

UNITED STATES
NUCLEAR REGULATORY COMMISSION

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JOINT MEETING OF THE FEDERAL ENERGY REGULATORY COMMISSION (FERC)
AND THE NUCLEAR REGULATORY COMMISSION (NRC)

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THURSDAY,
FEBRUARY 23, 2017

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ROCKVILLE, MARYLAND

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The Joint Meeting was held in the Commissioners' Hearing Room at the Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, at 9:30 a.m., Kristine L. Svinicki, NRC Chairman, presiding.

NRC COMMISSION MEMBERS:

KRISTINE L. SVINICKI, Chairman

JEFF BARAN, Commissioner

STEPHEN G. BURNS, Commissioner

FERC COMMISSION MEMBERS:

CHERYL A. LaFLEUR, Acting Chairman

COLETTE D. HONORABLE, Commissioner

ALSO PRESENT:

ANNETTE VIETTI-COOK, Secretary of the NRC

MARGARET DOANE, NRC General Counsel

DAVID MOREHOFF, FERC General Counsel

DAVID ORTIZ, Deputy Director, FERC Office of Electric Reliability

NRC STAFF:

FRANK AKSTULEWICZ, Director, Division of New Reactor Licensing,

Office of New Reactors

BILL DEAN, Director, Office of Nuclear Reactor Regulation,

JAMES ANDERSON, Director, Cyber Security Directorate, Office of Nuclear

Security and Incident Response

FERC STAFF:

DAVID HUFF, Electrical Engineer, Office of Electric Reliability

CHRISTOPHER MacFARLANE, Attorney-Advisor, Office of General Counsel,

Office of General and Administrative Law

DANIEL PHILLIPS, Energy Industry Analyst, Office of Electric Reliability

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION (NERC) STAFF:

MARK LAUBY, Senior Vice President and Chief Reliability Office

P R O C E E D I N G S

9:34 a.m.

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3 NRC CHAIRMAN SVINICKI: Well good morning everyone, and let us
4 begin now this somewhat unique and extraordinary session that we have occasionally.
5 It is a joint meeting of the Federal Energy Regulatory Commission, so we meet in joint
6 public session this morning and I welcome Chairman Cheryl LaFleur and Commissioner
7 Collette Honorable. Welcome here to the NRC meeting space, and my colleagues,
8 Commissioner Baran and Commissioner Burns are also joining us.

9 So we will hear jointly from the staff experts of both Commissions and
10 also from the North American Electric Reliability Corporation. But before we get to that,
11 I just want to say that I always some pride in these joint meetings of our Commissions.

12 Not so much a personal pride, but I think that these joint meetings are
13 unique among commissions in the government, and they also to me, over the course of
14 years, this is my ninth year of service on our Commission, they're really a reflection of the
15 experts of two federal agencies coming together and getting done what needs to get done,
16 bringing some measure of innovation to that, presenting solutions, challenges as well, but
17 solutions to their commissions.

18 I think as a result, the body of work that our commissions have engaged
19 in jointly, whether it be cybersecurity issues or just reliability, how our jurisdictions impinge
20 on each other, I think in a country where maybe people feel that government is frequently
21 not getting the job done, these meetings to me are just a high example of two agencies
22 coming together and working creative on problems to get done what needs to get done
23 for the American public.

1 So that's my source of pride in this, is the experts that we've gathered
2 here today to hear from. Chairman LaFleur, would you like to make some opening
3 comments?

4 FERC CHAIRMAN LaFLEUR: Yes, thank you very much Chairman
5 Svinicki, and thank you for hosting us this morning. This is always a really productive
6 meeting and one that I look forward to, and I certainly second your comments about this
7 is exactly what government should be doing. We all regulate aspects of the same things,
8 different aspects and so it's wonderful to meet together.

9 We do find ourselves in an unusual position at FERC right now, as we
10 await nominations to reestablish our quorum. So it's nice to sit with a full table of
11 Commissioners. Most of today's agenda focuses on our shared responsibility for the
12 security and resilience of the critical infrastructure that we both regulate, the bulk electric
13 system in our case and the nation's nuclear fleet in your case, and this is an area where
14 work is quite parallel and there's a lot we can learn from each other.

15 Recently, we've received a lot of attention for another aspect of our work,
16 which is our oversight of hydroelectric safety, with the emergency situation at the Oroville
17 Dam in California, with all the extreme rain they've had. Problems in both the service
18 and the emergency spillway that led to a mass evacuation.

19 As I have gotten briefed, I've been -- I've thought back to my days in
20 industry, having meetings on nuclear evacuation routes and drills, and community
21 preparation and it reminded me of a very excellent job that you all do in that public safety
22 area, which is such a big part of what you do and was very much in mind.

23 I just want to mention one other thing that's been on our joint agenda for

1 the past two sessions but is not on our agenda today, and that's the issues faced by
2 nuclear units in our wholesale competitive markets. Unfortunately, we were not able to
3 put that on our public agenda because we have pending a couple of complaints with
4 respect to the credits that states are seeking to pay to nuclear units in New York and
5 Illinois.

6 So we couldn't put that on the agenda again. But I wanted to assure
7 you it's something we're closely focused on. In the last couple of years we've overseen
8 significant changes to some of the capacity markets, to more properly compensate the
9 units that can be counted on to be there at times of system stress like nuclear units, and
10 Commissioner Honorable and I also have announced that we're going to be hosting a
11 technical conference later this spring on the issues of reconciling state initiatives with
12 market rules, which is very important to the nuclear fleet. So but unfortunately not today
13 because of the ex parte rules. Thank you.

14 NRC CHAIRMAN SVINICKI: Certainly, thank you. Commissioner
15 Honorable.

16 FERC COMMISSIONER HONORABLE: Thank you Chairman Svinicki,
17 and I also want to acknowledge Commissioners Baran and Burns. Thank you for your
18 hospitality, for hosting us here today and for allowing us to participate in for us a full
19 complement of Commissioners focused on both the nuclear and energy sectors broadly.
20 I look forward to this meeting, because we bring together the best and the brightest of our
21 respective teams, and those that work in the sector, like folks at NERC and other places,
22 to really focus on areas of interest mutually.

23 So I look forward to the robust dialogue. Acting Chair LaFleur

1 mentioned our continuing work in a number of areas attendant to issues associated with
2 nuclear facilities. I too am very eager and look forward to, as I know Chairman LaFleur
3 does, our upcoming technical conference.

4 Over the last few years, we've had a number of discussions with
5 stakeholders from all walks of life about the issues associated with the ways in which
6 markets work in implementing and minding state work, in developing policies that support
7 their respective jurisdictions, but also the challenges associated with it.

8 So I look forward to our upcoming technical conference, and I want to
9 thank our staff at FERC and also the staff at the NRC. Thank you for all that you do and
10 I look forward to a great day. Thank you.

11 NRC CHAIRMAN SVINICKI: Thank you very much. I turn to my
12 colleagues now. Commissioner Baran.

13 NRC COMMISSIONER BARAN: Well, I just want to join Kristine in
14 welcoming our colleagues from FERC. It's great to have you here, Cheryl and Collette.
15 Thanks for making the trip and I look forward to a good meeting.

16 NRC CHAIRMAN SVINICKI: Thank you, Commissioner Burns.

17 NRC COMMISSIONER BURNS: I would again add my welcome to
18 those of my colleagues. I appreciate the opportunity to meet together. It's always, I
19 think, interesting to learn of intersections between the things that we regulate here at the
20 NRC and the broader perspective on the electricity generation in the U.S. that you bring.
21 So welcome.

22 NRC CHAIRMAN SVINICKI: Okay, thank you. Well, let's get to these
23 interesting set of topics here. We will begin on the topic of grid reliability, protection of

1 critical infrastructure information with -- we'll begin by hearing from the NERC
2 representative Mark Lauby, if I've pronounced that correctly, who is the senior vice
3 president and chief reliability officer. You are recognized to begin. Thank you.

4 MR. LAUBY: Thank you. I want to thank the Commissioners and the
5 chairs of the Commissions for inviting me here. I'm delighted to be here to chat a little
6 bit about the State of Reliability report that NERC puts out every year.

7 It's usually actually posted around the May time frame, though we gather
8 information and data throughout the whole year and then make measurement of it and
9 make determinations from that information on certain key parameters or performance,
10 you might say performance indices that indicate if things are getting better or worse on
11 the system.

12 Next slide, please. So in this particular report, there are a number of
13 different key findings in these areas that we monitor, and the first one is misoperations,
14 what we call protection systems. Protection systems are there to ensure that when there's
15 a fault on the system or some sort of failure, that equipment is protected and the damaged
16 equipment is isolated.

17 At times, that cannot operate as you design it to operate, or it may fail for
18 a number of different reasons, be it equipment failure, logic errors, you know, whatever.
19 So what we've been focusing on here is industry's attention on what that rate has been,
20 which is the total number of failures divided by the total number of operations, and seeing
21 if we can drive that down. In 2015, we indicated a reduction of one percent of those
22 failure rates and it was a statistically significant reduction.

23 We're going to continue to focus on that in fact as a corporate metric,

1 working with industry to reduce those rates even lower. Because the idea is is that you
2 plan and operate to N minus 1, the next worse contingency. But when you have a relay
3 failure, you can go to N minus 5 real fast or 6 or 7. So we want to make sure that we
4 manage those.

5 We'll be targeted those three areas. We know where some of the
6 performance is at with individual organizations, what their performance is, and we're
7 working with the regional entities in the overall enterprise to work with those organizations
8 and provide information in webinars.

9 We're talking to vendors like Schweitzer Relay and GE. How can we
10 make these relays more robust and less prone for error?

11 The next slide talks a little bit about resiliency of the bulk power system,
12 and this is a way in which we calculate severity. You might say it's looking at outages of
13 different types of lines. Perhaps the ramification of those outages has been load shed,
14 for example, and measuring the different pieces of severity. Overall, we're starting -- we
15 continue to see that severe risk index kind of flatten out, that it hasn't been rising at all.

16 In fact, we've been spending a lot of time with industry focusing on winter
17 weather preparedness, because you all remember the polar vortex, and what we learned
18 from that was that not all units had taken the steps. When I was a kid living in Minnesota
19 and I had a 1963 Buick Skylark, I would winterize that car when it's getting 40 below in
20 Minnesota.

21 We have to do the same thing with the units, and especially further south,
22 as we see winter weather sometimes going further south. Anyway, we're starting to see
23 that performance level off. We'll continue to monitor. We'll continue to provide

1 information. I know that spot checks are going on as well throughout the industry. It
2 usually happens in the fall time frame.

