventing reception, that is harmful
14 interference. That's a problem. And determining
15 the impact is a complex undertaking, right? It's
16 not just -- you don't just do an algebraic
17 equation, there's modeling. It involves many
18 different things involving the distance, the
19 directivity, the antenna gain, the -- the source
20 of the unwanted noise.

21 I mean, there -- this is something that
22 the FCC is an expert in, and they're fully aware.
23 And every system is different. There are
24 systems -- for example, you may have heard there
25 were -- several years ago, there was issues with

1 new service impacting GPS.

2 Well, GPS -- the receiver for GPS is
3 receiving signals at such a low level that even
4 out-of-band noise in a different channel was
5 causing problems with the reception of GPS signal
6 that was used for precision agriculture, for
7 example. And that -- that was an issue, but if,
8 you know -- because the signal levels were at such
9 a low level that an out-of-band signal was causing
10 problems to that.

11 So, you know, it -- it's kind of --
12 there's no set answer, and it's basically a
13 case-by-case analysis. And in this case, in the
14 6-gigahertz band, it is protecting the fixed
15 receiver. And they are a point-to-point
16 transmission link, kind of, you know, like --
17 they're very directive.

18 So if I'm transmitting to you and my
19 receiver gets tilted like this, you're not going
20 to receive my signal. So, yeah, I hope I answered
21 your question.

22 COMMISSIONER MCNAMEE: That's helpful.

23 MR. MARINHO: If I could just interject.
24 One of the things that I think we should bear in
25 mind is is that interference is nothing new to the

1 wireless industry. It's something that the
2 wireless industry and the FCC has, you know, an
3 unusually good track record of ensuring that the
4 rules are followed, and that, indeed, we know how
5 to deal with the kinds of scenarios that John
6 Kuzin just described.

7 And the issue is is that I think we need
8 to take that into account. I mean, I think we
9 need to take into account that there's engineering
10 that goes behind this. Typically, when these
11 sorts of issues get resolved, and they have been
12 resolved in the past, in the other bands, is you
13 get the subject matter experts together, the RF
14 engineers together in a room and they will go
15 through the calculations to ascertain whether
16 there's a risk for interference or not.

17 But, again, I think from what you're
18 seeing, there's a commitment on the part of the
19 industry to support that kind of collaboration.
20 We welcome it, it's been done before, and there's
21 a proven track record at the FCC of how this is
22 done, and so I think we need to leverage that.
23 Because while 6 gigahertz is certainly, you know,
24 a band, a very important band, there are plenty of
25 examples of how these sorts of issues have been

1 done before. And how we have protected
2 incumbents, how incumbents have been able to move,
3 or incumbents have remained in the band but
4 there's sufficient protections so that they're
5 not interfered with.

6 And I think we can't lose sight of that,
7 because if we do, I think, you know, we run the
8 risk that again, we could be talking about this
9 again in 24 to 36 months without having done
10 anything about 6 gigahertz.

11 MS. DITTO: So I think it comes back to
12 the question of what I heard from some of the
13 other panelists before, was that they wanted to
14 ensure their incumbents in that band were
15 protected from interference. I heard that
16 earlier. And, I mean, the issue is while -- while
17 the experience of John may have been that the FCC
18 has a proven track record, there have been
19 mistakes. You just heard about one of them with
20 GPS.

21 So it's not always totally scientific.
22 There's some, you know, as you also heard,
23 case-by-case issues. The reason there are
24 licensed spectrum bands is precisely because of
25 interference. Because those licensed users need

1 bigger guarantees about interference mitigation,
2 so, therefore, there are licensed bands to
3 accommodate them.

4 Introducing unlicensed means that they
5 don't have control or visibility into that
6 unlicensed use. So they can't -- you know, unless
7 there are very stringent mitigation measures that
8 we believe are untested and unproven to date, that
9 we will -- hopefully will be tested and proven, so
10 that they can be mitigated against, we would not
11 be confident in the electric sector that that
12 interference would be mitigated thoroughly enough
13 to ensure electric reliability.

14 If the goal is to protect incumbents
15 from interference that was agreed to before, it
16 should take what it takes to get to that point
17 where we have the confidence that we can use the
18 band for electric reliability. I mean, to me,
19 that's the fundamental issue here.