3 The next slide shows kind of what the resiliency index looks like, and it
4 demonstrates a couple of the different types or particular days where we have some
5 severe weather, some of it as bad as the year before or during the polar vortex in certain
6 areas. But again, we saw the performance much more improved and again it's
7 something we'll continue to monitor.

8 Next slide. The next slide shows you the risk profile, you might say, of
9 different types of -- it's like a risk mapping of different types of causes of transmission
10 failures or severity of transmission failures. You'll see, for example, a top floor on a red
11 beam misoperations, which is an area we're focused on.

12 We're focusing on failed AC substation equipment. We're focusing on
13 power system conditions, which are really that's around, you know, high voltage/low
14 voltage stability conditions. Then finally you'll see human error also, and another area
15 to spend some time on.

16 The next slide shows that we're actually seeing human error, you know,
17 impacts of human error on transmission outages being reduced statistically, significantly
18 over the years. This is really a result of us focusing on this human error and human
19 performance issue, and I'm sure in the nuclear industry there's a lot of experience in this.

20 We're taking a lot of that and bringing that forward into the bulk electric
21 system. We have conferences on it. We measure it. We put workshops together.
22 We work with the NATF and the NAGF and are continuing to see, again, improvement
23 there as we put highlight and spotlight on it, and the industry learning and taking that into

1 account.

2 We understand individual organizations and their performance, and
3 again we work with them with site visits and assist visits you might say.

4 Next slide. I talked a little bit about the events, you know. We have a
5 categorization of events, 5 being the worse, kind of like a 2003 blackout all the way down
6 to Category 1, where it's basically some serious event, but not one that caused loss of
7 consequential loads.

8 Things we'll measure there, for example in Category 1 might be EMS
9 systems, partial outages, energy management systems that give visibility to the system
10 may have partial outages, or there may be some serious voltage condition.

11 So we measure them all, and in the last year we've only had one
12 Category 3, which is a mid-level and it was actually in the Texas Interconnection, which
13 what we do is we measure a Category 3 based on the amount of generation that's lost for
14 that event, and in Texas that's basically two large units. So, you know, we end up seeing
15 a little bit more of them in Texas.

16 We're doing an event analysis of that. We're looking to see if there's
17 any gaps in our compliance activities, any gaps in the standards as we monitor these to
18 make sure we continue to improve. We also published lessons learned. This is kind of
19 almost like your near-miss database, but we kind of gather event information, identify
20 trends and what are the learnings from those trends. So we continue to put those out.

21 The fifth key finding was improving modeling. This is becoming
22 increasingly important as we see the changes in the resource mix. How do we
23 understand a system's behavior? It's a dynamic, huge non-linear system, right?

1 How do we understand what its behavior is during events, and how do
2 we make sure our models simulate that so we can plan a system that's robust and that
3 we operate a system in a robust fashion, and we're using synchrophasor technology so
4 during small events, we get kind of what happens on the system, and we compare that to
5 our models and we adjust our models.

6 We'll continue to be working on that over the next few years to see if we
7 can improve. We actually measure a case. We call these cases, and I'm sure you do
8 something very similar in the nuclear industry, where you model an overall plant and what
9 happens in that plant. The same thing on the system. We measure the, and validate
10 the quality of those cases and we're using some of the actual online systems to do that.

11 The next lesson learned is around essential reliability services.
12 Essential reliability services are those services who typically you got from units to begin
13 with when you have your reserve margins.

14 But as we start putting in different types of resources, let's say solar
15 resources, wind resources, even some of the gas turbines that come on nowadays do not
16 necessarily automatically provide frequency response, inertial response, support voltage
17 because, you know, perhaps either in a merchant market or even if they're not, that
18 provides wear and tear on a machine.

19 So how do you minimize that wear and tear? Well, you keep it steady,
20 right? So we've got to balance all that and understand exactly what is the frequency
21 response, for example, in each one of our interconnections, and those are those four
22 areas that have different heartbeats within North America, actually with a fifth being in
23 Mexico now.

1 And so, you know, how do we -- how do we know where we are and how
2 do we know where it's going and how much do we actually need? In any event, what we
3 did see is a bit of an increasing trend in the eastern interconnection. That's where we're
4 at right now. In the west, it was not really clear. We didn't have a statistically significant
5 change.

6 We did see an increase in Texas and in Quebec a slight decreasing
7 trend. So we're going to continue to measure the frequency response, as well as we're
8 going to be working through a number of different groups to identify what is really
9 sufficient. What do we need to plan to? What do we need to operate to?

10 When I get them planning a system and I give it to an operator, that they'll
11 be able to actually have a robust system. So anyway, that's one of the key areas that
12 we can measure. The next slide talks a little bit about initial services about voltage
13 support, much more of a localized phenomenon, and again where we continue to
14 measure that.

15 We're working with the NAGF, the Generation Forum, the NAGF, North
16 American Generation Forum on the performance of the units themselves, and we monitor
17 on the system low voltages and high voltages.

18 Next slide talks about cyber and physical security. We did not lose any
19 load as a result of either one or cyber events, though we did have a small load shed
20 because of a physical event in 2015, which we, you know, were able to obtain information
21 through the 417 Forum. We're going to continue to strengthen the situation awareness
22 and provide timely and coordinated information to the industry through ESCC or ES-ISAC,
23 etcetera.

1 So continuing to monitor that. We have standards, of course, in place
2 and you'll be hearing more about those today. So in summary, you know, we've seen
3 the protection system, misoperations have been decreasing. We're seeing improved
4 performance of the bulk power system to severe weather, human errors decreasing, no
5 Category 4 or 5 which is real serious events in 2015.

6 The frequency and voltage remains stable, but we're going to continue
7 to monitor to now, as well as looking into the future. We're looking for those faint signals
8 that tell us if there's any changes there, and that physical and cybersecurity is maintained
9 under increasing threats. So with that, I'd be happy to take any questions. Thank you.

10 NRC CHAIRMAN SVINICKI: Thank you for that presentation, and I just
11 want to begin with an acknowledgment that I think for every presenter today, we've asked
12 you to cover at a high level something you could probably construct a three day
13 conference around. So I know you're doing your best and we've given you very little time
14 on our part.

15 We have Mr. Bill Dean, who's going to cover probably what six
16 colleagues would cover on three different Commission meetings. He's going to get it
17 done in the brief time that we've given him. And also with those familiar with the way we
18 conduct our meetings, we're departing a bit from our strict recognition and equal time.

19 The way that our Commissions have generally approached the Q and A
20 is that if the matter, subject matter is more expert to the other agency, we begin with the
21 Commission less familiar with the subject matter, and just offer it somewhat fluidly, and
22 of course then allow any points of clarification that my colleagues from FERC would want
23 to offer.

1 So in light of that, with NERC we would begin with the NRC Commission.
2 I can begin with a question. I will, and then my colleagues can jump in. So again, you
3 have presented a lot of different topics there which piqued my interest. Maybe at high
4 level, you talked about modeling improvements and of course you said you've got a
5 system here with a lot of different components and facets.

6 But it does at the end of the day, through its interconnection, operate as
7 one integrated system. So how would you assess the overall state of the modeling
8 capability if you were ultimately aiming for an A plus grade?

9 Is there you're just moving along that continuum, and also if you could
10 weave in there any kind of coordination, that maybe the Electric Power Research Institute
11 or other across industry institutes do in this and how do you tap into that? Maybe you're
12 a direct participant in those modeling improvements and endeavors.

13 MR. LAUBY: Well good questions, and I'll say that you're right. The
14 system works in an integrated fashion within an interconnection, and within that
15 interconnection I think that, you know, when you talk about modeling, you have to talk
16 about it in many different ways and many different facets.

17 If you talk about the overall interconnection model, I think it's something
18 that, you know, we recognize we need to continue to improve. You know for example
19 there were some studies done on frequency response a few years ago, which showed
20 the system to have far more frequency response, and actually we're seeing and system
21 performance.

22 So we recognize that that's something that needs to be worked on, and
23 of course there's actually standards around providing good information that the

1 Commission recently approved, so that we can ensure that we start continuing to improve
2 those models and validate them against system performance.

3 So as far as who we coordinate with, well gee I used to work at EPRI for
4 20 years so I --

5 NRC CHAIRMAN SVINICKI: I do not know that.

6 MR. LAUBY: So we're well connected with EPRI and the work that
7 they're doing. In fact we worked with them over time on other types of projects like GMD
8 modeling, for example, geomagnetic disturbance modeling, and they have helped us a
9 great deal, especially when you start talking about new analysis and new techniques that
10 you need, be they for distributed resources. They'll participate sometimes in our
11 standard drafting teams and in our technical committees.

12 Also the DOE does and of course FERC partners with us all along the
13 way. So I think we have a -- I think good representation. So I would say that, you know,
14 if you were to look at it, for example, in an individual ISO or an RTO, which is these kind
15 of market areas, they have very good models perhaps for their own system. It's the
16 outside system that perhaps need to get some improvements.

17 If you look at short circuit modeling, I think there needs to be some
18 improvement there too. So it's a project we recognize, or an area that we recognize that
19 requires improvement and we have a number of different NERC technical staff working
20 on that with industry. We've got modeling improvement task forces, we've got load
21 modeling task forces and so it's something we're continuing to work through.

22 NRC CHAIRMAN SVINICKI: Okay, thank you for that. To my
23 colleagues, Commissioner Baran.

1 NRC COMMISSIONER BARAN: I have a couple of questions about
2 nuclear power plants entering decommissioning, kind from the reliability side. We don't
3 normally have panelists that can talk about that element of it, so I wanted to pick your
4 brain a little bit about that. When a nuclear power plant in an organized market decides
5 to shut down, can you talk a little bit about what the utility is required to do on the reliability
6 side? Do they just stop bidding into the capacity markets? Does the RTO or ISO need
7 to sign off in some way on it? Are there other things that the utility needs to do if it's
8 going to shut down a plant in an organized market?

9 MR. LAUBY: Well I think, you know, of course we're agnostic if it's
10 market or not. But generally if a unit is going to retire, there's a certain period of time
11 that they need to inform the ISO or RTO, for example, of the market I believe, and there's
12 a certain amount of time. I think it's on the order of I think like 90 days in some cases,
13 not very long.

14 FERC CHAIRMAN LaFLEUR: Longer on some markets.

15 MR. LAUBY: In some, thank you.

16 FERC CHAIRMAN LaFLEUR: It all depends on the RTO.

17 MR. LAUBY: Yeah, yeah, and it depends. But you know, once they do
18 that then there's studies done and if they are what they call a reliability must run, that is
19 to say they've got to keep them in the market and pay them a little bit more to stay in for
20 a while, while they make adjustments to the system, either its capacity or they maybe
21 have to replace the centralized --

22 Well, you know, they don't move too much. But voltage support, more
23 capacity and they'll have time to do it. So it generally is kind of an inform and then either

1 bring, keep them around for a period of time until they can replace the resources, and
2 build a transmission system or acquire the capacity that's needed.

3 NRC COMMISSIONER BARAN: Okay, and understanding I know a lot
4 of this works down at the RTO/ISO market level, has NERC identified or are you
5 anticipating any reliability impacts from the nuclear plants that have shut down or are
6 planning to do so?

7 MR. LAUBY: Well we can -- for example, we've put together a number
8 of studies where we were looking at what the impacts of the CPP was going to be, or in
9 the end it's kind of happening anyway because of the price of gas and the renewable
10 subsidies, etcetera, that are coming on. So we do, you know, we look at those that are
11 expected to come out of the system, and look at what are the capacity issues and
12 reliability issues.

13 We do this through our long-term reliability assessment. We look
14 actually out for ten years and say well what are some of the issues that we're seeing
15 coming? What kind of resources are coming on? What resources are coming off, and
16 what are the implications of that? We do that working through industry, through the
17 regional entities that work with us and then we'll make some determination.

18 We also may have some sensitivity studies around, you know, all nuclear
19 coming off and what impacts do I have, or you know, maybe an increase in nuclear. Of
20 course, sometimes it will be a regional impact more than -- but we study that all the time,
21 you know.

22 NRC COMMISSIONER BARAN: Let me just ask one question on a
23 completely different topic, which is I've heard from a couple of nuclear utilities that they're

1 seeing an increase in the number of new non-safety related components at operating
2 plants with defects, a malfunctioning transformer is a recent example I heard about.

3 I know some of the utilities actually have programs where they do a fair
4 bit of testing of new components, again not safety-related components but other
5 components to kind of ensure that they're going to work and not fail early on. But I've
6 heard that there is this, at least from some, that there's a trend. They're seeing more of
7 these defects than they used to. Is that a trend that you're seeing more broadly in the
8 electric sector?

9 MR. LAUBY: I haven't seen that yet. It's an interesting question and
10 something we can perhaps dig into and look at the data a little bit more. We don't usually
11 get to the granularity. For transformers we do.

12 But some of the other components and switch gear or new relays,
13 etcetera, we don't necessarily have the life information that perhaps we'd like to have. It
14 sounds like infant mortality, right, and of course you try to wring that out like you say with
15 early testing.

16 But it might be interesting to see what manufacturers are involved and all
17 that. But right now we don't get to that component level.

18 NRC COMMISSIONER BARAN: Thanks for being here.

19 NRC COMMISSIONER BURNS: That's interesting, because it
20 suggests that some of the issues we have in the supply chain and issues overall with
21 various manufacturing components about, you know, the quality in the supply chain,
22 particularly in a more global market. I'm going to turn just briefly to a couple, touch on a
23 couple of points that you raised.

1 I think you noted that one of the regions experienced a noticeable
2 improvement in the relay misoperations 2013 into 2015, and that could be attributed
3 perhaps to reduced communication failures. Is there a way of expanding those lessons
4 learned to say other regional areas or other components more broadly, that people sort
5 of get the benefit of that performance --

6 MR. LAUBY: I have to retrace my steps there. You know, the statistics
7 I gave you were with all of North America except the West, and we're getting that
8 information now and actually we'll build it into this year's upcoming. So that data is like
9 Texas, it's the Eastern Interconnect, I think it's also Quebec, and we saw a noticeable
10 improvement there.

11 Now as you know about averages are, right, is that there are some above
12 and some below. So now we're working on the ones that are above, the individual
13 organizations that are above, and we do that by working through the regional entities.
14 We have the lessons learned and we -- you know, not only do we have workshops and
15 webinars.

16 We actually have sitdowns with those individual organizations and say
17 hey, this is where you're at. This is where the overall industry average is. Here's some
18 of the things we're setting in your data and some of the things you might want to think
19 about.

20 We also again, like I said, are working with the vendors, who then also
21 bring our lessons learned into operations and into their devices and in their training as
22 well.

23 NRC COMMISSIONER BURNS: Okay, and perhaps a related matter, I

1 mean you talked about in terms of lessons learned from system events and things like
2 that. I'd just like to get a picture of what type of operational reporting systems or way of
3 maintaining databases. I know that was a big learning coming out of Three Mile Island
4 accident for this agency is a focus on operational data, experience, what it tells you, you
5 know, things of precursors, lessons learned, etcetera.

6 I just got -- it would be interesting to get just maybe a more granular
7 picture of what --

8 MR. LAUBY: Sure. I'd be happy to chat with you about that. We have
9 two kinds of sets of I'd say data collection approaches. One is we have a mandatory
10 data collection or mandatory -- it's mandatory to give us the data, and that can be through
11 our reliability assessment effort, which is really called for on the rules of procedures and
12 all organizations sign that. So like, you know, lowered forecasts, transmission plans,
13 generation plans, etcetera.

14 We also then have what we call a Section 1600, and I'm sorry it's our
15 rules of procedures. But basically it's --

16 (Commissioner Burns comment.)

17 MR. LAUBY: Where we as a mandatory data collection for transmission
18 outages, generation outages, misoperations. In fact, now we're going, working with
19 FERC to transfer that data information over to FERC. Then we have another, which is
20 more on the voluntary set, and that would be for a different specific event. So an event
21 has lines going out, and so the lines are going to go -- and we're going to see that in the
22 GADS data, the TADS they would call it TADS and GADS, generation and transmission.
23 Misops is really misoperations.

1 That's where we do a deep drive root cause analysis on specific events,
2 especially at certain levels, Category 1 through 5. Last year we had about 173 of these.
3 Half of them were EMS system type, you know, software type things and the rest of them
4 were different type of events. Then we look for trends. Once we go through, it takes
5 about 20 hours per event. We look through trends for that and then we'll post those on
6 the website. We all have webinars around those lessons learned to get the word back
7 out.

8 NRC COMMISSIONER BURNS: Okay, thanks. Thanks.

9 NRC CHAIRMAN SVINICKI: Thank you. Do my FERC colleagues
10 have any points that they'd like to illuminate here?

11 FERC CHAIRMAN LaFLEUR: Thank you very much. Thank you
12 Mark. That was excellent and one of the things I really like about the state of reliability
13 report is just the attention on learning from experience that then informs the ongoing
14 priorities and kind of that learning cycle that you've established at NERC.

15 You mentioned not just a report you did, but that you also do long-term
16 scenario planning. Could you just expand a little bit on what do you think some of the
17 emerging issues are, that in a few years will be bigger than they are today that we should
18 have our eyes on?

19 MR. LAUBY: Thank you, and of course I think it will dovetail a little bit
20 more with those people who might want to come to the Reliability Leadership Summit that
21 will be on March 21st.

22 FERC CHAIRMAN LaFLEUR: Yes, I think we'll be there.

23 MR. LAUBY: I look forward to you being there and giving us a keynote.

1 I would say that if you were to look at our Reliability Issues Steering Committee, which is
2 called RISC, haha, it actually puts out a report every year, and in there we have nine
3 different risks. Now I can't off the top of my head hit all nine of them, but certainly
4 changing resource mix is one of the most significant.

5 How we change from where we were to where we're going, and what are
6 the bumps along the way? You know, as an engineer I can tell you I can design just
7 about any system and I can make it work, but I have to have enough time and money to
8 do that. It's in that old sage. It's true, and so as we go through this transformation or
9 metamorphosis is what I call it, from where we are to where we're going, you know,
10 making sure that we do that seamlessly with a high -- the high kind of reliability we're used
11 to having, DER closer to the cuff somewhere, what are the impacts of this changing
12 resource mix and what are the impacts of the new equipment.

13 Another set of challenges continues to be cyber and increasing security
14 or increasing sophistication on both sides. Both we work hard on it of course from the
15 cyber perspective and protections in our standards and physical security and the
16 standards there. But you know, I want to get to a day where this is just like any other
17 threat vector. For example, we plan a system to next worse contingency.

18 We'll look at multiple outages. Well, I think a cyber-attack is just about
19 threat to the system like weather, like Mother Nature or failed equipment or whatever else.
20 How do I design a system so I'm less vulnerable to a cyber-attack. How do I operate
21 that system to be less vulnerable?

22 So I think those are two significant areas, the resource mix and the
23 implications of that going to let's say a lot more solar, for example, and wind and just

1 recently you've heard about the faint signal we've had on inverters, which are tripping up
2 faster than the breakers can move because they're calculating frequency incorrectly.

3 So we lost 1,000 megawatts scattered over across the one state as a
4 result of this kind of fault on the high voltage system and reading the frequency wrong.
5 So we've got to make sure we do this and do it right, and again, all the resources on the
6 distribution. So I think those are kind of the key significant areas.

7 We're also worried about training, young folks to get them into the
8 industry. That's something that continues to be a concern as we see power programs
9 get ramped down. How do we ramp in new people that come in? The kind of skill sets
10 they're going to need are going to be different than the power engineer of the past. So
11 aging infrastructure like myself.

12 I was in a meeting and they said, you know, older transformers are like
13 you, Mark. They start fizzing a lot and gassing a lot, you know. So yeah.

14 FERC CHAIRMAN LaFLEUR: Thank you very much.

15 MR. LAUBY: Thank you.

16 NRC CHAIRMAN SVINICKI: I don't know how you take it from there.
17 Please try. If anyone can, you can.

18 FERC COMMISSIONER HONORABLE: Madam Chair, thank you. I
19 was going to say the same thing. That's a tough act to follow, Mark. But I want to thank
20 you for being here and most of all for your work and the leadership that you and your
21 colleagues at NERC have exhibited.

22 I'll start with the latter issue, because as you may know, workforce issues
23 have been a priority for me in my work as both a state regulator, NARUC president and

1 now at FERC. I'm very pleased to hear you speak about that here, because I know it's
2 an issue for both of us, for all of us collectively and for our industries together at large.

3 So I appreciate that you all are focusing on that. No question about that.
4 I'm afraid of what you might say next. The other issue that I want to speak about in
5 commend NERC on is your work and your focus on both misops rate reductions, as well
6 as human error rate reductions.

7 From my interaction with you all, from attending your board meetings and
8 our meetings together, also my meetings and involvement with RTOs and ISOs. I've
9 definitely seen a higher priority placed on both, and leadership certainly shows here.
10 And the results are very clear from the reduction in both rates. So I want to commend
11 you and commend the industry and the sector at large for the work.