20 So we're happy and look forward to the
21 collaboration, but we have to keep our eye on the
22 ball. There's a reason why there are two types of
23 spectrum, you know, licensed and unlicensed, that
24 we're already -- so there's already a recognition
25 that this is a possibility.

1 MR. KUZIN: On the GPS issue, just to be
2 clear, the interference I described was due to
3 testing of a proposed service that was not
4 deployed.

5 COMMISSIONER MCNAMEE: What I'm
6 concerned about, we heard in panels earlier today
7 about the seams discussion about basically
8 communication and having the same terms. I'm a
9 little worried just from the conversation I'm
10 hearing about what reliable service is, that the
11 telecom -- and I'm not a telecom expert, but from
12 what you're saying, if you have a few blips,
13 that's still reliable service.

14 MR. KUZIN: If it can withstand it, yes.

15 COMMISSIONER MCNAMEE: Right. And you
16 know, and, you're on your cell phone, it cuts out,
17 it's not a big deal. On the electric side, you
18 have a blip, it may disrupt a dispatch signal
19 that's very critical. So that one mistake could
20 be a very big problem that isn't -- you can't.
21 tolerate and I'm not saying that that's what it
22 is, but it seems to me that there may be a
23 fundamental problem that -- that FCC speak about
24 what is tolerable and FERC speak about what is
25 tolerable are two different standards. And we're

1 not saying the same thing, and so we're not able
2 to get a proper resolution to it.

3 And so I would urge that you-all make
4 sure that you're understanding the same things so
5 you don't say, oh, we're reliable on the telecom
6 side; we can tolerate, you know, a few blips per
7 whatever, and on the electric side we're saying,
8 we can't take a blip at all. I don't know if
9 that's true.

10 MR. KUZIN: No. Completely agree. So.
11 if there is a link. If there is a link that is
12 engineered to 5/9ths or 6/9ths reliability, that
13 reliability must be maintained. Must be
14 maintained.

15 MR. BRUMMOND: Let me add to it, and I'm
16 the last person to talk technically about
17 interference, but I think that shared
18 expectations around interference, what that looks
19 like, what's acceptable, what's not, between
20 FERC, between the FCC, between utilities, between
21 the different -- different organizations. I
22 think that's key, knowing, you know, what's
23 acceptable, what's not, and having those shared
24 expectations, to me, that would be a key thing to
25 add.

1 MS. DITTO: And I think that's why.
2 having this today is so important, because this
3 conversation is important and I'm glad to see a
4 representative from the FCC here, and these are
5 the kind of discussions we need to have to flesh
6 these things out.

7 COMMITTEE CHAIRMAN CHATTERJEE: We've
8 got about 15 minutes left. Unless my colleagues
9 have any further comments, questions, closing
10 statements, I'm going to turn it over to Staff
11 for a question.

12 MR. DODGE: We just want to thank the
13 panelists for attending today. Absolutely
14 fantastic job, and we have no questions, from this
15 side, I guess.

16 MR. ANDREJCAK: I'll just throw one.
17 brief question out. I know there was a lot that
18 was discussed in here about smart meters,
19 distribution networks, communications from the
20 distribution site.

21 Have you-all been engaging NARUC and the
22 states as far as this discussion as well?

23 MS. DITTO: Yes. Yes, we have.

24 MR. MARINHO: Yes.

25 MR. BRUMMOND: Yes.

1 COMMITTEE CHAIRMAN CHATTERJEE: With
2 that, this concludes our -- our technical
3 conference. I want to, again, thank all the
4 panelists throughout the day for their
5 participation, their testimony, and their candid
6 discussion, and I particularly want to thank all
7 of the Commission Staff that put a tremendous
8 amount of time, effort and energy into this. I
9 think today was a very productive day, and it was
10 owed solely to your all's efforts.

11 So thank you.

12 (The proceedings concluded at 5:00 p.m.)

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This is to certify that the attached proceeding before the FEDERAL ENERGY REGULATORY COMMISSION in the Matter of:

Name of Proceeding:

2019 Reliability Technical Conference
Regarding the Bulk-Power System

Docket No. AD19-13-000

Thursday, June 27, 2019

Place: Washington, DC

were held as herein appears, and that this is the original transcript thereof for the file of the Federal Energy Regulatory Commission, and is a full correct transcription of the proceedings.

SYDNEY CRAWFORD

Official Reporter