12 I want to ask you to speak about -- I think this is instructive, because in
13 the same way that you all have led and encouraged and incited others to work on the
14 reduction of both misop rates and human error rates, both of which we know will occur,
15 how we manage them, how we anticipate them, how we reduce them, are there really
16 lessons learned about the way in which that came to be a priority for you, and could you
17 replicate that with regard to other areas of focus?

18 MR. LAUBY: Yeah. Well thank you, and I appreciate that. I think
19 there's been a good partnership, NERC and working with industry as you said, but also
20 with FERC and the OER staff especially have been very supportive and helpful in, you
21 know, they come to many of the meetings and provide their voice and technical expertise
22 as well.

23 So it's been very helpful. As far as these particular programs, we

1 continue to monitor, you know, what happens on the system and all the transmission
2 TADS data, the GADS data. We look for trends. So we have very curious people,
3 statisticians and engineers who ask questions and what ifs, and they start seeing things
4 and asking questions.

5 This thing about, like for example infant mortality. That's brought
6 something to my mind. I'm going to go back home and start doing some -- ask folks to
7 do some analysis on that and think about, you know, are we starting to see that and how
8 would it manifest itself.

9 So we actually calculate a severity of different types of events, and we
10 try to categorize them like we did with human performance or with AC equipment failure
11 or with misoperations. With AC equipment failures, a good example. We know it's an
12 issue, but now we have to start digging deeper and getting more data around that
13 equipment.

14 What equipment's really failing? Is it breakers generally? Maybe
15 transformers, breakers? Why are they failing? Maybe it's lubrication and the breaker.
16 They get a little bit older and they don't update or maintain them well with the right kind of
17 lubrication, or maybe there's asset management programs need to be improved, etcetera.

18 So we're going to continue to monitor and calculate the severity and then
19 understand what the implications are, and then once you are -- I call account -- I think it's
20 called SAM, be specific. Then, you know, make sure that you do the analytics and then
21 monitor it and make sure it's getting better. Then if it's not, then keep on, you know, get
22 a new program in place and keep on pushing until you get to where you want to be and
23 where the right level is. So --

1 FERC COMMISSIONER HONORABLE: Go ahead.

2 MR. LAUBY: And the other piece I wanted to add is that as far as
3 students, if you don't mind, it's also something close to my heart too, and I think that, you
4 know, the partnership between industry and the universities especially needs to be
5 regrown. I think it's become much more important for those relationship, so that
6 professors understand what are the practical implications?

7 The students will see a potential opportunity to go into the industry and
8 you can actually go places where there's IT professionals and convince them that the
9 power industry is the right place to do go too. It takes time, it takes energy, but it's
10 something I've devoted some of my time too as well through IEEE and few others, and
11 certainly certain universities. So just continue to build those programs.

12 FERC COMMISSIONER HONORABLE: Thank you. I wanted to
13 mention also your inclusion of vendors and others is astute, because we need everyone
14 along the supply chain to be involved and equally focused on these issues to aid in our
15 critical thinking and analysis of what the issues are and how we can resolve them.

16 Chair LaFleur and I were speaking this morning about the importance of
17 our continued interaction with universities and colleges, and think tanks, etcetera. It's a
18 very important part of our work. I too find that I'm challenged and really inspired by
19 inquisitive minds and young minds.

20 They think differently than we do. I'm a lawyer, you're an engineer, and
21 then these bright students who are thinking about how to tackle challenges and issues
22 from a different perspective, and it really is a necessary part of our work and evolution in
23 this sector. So thank you for mentioning that. Thank you.

1 NRC CHAIRMAN SVINICKI: Thank you, and thanks to my colleagues
2 for that interesting Q and A and dialogue. Next we will hear from the FERC presenters.
3 We have David Huff, an electrical engineer with FERC's Office of Electric Reliability,
4 followed I believe by Christopher MacFarlane, attorney advisor in the Office of General
5 Counsel, Office of General and Administrative Law. So I think Mr. Huff you will begin.
6 Thank you.

7 MR. HUFF: Thank you and good morning acting Chair LaFleur, Chair
8 Svinicki and Commissioners. My name is Dave Huff, and I am an electrical engineer for
9 FERC's Division of Compliance in the Office of Electric Reliability. The division's role is
10 to monitor the compliance of the users, owners and operators of the bulk power system
11 with the reliability standards through audits, as well as through analysis and investigations
12 concerning events on the bulk power system.

13 Among other things, the division also leads and participates in periodic
14 reviews of the ERO, regional entities and users, owners and operators to determine the
15 effectiveness of their reliability programs, including considering if changes to the reliability
16 standards are warranted.

17 Next slide, please. Next slide, please. Based on recent events,
18 including Superstorm Sandy in 2012, the 2011 Arizona-Southern California blackout and
19 the possibility of cyber-attacks, the Commission staff in collaboration with NERC and the
20 regional entities, initiated a voluntary review of recovery and restoration plans for selected
21 registered entities with the purpose to assess and verify the electric utility industry's bulk
22 power system recovery and restoration planning, and to test the efficacy of the reliability
23 standards in achieving or maintaining reliability.

1 Next slide, please. Subject matter experts from the Commission,
2 NERC, and the regional entities identified a representative sample of nine entities with
3 significant bulk power system responsibilities to achieve a comprehensive review of the
4 wider area restoration capabilities.

5 All contacted entities agreed to participate in the review, and without
6 exception were exemplary in their cooperation with the joint staff review team, sharing the
7 detailed technical rationale behind their restoration and recovery plans, for assessment
8 of their readiness for system restoration and recovery efforts following a widespread
9 outage.

10 The joint staff review team also evaluated the efficacy and clarity of the
11 associated reliability standards to determine any gaps.

12 Next slide, please. On the power grid operations side, focus was on
13 review of entities' restoration plans that are required by the approved reliability standard,
14 emergency and operations preparedness or EOP 5-2, system restoration from black start
15 resources, which required registered entities, i.e. transmission operators and reliability
16 coordinators, to develop and maintain adequate system restoration plans.

17 Specifically, each transmission operator is required to have a system
18 restoration plan to reestablish its electric system in a stable and orderly manner, in the
19 event of a partial or total shutdown of its system.

20 From the cybersecurity side of things, the joint team reviewed entities'
21 response and recovery plans associated with reliability standards critical infrastructure
22 protection or CIP-008-3, cyber plans for critical cyber assets and incident in CIP-009-3,
23 recovery plans for critical cyber assets and CIP-008, incident reporting and response

1 planning, which were part of the Version 3 standards that were in effect at the time of the
2 review.

3 Next slide, please. Overall, as outlined in the Joint Review Report
4 issued on January 29th, 2016, the Joint Staff Review Team found that the participants
5 had system restoration plans that were thorough and highly detailed. The reviewed
6 plans required identification and testing of black start resources, identification of primary
7 and alternate cranking paths and periodic training and drilling on the restoration process
8 under a variety of outage scenarios.

9 Also, the joint team found that participants had extensive cyber security
10 incident response and recovery plans for critical cyber assets, covering the majority of the
11 response and recovery stages. In addition, the team observed that each participant had
12 full time personnel dedicated to the roles and responsibilities defined in their respective
13 cybersecurity response and recovery plans.

14 Next slide, please. The Joint Review Report identified 15 industry-wide
15 recommendations for improving system restoration and cyber incident response and
16 recovery planning and readiness. They included recommended changes to address
17 concerns identified by the team, further studies to be performed related to certain areas,
18 taking into account the new Version 5 CIP reliability standards, and many beneficial
19 practices for entities to consider to benefit their restoration and recovery planning.

20 Recommended changes regarding system restoration included
21 recommending that measures be taken including considering changes to the reliability
22 standards to address clarifying when bulk power systems' changes should trigger a need
23 to re-verify and update restoration plans, and training exercises on transitioning from the

1 transmission operator island control back to balancing authority control.

2 Next slide, please. Recommended changes related to the cyber
3 security incident response and recovery planning included recommending that measures
4 be taken considering changes to the standards to address designating ownership,
5 accountability at the cyber asset level in the cybersecurity response and recovery plans;
6 specifying details on the types of cyber events that should trigger cybersecurity response;
7 expanding the use of cybersecurity technical expertise and advance tools; and reducing
8 inventory assumption risks.

9 Next slide, please. The recommended studies involved assessing
10 system restoration plan steps that may be difficult in the absence of SCADA or EMS and
11 identifying viable resources that would enable timely system restoration; gaining further
12 understanding of recent black start resource changes and strategies for replacing those
13 black start resources going forward; gaining further understanding to determine the
14 benefits of including existing or future full resource converted DC lines and system
15 restoration plans; testing of black start resources under anticipated system restoration
16 conditions; and gaining further understanding of response and recovery planning, their
17 updating following testing or actual cyber events.

18 Staff is working jointly with NERC to perform these studies, and we are
19 engaged in three of these now. The report also recommended certain practices for
20 applicable entities to implement in addition to identifying numerous observed practices
21 for industry consideration to incorporate where appropriate.

22 This concludes my presentation, and I'm happy to take any questions
23 you may have.

1 NRC CHAIRMAN SVINICKI: Thank you. I think we'll hear next from
2 Mr. MacFarlane and then do the Q and A. Thanks.

3 MR. MACFARLANE: Thank you Chair Svinicki and Chair LaFleur.
4 Good morning Commissioner Honorable, Commissioner Baran and Commissioner
5 Burns. My name is Christopher MacFarlane, and I'd like to start by thanking you again
6 for inviting FERC staff to present on areas of mutual concern and mutual interest, and the
7 particular area that I'm going to talk about, which hopefully fits into that category, is recent
8 changes to the Commission's critical energy electric infrastructure information regulations
9 or CEII regulations as I'll be referring to them.

10 Next slide, please. Next slide, please. I'll be talking about this in
11 basically three parts. First I'm going to provide a little bit of background on the
12 Commission's previous critical energy infrastructure information regulations. Then I'm
13 going to talk about the FAST Act and some of the requirements that it put upon FERC,
14 and finally talk about the changes to the CEII regulations that resulted from the FAST Act.

15 First by way of background, the Commission implemented or FERC
16 implemented its critical energy infrastructure information regulation shortly after the
17 attacks of September 11th. FERC took a hard look at some of the information that was
18 in the public realm and decided that some of this information that contained detailed
19 design, engineering and vulnerability information just wasn't appropriate for public
20 release.

21 So it designated all that information as non-public, and then it undertook
22 procedures in 2003 to not only protect that information, but in recognition that industry
23 counterparts and folks in proceedings would need access to that information, the

1 Commission also established a procedure by which people who had a particular need
2 and a valid need for information could submit requests to FERC for CEII information.

3 That information required the person requesting to submit a statement of
4 need justifying the access to the CEII, and to execute a non-disclosure agreement.

5 Next slide, please. The cornerstone of the previous CEII regulations
6 was the definition of critical energy infrastructure information, and that definition defined
7 a critical energy infrastructure information as specific engineering, vulnerability, detailed
8 design information that met four criteria.

9 First, it had to relate to details about the production, generation,
10 transportation, transmission and distribution of energy. Secondly and perhaps most
11 importantly, it had to be information that could be useful to a person planning an attack
12 on critical infrastructure. Third, it had to be information that is exempt from mandatory
13 disclosure under the Freedom of Information Act or the FOIA. I'll talk a little bit more
14 about how the FAST Act changed this component in a little bit.

15 The final criteria is that it had to be information that gave more than just
16 the general location of critical infrastructure.

17 Next slide, please. On December 4, 2015, the President signed into
18 law the Fixing America's Surface Transportation Act or the FAST Act. The FAST Act
19 added Section 215(a) to the Federal Power Act, with the goal of improving security and
20 resiliency of energy infrastructure in the face of emergencies.

21 The revised Section 215(a) of the Federal Power Act required FERC to
22 promulgate regulations that were necessary to do four particular actions. First, Congress
23 called upon FERC to establish a criteria, the procedures to designate information as CEII.

1 Second, it asked FERC to establish procedures that would prohibit the unauthorized
2 disclosure of CEII, and third to establish sanctions for employees and other individuals
3 who knowingly and willfully make an unauthorized disclosure.

4 The final requirement of the FAST Act was that it asked FERC to facilitate
5 voluntary sharing of CEII among various federal, state, political subdivisions and other
6 entities that were designated by the statute or as deemed appropriate by FERC.

7 Next slide, please. On November 17, 2016, the Commission issued
8 Order 883, which amended the existing CEII regulations to do two things. First is it
9 implemented the provisions of the FAST Act that pertain to the designation, protection,
10 and sharing of CEII information. Secondly, we took a look at our existing CEII
11 regulations and found opportunities to improve them.

12 So it made amendments and revisions to the old regulations that would
13 be consistent with the new requirements of the FAST Act. And in a very timely, the rule
14 came into effect earlier this week.

15 Next slide, please. An important component of the FAST Act and our
16 interpretation of the FAST Act was the definition of critical electric infrastructure
17 information. Section 215(a)(3) of the FAST Act defined critical electric infrastructure
18 information to mean information that's related to electric infrastructure or proposed
19 electric infrastructure that's generated by or provided to the Commission or another
20 agency.

21 Importantly, the definition distinguished CEII from classified information,
22 a Congressional recognition of the different levels of protection associated with that
23 information. And importantly, the last part of the definition of critical electric energy

1 infrastructure information is that it expressly included the term of information that qualifies
2 as critical energy infrastructure information under the Commission's existing regulations.

3 In addition to providing a definition of critical electric infrastructure,
4 Congress gave us statutory authority to withhold information from mandatory disclosure
5 that qualifies CEII under the Freedom of Information Act.

6 Next slide, please. With the definition of CEII in place that Congress
7 provided, an important component of that as who exactly could designate CEII
8 information, and the FAST Act specifically directed that FERC and the Department of
9 Energy could designate CEII information. However, in Order 883, based upon
10 comments including those from NRC staff, the Commission recognized that other federal
11 agencies may possess information related to the electric grid and critical infrastructure
12 information.

13 As such, the final rule added a new provision that indicated that nothing
14 within the regulations would prohibit or limit the ability of a federal agency to take the
15 necessary steps to protect the information within their custody related to the security of
16 the electric grid. Also, it provided the mechanisms for agencies to consult with our CEII
17 coordinator about the designation or treatment of such information in other agencies'
18 possession.

19 I'm very pleased to report that shortly after this rule was issued, NRC
20 staff reached out to us and we had begun consultations on developing a framework to
21 protect NRC's information. Those discussions have been very cooperative and collegial,
22 and I anticipate that that will continue going forward.

23 Next slide, please. Now I want to talk a little bit about some of our

1 changes to our CEII regulations that resulted from the FAST Act in a little bit more detail.
2 The first notable change was we amended our regulations with regard to the designation
3 of CEII, and among the changes we adopted procedures for the public to request the CEII
4 treatment of a document that they submitted to the Commission.

5 We also detailed more of our procedures for the designation of
6 Commission-generated documents. In addition to these criteria, in addition to the
7 process for designating information, we also detailed the regulations that would provide
8 for the removal of a CEII designation, including what notification requirements would be
9 applicable to documents that were submitted to the Commission by an outside entity.

10 Finally, as it relates to the designation of the CEII, we recognize that in
11 not all cases are members of the industry or the public going to agree with our
12 determination. So we established an appeals process in which someone could
13 challenge the CEII designation or the removal of a CEII designation.

14 Next slide, please. The second broad change to the regulations that we
15 made as a result of the FAST Act was to change our processes for accessing CEII. As
16 I mentioned earlier, the initial CEII regulations recognized the need for industry and
17 certain members of the public to have a valid and legitimate need for information to be
18 able to access CEII.

19 When we revised the regulations, we established more of a detailed
20 process for members of the public and industry to gain access CEII. For example, a
21 member of the public must submit a more detailed statement of need expressing why
22 they need CEII and attest to the accuracy of that information. We've also added new
23 provisions to our non-disclosure agreements and recognized some minimum

1 requirements that should be in the non-disclosure agreements.

2 In addition, the provisions of the FAST Act require the FERC to facilitate
3 voluntary sharing among federal, state, EROs and other entities. Provisions now create
4 a procedure to facilitate that voluntary sharing, and describe the process by which it would
5 occur.

6 In addition, we also created a separate process for owners and operators
7 to receive their information outside the two processes that we described above, as well
8 as an ability to share information that we possess with our federal agency counterparts
9 through an acknowledgment agreement.

10 The final change from the FAST Act to the results in our regulations is
11 the FAST Act explicitly put a duty to protect CEII and established penalties for the
12 unauthorized disclosure of CEII information. As a result, the revised regulations ensure
13 that duty to protect CEII with, among other things, minimum requirements for CEII non-
14 disclosure agreements, as well as creating sanctions applicable to officers, employees
15 and agents of FERC to knowingly and willfully disclose CEII in an unauthorized manner.

16 With the FAST Act going into effect this week, we are happy to be
17 implementing these procedures. Thank you.

18 NRC CHAIRMAN SVINICKI: Thank you very much, and I'm sure that
19 for you presenting that information with the general counsels of both Commissions sitting
20 here near you at the table didn't provide any kind of pressure on you or anything. But
21 thank you for covering that important subject matter.

22 We will begin with questions for the FERC presenters again with the
23 Nuclear Regulatory Commission, and I want to lead off by -- so this is maybe a question

1 that will be a little strange. I'm sure you'll both do your best, but we recently in our
2 knowledge management program were honored to have Governor Ridge, the first
3 Secretary of Homeland Security, talk to us about emergency preparedness, Katrina, Rita,
4 9/11. So it's a great part of our knowledge management program here at NRC.

5 But he talked about an overall posture towards preparedness for the
6 United States, and as I listened to you both, you're talking about issues of preventing what
7 we can, but then having the ability to respond and the resiliency that we need, because
8 we're not going to live in a world where we are able to prevent all adverse events, extreme
9 weather events being a perfect example of something that we can't stop from happening.

10 But as we look at taking actions as regulators in this area and requiring
11 measures towards that resiliency that we want nuclear power plants or the bulk power
12 system to have, we also do have this imperative to keep a certain amount of this
13 information that is critical and sensitive to the protection of those assets. We have to
14 keep that maybe more private or protect that from disclosure.

15 We do have organizations, I think, for both of our Commissions that
16 advance a theme that although what we've required as regulatory agencies is good as far
17 as it goes, there are organizations that advance a notion that it is inadequate in some
18 aspects.

19 So for either of you, how do you feel that -- does FERC have the
20 opportunities to get -- build a knowledge base about the measures that have been taken,
21 while at the same time having to navigate the protection of this information? Is there any
22 kind of observation you would make about the difficult of navigating that? And of course
23 Congress, as it should, has a very consistent eye on the protection of these assets for the

1 nation.

2 Is there anything you'd like to share about FERC's activities, to build that
3 education and awareness while navigating the protection of specific information? Mr.
4 Huff.

5 MR. HUFF: Thank you for that question. That's a good question. We
6 from participating on the restoration and recovery project, the Joint Team members, one
7 of the takeaways we had was staying close to industry was vitally important,
8 understanding their preparedness, their plans and processes that they have in place,
9 things they're thinking about, things that are keeping them up at night and us as FERC
10 staff, if we can maintain that closeness and have that understanding that's going to benefit
11 our endeavors of what we review and our knowledge gained.

12 We do -- in those interactions, we don't forget about the sensitivity of
13 information, and we take that very seriously, that we -- that we handle that information
14 appropriately. So Chris, if you want to add to that.

15 NRC CHAIRMAN SVINICKI: Thank you.

16 MR. MACFARLANE: The only thing I would add to that, and thank you
17 again for asking that question. In interpreting the FAST Act, I think that the FERC tried
18 to strike an appropriate balance between protecting the information and ensuring that
19 information gets into the hands of folks who need it, so that we can have a framework like
20 what David's talking about, where there's collaboration and discussion, built-in knowledge
21 about information.

22 NRC CHAIRMAN SVINICKI: Thank you. Do either of my colleagues
23 have questions? Commissioner Baran.

1 NRC COMMISSIONER BARAN: Sure. I think I'll ask a follow-up
2 question on CEII. You mentioned that NRC and FERC staff are in discussions about
3 how we're going to coordinate, and so maybe the answer to my question is still being
4 worked through.

5 But when I looked at the information on the rule that went into effect this
6 week, I wasn't clear on -- if NRC has information that we have in our possession that we
7 think should be protected as CEII, what steps to you envision us taking? Is the idea that
8 we would come to FERC for potential designation of that information, or is there another
9 process that's being contemplated?

10 MR. MACFARLANE: That's a great question, and yes, the devil's sort
11 of in the details on those discussions, as we're working out the best means to both ensure
12 that we interpret the FAST Act correctly, particularly with regard to FERC's authority to
13 designate information, and with regard to getting expedited designations of NRC
14 information, so that that information is protected quickly and adequately.

15 NRC COMMISSIONER BARAN: Okay. So that's something you guys
16 are actively working through?

17 MR. MACFARLANE: Correct.

18 NRC COMMISSIONER BARAN: Okay, thank you.

19 NRC COMMISSIONER BURNS: Let me follow-up with a couple of
20 questions. I may go to our internal counsel as well. But okay. So as I understand it,
21 what the FAST Act does, it makes an explicit tie to the Freedom of Information Act, I
22 would presume it's like Exemption 3 type information; correct?

23 And that's basically to say that's to eliminate the possibility of arguments

1 that FOIA doesn't really protect this. So I think that would be my analysis. I'm hear or
2 hear heads nodding; I see heads nodding. I got my senses mixed up.

3 The other thing is, and this is for our general counsel, what does the
4 FAST Act add for us? What is it that it -- how is it helping, because if I go back historically,
5 why we have Safeguards information is because at one point in the 1970's, believe it or
6 not, people didn't think of these nuclear power plants as part of critical infrastructure. So
7 we needed a separate provision on Safeguards.

8 Now Safeguards is maybe more like classified, less like, you know, it's
9 less like pure proprietary. But that was clearly one of the things. So what I'm -- the
10 question I have, and I know we've had probably some discussion of it is what does it add?
11 What gap is it filling or what does it enhance for us?

12 MS. DOANE: So as Chris --

13 NRC COMMISSIONER BURNS: Mic.

14 MS. DOANE: Is that working? Oh gosh, it wasn't close enough. Sorry
15 about that. So as Chris was discussing, they already had a designation of CEII and the
16 statute recognized that designation. We didn't use that designation of critical energy
17 infrastructure information. What we used was sensitive information.

18 So it would be non-public information, sensitive. So that would be below
19 Safeguards. So we were protecting the information as non-public and as sensitive, but
20 we didn't have the same label. The gap that this fills is that it now takes that information
21 and makes it Exemption 3.

22 That information was not under Exemption 3 because it wasn't protected
23 by a statute, because we couldn't put it under our Safeguards, the statutory prohibitions

1 on Safeguards because we had intentionally said it was one step below as sensitive
2 information.

3 And that -- I think that led to, as Chris was saying, it led to an easy way
4 of distributing the information among agencies, and I think that was necessary at the time.
5 So the gap it fills is actually get a statutory protection for it, so that it comes under
6 Exemption 3.

7 NRC COMMISSIONER BURNS: Okay thanks, and just one brief
8 question Mr. Huff. I think you had indicated there were some follow-on studies planned
9 by this Joint Review Team. Are there particular ones FERC is considering maybe taking
10 next step and doing as follow-on studies? I'd be interested in that.

11 MR. HUFF: As I mentioned earlier, that's a good question. We're
12 currently engaged in three of those five studies, and they were spawned from the
13 discussions on the restoration and recovery project that led to the report, areas that were
14 out of scope with what we had scoped for that study, but we felt that needed further,
15 warranted further research and investigation on.

16 So that's where we're engaged right now, in mapping out that, the game
17 plan, so to speak, to perform all those studies.

18 NRC COMMISSIONER BURNS: Okay, thanks.

19 NRC CHAIRMAN SVINICKI: Thank you. Chairman LaFleur, you and
20 Commissioner Honorable please proceed.

21 FERC CHAIRMAN LaFLEUR: Thank you. Thanks very much, David
22 and Chris. I'm not going to ask questions. I just wanted to pull out a couple of points to
23 emphasize. I was very happy to see the passage of the FAST Act, even though I didn't

1 think I'd get the FOIA exemption under transportation law. I'll take it whether it's called
2 an energy law or not, because that's something we've been asking for for some time.

3 Another aspect of the FAST Act that was not specifically in your
4 presentation but affects both of us is for the first time it designated the Secretary of Energy
5 to have emergency authority in a major grid emergency, and I think the Department of
6 Energy is really just in the process of putting out regulations on that now, which is
7 something that had never been clarified before.

8 The second thing I wanted to mention is the importance of voluntary
9 sharing of information. I know we're running a couple of classified briefings or to help to
10 facilitate classified briefings for state regulators early next month I believe, and it's as
11 good as we try to make the standards, it's impossible to regulate your way out of an
12 emergency, because the threats or the cyber threats and even the physical threats are
13 happening so fast that when we get something, you know, ransomware, some new thing,
14 by the time we start the process of rulemaking and notice and comment, you can't
15 respond that way.

16 So some of the voluntary things that we and the industry we regulate do
17 together, the Electric Subsector ESCC, Coordinating Committee, the ES-ISAC, which is
18 the threat-sharing, are just very, very important adjuncts to the regulatory process.

19 The final thing I want to say is I just really appreciate the NRC staff's
20 comments when we were working through the FAST Act regulations. We don't -- it's
21 always a question whether you comment on someone else's regulations. We do it very
22 rarely ourselves, but it was extremely helpful to have those. Thank you.

23 FERC COMMISSIONER HONORABLE: Thank you Madam Chair. I

1 want to thank David and Chris for your presentations here today. David, first yours. I
2 wanted to really shed light on the very deliberate and painstaking effort with FERC and
3 NERC in reviewing the recovery and restoration plans. Very good job on behalf of both
4 of you.

5 I've read the report. It's voluminous. My staff has as well, and it really
6 speaks to our continued need to be vigilant, because it goes back to something Mark
7 mentioned earlier. Our focus on resilience must be prominent and prioritized, part of our
8 work. And so your -- the time that you collectively took, as I understood the effort, worked
9 very well and you were pleased with what you saw and what was occurring in industry.

10 But also it really is a good time for all of us to reflect upon how we can
11 do this work better. For Chris' presentation with regard to our work on the FAST Act, for
12 our colleagues and stakeholders in the industry that have been watching, it has been an
13 effort that carried over a few months.

14 We wanted to make sure that we got it right and we did work deliberately
15 to bring that about. I've been very pleased to hear how well our teams are working with
16 the NRC staff. I'm not surprised about that. But I do want to encourage our colleagues
17 at the NRC through your staff to please keep us aware of the practical. The
18 Commissioners' questions were astute ones focusing on okay, we've got this regulation
19 in place. Now let's look at how it's going to carry through practically.

20 Please do challenge our work there and keep us apprised of anything we
21 may have missed, and how we can enable your efficient work on protecting this
22 information, while allowing access where appropriate. Thank you.

23 NRC CHAIRMAN SVINICKI: Well thank you both, and thank you for

1 that commentary and points of emphasis from the presentation. I perhaps share a
2 concern that Chairman LaFleur talked about, which is I think for our agencies we have
3 great access to information about this evolving threat, environment.

4 I do sometimes wonder about that information always getting into the
5 hands of people for whom it might be more directly actionable, and in this country we
6 always have to remember that we -- the assets are held in private industry. So I know
7 it's caused discomfort in some quarters, but the notion of the voluntary sharing I think is
8 a necessary component.

9 Congress has grappled with that. They've arrived at some outcomes,
10 and I think, you know, I'm comfortable that we are getting there in terms of what we
11 regulate here at NRC in terms of information getting to the right people. But we'll have
12 to continue to always be advancing that interest.

13 So now we will hear from the NRC presenter, Mr. Bill Dean, who is our
14 director of the Office of Nuclear Reactor Regulation. Mr. Dean, please proceed. Thank
15 you.

16 MR. DEAN: Thank you Chairman Svinicki. Chairman LaFleur and
17 Commissioner Honorable, it's a pleasure to have you here with us today at the NRC, and
18 Chairman, Commissioner Baran and Burns, it seems like I was just here last week talking
19 to you. So it's a pleasure to be with you this morning.

20 Next slide. So what I hope to talk about over the next 20 minutes is to
21 provide you, as Chairman Svinicki had indicated earlier, a very high level snapshot of the
22 current and projected contributions of the nuclear fleet to the nation's energy mix, and I'll
23 also update you on the status of the NRC and industry's effort to protect against severe

1 external natural events through implementation of what we call the FLEX approach.

2 Next slide. So first, I'd like to highlight two formal agreements between
3 the NRC and FERC and NERC, which facilitated interactions on matters of mutual
4 interest, pertaining to the nation's grid reliability, including both cyber and physical
5 security. These agreements clearly establish roles and responsibilities, and also
6 facilitate the sharing of sensitive, unclassified information, such as the information that
7 Chris just discussed with you.

8 The August 14th, 2003 blackout in the Northeastern United States was
9 the largest power outage in U.S. history. Approximately 500 generating units
10 experienced a shutdown that day, including nine U.S. nuclear power plants and seven
11 Canadian nuclear power plants.

12 The 2004 Memorandum of Agreement between NRC and FERC, which
13 has been renewed twice since, was in response to this event, to help facilitate interactions
14 on matters of mutual interest pertaining to the nation's electrical grid reliability. The NRC
15 has a similar Memorandum of Understanding with NERC to clarify roles and
16 responsibilities specifically related to physical protection and cybersecurity of the nation's
17 bulk power stations. Both of these agreements continue to serve us well.

18 Next slide. With the recent shutdown of Fort Calhoun last fall, there are
19 currently 99 operating power reactors in the United States. These reactors have a
20 combined output of over 300,000 megawatts thermal, resulting in the generation of over
21 100,000 megawatts of electricity.

22 Over the past 20 years, the NRC has issued 87 renewed licenses, which
23 allow plants to operate for an additional 20 years. Since the 1970's, the NRC has

1 approved a number of power uprates, ranging from small power updates on the order of
2 one to two percent, up to what we call extended power uprates on the order of 12 to 15
3 percent.

4 These power uprates have added approximately 7,400 megawatts
5 electric more capacity to the grid. At this point there are currently four power uprates
6 under review that will provide an additional 500 megawatts of electricity to the grid, and
7 we expect to receive applications over the next several years for several additional small
8 power uprates, yielding an additional 170 megawatts of electricity.

9 However, beyond that we anticipate very little interest or activity in terms
10 of additional power uprate requests.

11 Next slide. As this slide depicts, for the past 15 years or so, nuclear
12 power plants have operated overall very reliably. In 2016, there were only 54 reactor
13 scrams, which represents a new low both in terms of the number of absolute -- absolute
14 number of scrams, as well as the ratio of scrams per unit.

15 Of note, this number includes Watts Bar Unit 2, which came online last
16 year, which experienced multiple scrams during its first year of operation, as you would
17 expect for a newly licensed plant. This performance reflects a significant emphasis on
18 the part of industry to operate not only safely but reliably.

19 Next slide. For the next few minutes, I'll be discussing the current and
20 future status of our license renewal program. The regulatory requirements for license
21 renewal focus on ensuring that long-lived passive structures and components are
22 appropriately age managed, so that they can continue to safely perform their intended
23 function during the 20 year period of extended operation.

1 License renewal application reviews cover two main areas, safety and
2 environment. NRC's review is accomplished through a combination of onsite and in-
3 office reviews, audits and inspections. Under a renewed operating license, the licensee
4 is responsible for meeting all existing NRC requirements, as well as the additional
5 requirements imposed related to aging management.

6 The NRC's inspections conducted as part of our reactor oversight
7 process are designed to ensure our licensees maintain plant safety for both active and
8 passive systems, structures and components through the entire operating life of the plant.

9 Next slide, please. Well this slide's a little bit busy. The map provides
10 a good pictorial snapshot of the license renewal landscape. To date, as I noted earlier,
11 the NRC has issued 87 renewed licenses. Of those 87 renewed licenses, 84 of those
12 units are still operating today.

13 Of the 15 plants that are still operating with their original license, eight
14 units are currently under staff review for a renewed license, and letters of intent have
15 been provided to the NRC indicating licensees will submit applications for license renewal
16 for another five units.

17 Next slide. This graph provides information on how renewed licenses
18 have or will affect the contribution of nuclear power plants to the nation's energy portfolio
19 over the next 40 years. As of 2010, U.S. nuclear power plants provide approximately
20 100 gigawatts of electrical energy to the nation's grid.

21 The red line reflects the capacity if all that was existing was the initial 40
22 year licenses. The blue line that shifts to the right shows the capacity with initial license
23 renewals already approved by the NRC, while the yellow line provides the potential

1 capacity if all plant initial license renewals are approved.

2 Then far to the right, the orange line would provide the potential capacity
3 if all plants currently operating would receive a renewed license. This slide does not
4 reflect either plant shutdowns of multiple units over the next seven years, nor the impact
5 of subsequent license renewal, which I'll touch on after my next slide.

6 Next slide, please. The fleet of operating reactors continues to mature.
7 As of December of 2016, there were 45 units that have been operating for more than the
8 original 40 year license period. By 2030, the average age of currently operating U.S.
9 nuclear power reactors will be over 50 years.

10 Assuming they continue to operate, Nine Mile Point Unit 1 and Ginna in
11 upstate New York and Dresden Unit 2 in Illinois will be the first plants to reach 60 years
12 of operating in 2029. If the nuclear industry decides not to pursue subsequent license
13 renewal, which is the second renewed license that would extend the operating life of a
14 plant from 60 to 80 years, the last operating nuclear power plants would go offline by May
15 of 2053, with the exception of Watts Bar Unit 2, which was just recently licensed.

16 Next, I will discuss the status of our efforts associated with subsequently
17 license renewal. The NRC has been preparing for subsequent license renewal or SLR
18 for that past decade. These efforts will culminate this summer when the NRC will finalize
19 two guidance documents, one known as the Generic Aging Lessons Learned report, SLR,
20 which provides guidance to industry on how to develop an application for subsequent
21 license renewal, and the NRC's standard review plan, SLR (sic), which provides guidance
22 to the NRC staff that would be doing the safety and environmental reviews.

23 Thus far, two letters of intent have been sent to the NRC indicating that

1 the licensees for Surry and Peach Bottom will submit applications for subsequent license
2 renewal in the fourth quarter of fiscal year 2018 and the second quarter of 2019. We are
3 also aware of two other licensees that we expect will submit letters of intent in the near
4 future.

5 In 2008, NRC and staff and industry began identifying the issues that
6 would need to be resolved to provide assurance of safe operation of nuclear power plants
7 from 60 to 80 years, and we agreed that the top four technical issues were neutron
8 embrittlement of the reactor pressure vessel, stress corrosion and other types of
9 degradation of reactor pressure vessel internals, concrete and containment degradation,
10 and electrical cable qualification and condition monitoring.

11 It is clear that it is industry's responsibility to develop the technical basis
12 for long-term operation. Considerable progress has been made on all four of these
13 areas, but not all of these issues will be resolved on a generic basis by the time the first
14 application for a subsequent license renewal is received.

15 The first applicants therefore will need to address unresolved technical
16 issues with plant-specific programs as part of their SLR application. We are working with
17 industry to finalize the technical resolution of these issues, and staff is collaborating on a
18 number of research activities with the Department of Energy, domestic industry
19 organizations like EPRI and international partners.

20 Next slide. Over the next two slides, I will just discuss some of the key
21 factors that are influencing utility decision-making with respect to pursuing subsequent
22 license renewal or not. Industry has indicated, as you would expect, that economics is
23 the key driver in their decision on whether to shut down or pursue subsequent license

1 renewal.

2 Economic factors include consideration of the current and future cost of
3 natural gas, wind and solar power subsidies, potential clean air subsidies, being in a
4 regulated versus a deregulated market, which affects the ability to recover costs for things
5 like capital improvements, and requirements imposed by a state such as through their
6 delegated authorities under the Clean Water Act.

7 Next slide. The location of a facility could also impact their decision-
8 making. For example Fort Calhoun, which was located in an area where there aren't
9 many transmission lines, contributed to their decision to shut down last year. Reactor
10 sites with multiple units are probably more likely to pursue subsequent license renewals,
11 since there is an economy of scale that can be applied.

12 And then the cost to repair and replace major equipment is also a
13 consideration. For example, the San Onofre units in southern California shut down
14 probably because of the expense of steam generator repairs that would have been
15 needed there.

16 Next slide. This chart provides an educated guess as to how many SLR
17 applications we can expect. This data is based on a survey conducted by the Nuclear
18 Energy Institute in June of 2016. Of note is that not all of the utilities responded to this
19 industry survey. Also, the NRC licenses each unit individually, and this graph is
20 presented in terms of potential site applications rather than units.

21 Therefore, an application may be submitted for a site that may have one,
22 two or three units depending on the site. Given my earlier comment about multi-unit sites
23 being more likely to pursue subsequent license renewal, if you double the number of

1 applications that are on this chart, you would have approximately 40 units as potential
2 candidates for subsequent license renewal.

3 It's my understanding that NEI does plan to issue a similar survey later
4 this year, so we'll get some updated information on industry interest. This completes my
5 discussion of subsequent license renewal. Next I'll discuss power reactor
6 decommissioning related activities.

7 As I noted earlier, economic and other factors that come into play in
8 making a decision on subsequent license renewal also apply to decisions made on
9 whether or not a plant can continue to operate safely and reliably. As this table indicates,
10 six units have shut down over the past seven years, and another seven units are poised
11 to cease operations by 2025.

12 While we know why economic factors played a key role, some of these
13 decisions to enter the decommissioning process have also had some unique issues that
14 contributed to the utility's ultimate decision. Of note is that none of the plants listed here
15 will complete a 20 year full renewed license term.

16 Four units were poised to decommission in the near future, Fitzpatrick,
17 Clinton and Quad Cities 1 and 2. They benefitted from recent legislative action in New
18 York and Illinois to address what some would call a market inefficiency, and how nuclear
19 plants are valued for their lack of carbon emissions.

20 As you alluded to in your opening comments Chairman LaFleur, it does
21 remain to be seen if other states will follow suit, and if these actions will survive the legal
22 challenges that they currently face.

23 Next slide. The NRC continues this mission to ensure public health and

1 safety during the entire process of decommissioning. The NRC has inspection guidance
2 for power reactors transitioning to the decommissioning phase, as well as following the
3 permanent cessation of operations.

4 Once the plant permanently shuts down, the fuel is moved to the spent
5 fuel pool, and fuel that is recently removed from the reactor must be cooled for a period
6 of about five years after that before it can be moved into dry cask storage. With the
7 exception of the removal of the authorization to operate, the regulatory requirements
8 remain essentially unchanged after permanent shutdown.

9 However, many of the NRC's regulatory requirements are not needed for
10 assuring public health and safety from a defueled reactor. Therefore, licensees must
11 submit a number of a license amendments and/or exemption request to appropriately
12 reduce the regulatory requirements after ceasing operation, commensurate with the
13 reduction in risk of a decommissioned plant.

14 We recently issued a lessons learned report from our experiences related
15 to the recent decommissioning plants, which has helped us operate more efficiently in
16 processing these exemptions and amendments. However, it is important that we
17 establish a durable decommissioning rule that codifies expectations for how a facility
18 plans and conducts its decommissioning activities.

19 Several years ago, the Commission directed the staff to develop such a
20 rule. The staff was also directed to seek public comment on a variety of issues beyond
21 those which licensees must currently seek exemptions and amendments. The first
22 phase of this effort to seek public comment was conducted in 2016, and we expect to
23 issue a draft regulatory basis based on the staff's analysis of this feedback by early March

1 for public comment.

2 There remains considerable work before we actually begin developing a
3 proposed final rule, which is scheduled to be provided to the Commission in late 2019.

4 Next slide. Now we'll discuss how safety of operating nuclear power
5 plants has been enhanced in the post-Fukushima environment, through the combined
6 efforts of industry and NRC to institute the FLEX approach. Safety of U.S. nuclear plants
7 has been significantly improved by providing defense in-depth against extreme natural
8 hazards and other beyond design basis events.

9 Each site has developed strategies that include both on-site and off-site
10 capabilities to maintain reactor safety against these extreme events. The U.S. approach
11 in response to the Fukushima accident is a comprehensive approach called FLEX. It
12 was developed with significant stakeholder interaction including substantial international
13 engagement.

14 We are nearing completion of all of our Tier 1 activities, which were the
15 NRC's highest priority and response actions, with the most safety-significant
16 improvements in place now, with only a few minor exceptions at every plant in the United
17 States.

18 The staff's final proposed mitigation of beyond design basis event rule
19 was submitted to the Commission in December of 2016. This represents the centerpiece
20 of our post-Fukushima efforts. The rule makes generically applicable key post-
21 Fukushima regulatory actions, establishes an integrated response capability, provides an
22 appropriate balance of formal regulatory requirements with the flexibility of performance-
23 based requirements, and benefits from significant stakeholder interaction including public,

1 industry and the Advisory Committee on Reactor Safeguards.

2 We have conducted over 300 public meetings on Fukushima-related
3 topics since March of 2011 when the accident occurred.

4 Next slide. While these FLEX strategies were intended to mitigate
5 beyond design basis external events, they can be used in a variety of ways to demonstrate
6 the increased safety margin they provide. The NRC established a team to evaluate the
7 NRC's processes and guidance to determine where and if changes can be made to
8 provide appropriate credit by reducing or eliminating regulatory requirements to account
9 for FLEX.

10 The team is also monitoring ongoing license amendment requests where
11 licensees are requesting credit for FLEX. By monitoring these applications, the team
12 can evaluate the current NRC processes and guidance, and determine if changes are
13 needed. The evaluation team is updating guidance that has been identified as areas
14 that need or would benefit from additional guidance.

15 Some examples include our significance determination process, which
16 we use to evaluate the significance of inspection findings; incident response decision-
17 making, which is used to determine what approach we would take to an emerging event
18 at a plant; and what we call notices of enforcement discretion, which is a process that we
19 use to give temporary relief for emergent interoperability situations involving safety
20 systems or safety components.

21 In many years, the current NRC guidance is sufficient to provide
22 appropriate risk credit for FLEX. So in these areas, the team is evaluating if knowledge
23 management training is needed and if so, developing the appropriate training and/or

1 communication strategies for both internal and external stakeholders.

2 Next I will discuss the status of new reactor licensing in the United States.
3 Next slide, please. For new reactors, the NRC has a notable portfolio of work. For
4 example, we have or are currently reviewing six designs that applicants are considering
5 for potential new construction.

6 Of these, three are already certified by the NRC: the advanced boiling
7 water reactor, ABWR, the advanced passive 1000 or AP 1000 and the economic
8 simplified boiling water reactor, ESBWR. The NRC is still reviewing the U.S. APWR and
9 the APR 1400, which is a Korean design, and has recently received an application for the
10 NuScale design, which I'll talk about more in just a minute. NuScale is first small modular
11 reactor application to be submitted to the NRC.

12 Next slide. Following the 2005 Energy Policy Act, there was substantial
13 interest on the part of the nuclear industry to embark on a wave of new construction. But
14 economic realities have overcome this enthusiasm. To date, there are four units under
15 construction at two sites in the United States, the Vogtle site in Georgia and the V.C.
16 Summer site in South Carolina.

17 The units under construction are Westinghouse AP1000s. The licenses
18 for the Vogtle and Summer units were issued in 2012, and the current published
19 anticipated operational dates for these plants are in 2019 and 2020.

20 Next slide. While only Vogtle and V.C. Summer are under active
21 construction, the NRC has issued a total of 11 combined construction and operating
22 licenses or COLs for plants in the United States. This map shows the landscape relative
23 to the new reactor licensing today.

1 For the remaining seven units, the licensees do not have firm plans for
2 near-term construction. I will note that the NRC has completed its review of three
3 additional units, North Anna Unit 3 and Turkey Point 6 and 7, and they must undergo
4 hearings later this year before licenses can be issued.

5 Next slide. As I noted earlier, the NRC received its first application for a
6 small modular reactor. The NuScale design consists of up to 12 modules of 50
7 megawatts electric each that would be built at the manufacturing facility and shipped to
8 the plant site.

9 NuScale submitted its application for design certification which was
10 docketed in January of this year, and the staff has commenced a 60 day acceptance
11 review to determine whether or not the application is complete and contains sufficient
12 information to satisfy NRC requirements to support a more detailed review. If accepted,
13 anticipated completion of our design review is 2020.

14 The NRC recently docketed an application from Tennessee Valley
15 Authority for an early site permit for SMRs at the Clinch River nuclear site in December
16 of 2016.

17 In addition, Utah Associated Municipal Power Systems or UAMPS has
18 stated its intent to submit an application for an SMR combined operating license,
19 combined operating construction license referencing the NuScale design at potential sites
20 in Idaho, including property within the Idaho National Laboratory complex. The NRC has
21 begun initial pre-application interactions with UAMPS.

22 Three other vendors for SMR designs, Holtec, Westinghouse, and
23 Babcock and Wilcox have held pre-application interactions with the NRC. At this point,

1 the NRC does not have confirmed application dates for any of these designs.

2 Next slide. There's also renewed interest in the development and
3 deployment of advanced non-light water reactor designs in both the United States and
4 abroad. To prepare for these new designs, the NRC staff has assessed our ability to
5 license advanced designs using the existing regulatory framework and has developed an
6 over-arching vision and strategy document.

7 The NRC's non-light water reactor vision and strategy has three strategic
8 objectives: enhancing technical readiness, optimizing regulatory readiness and
9 optimizing communications. The staff has issued implementation plans for the near-term
10 actions and is developing plans for mid- and long-term actions today.

11 The NRC continues to reach out to the industry regarding the status of
12 their designs and future plans to engage with the NRC. Based on information provided
13 by potential applicants, the staff anticipates receiving several design certification
14 applications for advanced reactor designs in the next two to four years, and has begun
15 pre-application interactions with these potential applicants.

16 This concludes my presentation this morning. I did cover a wide variety
17 of topics at a pretty high level. I do want to thank a number of NRC staff, in particular
18 Ngola Otto of my organization, as well as Donna Williams of the Office of New Reactors,
19 for their considerable support in helping me prepare for this presentation. We look
20 forward to answering your questions that may allow us to get into a little bit more detail
21 as you may wish.

22 NRC CHAIRMAN SVINICKI: Thank you, Bill. And we did ask you to
23 cover an awful lot in a short period of time. You did very, very well on the time. It

1 necessitated you bringing what I will think of as your auctioneer's --

2 MR. DEAN: Yes, ma'am.

3 NRC CHAIRMAN SVINICKI: -- voice here today.

4 (Laughter.)

5 MR. DEAN: Yes, ma'am.

6 NRC CHAIRMAN SVINICKI: As an example of that, it took me a
7 moment to realize that you said that we seek a durable decommissioning rule. For a
8 moment I thought you were looking for adorable decommissioning.

9 (Laughter.)

10 NRC CHAIRMAN SVINICKI: I wasn't sure how it was going to be
11 adorable, but if you -- if anyone could develop an adorable regulation, it would be you.
12 So thank you. And given that this is NRC subject matter, we will begin the questioning
13 with our FERC colleagues.

14 Chairman LaFleur, please begin.

15 FERC ACTING CHAIRMAN LaFLEUR: Well, thank you very much, Mr.
16 Dean. That was fascinating. And it's a privilege to have nuclear experts in front of us
17 to ask questions. And we know the nation's nuclear fleet is an absolute critical part of
18 the electric system. It provides reliable baseload electricity and carbon-free electricity as
19 well.

20 I want to ask a couple questions on the existing fleet and then the new
21 fleet. So if I understand SLR, subsequent license renewal, that's talking like from 60
22 years to 80 years.

23 MR. DEAN: Yes, ma'am.

1 FERC ACTING CHAIRMAN LaFLEUR: And one of the things I think
2 about a lot is kind of the age of the assets in the country including in our area some of the
3 hydro assets. And some of these are not ones we regulate. But if you look at Grand
4 Coulee and some of those dams, those are not things you'd readily put up again in 2016.
5 They're really treasures that were built in the past.

6 Is there a theoretical age of these units? I mean, when -- some things
7 can be -- you can have -- like I -- they say when you own a Volvo, after a couple years it
8 doesn't have any original parts because everything has been like replaced and it can just
9 keep going. There are some things I suppose that can be replaced, but then I guess
10 you're not going to build a new reactor vessel or whatever. Is there a theoretical age or
11 do we not know that, that they can safely keep going?

12 MR. DEAN: So that's a great question, and as I noted in my remarks,
13 our License Renewal Program is focused on aging management of the passive
14 components. As you indicated with your Volvo example, active components in a nuclear
15 power plant are continually being tested, modified, replaced as they wear out. And so,
16 we have less of a concern of active components because they undergo continual
17 refurbishment and replacement.

18 But it's the passive components -- and as I indicated the four major
19 technical issues that we felt were important for us to have some technical resolution of
20 for subsequent license renewal -- I would offer that the one that you talked about in terms
21 of the reactor vessel is really probably the most important because it's continually being
22 bombarded by radiation. And as we know, radiation has effects on material properties.
23 And so, but that is probably the best understood phenomena of the four that I indicated.

1 So there's a lot of information, a lot of analysis that exists that gives us
2 some confidence that we can continue to operate, but there is appropriate surveillance
3 monitoring that has to go on to assess the condition of that reactor vessel material. So
4 that's an important ongoing surveillance activity.

5 FERC ACTING CHAIRMAN LaFLEUR: Thank you. That's very
6 helpful. I mean, just when you look at the fleet now, at the pace we're building, even if
7 newer modular designs come on, it just doesn't seem like it's replicable given all the other
8 competing new technologies that have come on. And so, I think keeping it going safely
9 is -- has a lot of -- have a lot of benefits. And even though we see some states, most
10 notably California, turning away from nuclear, other states are very committed to nuclear
11 as part of their fleet. So I appreciate your work on that.

12 Turning to the new fleet, one of the things I've always thought I believed
13 was that one of the challenges of the fleet in this country is all the different designs and
14 not having a standardized design. And certainly that's true where I come from in New
15 England where we reinvented the wheel every time we saw a wheel. And that's why
16 most of them are in dry cask storage, perhaps.

17 But anyway, do you see more standardization in the new fleet? It looks
18 like the four that are under construction, if I understand, are all AP1000s. And then now
19 with these new smaller modular designs that we're seeing in Europe and elsewhere do
20 we see that changing where now people will build more of the same thing rather than
21 everyone building different?

22 MR. DEAN: So being a regulator and not being in a country that values
23 competitive markets, right, it would be a lot easier to be a regulator if there was just one

1 design. I think there was a concerted effort in part of our new reactor 10 CFR Part 52
2 rulemaking to try and encourage consistency of designs so that we don't have what we
3 have now, which is 99 units with quite a lot of difference as you go from unit to unit.

4 But that being said, you can't stifle innovation and creativity. And so the
5 important thing is do we establish an appropriate regulatory framework that is capable of
6 accepting some differences but while still trying to sustain some degree of constancy.

7 I may ask Frank Akstulewicz, who's from the Office of New Reactors in
8 their Licensing Program, to kind of talk about their philosophical.

9 MR. AKSTULEWICZ: Good morning. Thank you for the question. I
10 think domestically you're going to see a consolidation around certain designs simply
11 because those are the activities that we have in front of us, the AP1000 being the most
12 prominent. You probably will see construction of an ESBWR at some point in time. And
13 the variety in SMRs, at one point in time there were several designs that were being
14 offered, but again the economics of the development of those projects kind of whittled
15 down to one singular at the moment, which happens to be the NuScale modular design.

16 FERC ACTING CHAIRMAN LaFLEUR: Thank you very much. I'm just
17 going to indulge myself in one more question, then I'll shut up.

18 We talked a little bit earlier about the aging workforce. And I know that's
19 an issue. I believe that's an issue in the nuclear engineering community. And I thought,
20 at least the ones I know, so many of the nuclear engineers came out of the Nuclear Navy
21 when they were training a lot. Is the military still a major source, or do we have enough
22 young people coming in to take this fleet forward?

23 MR. DEAN: So that's a -- that's funny you should ask that question

1 because I participated in a meeting with industry last week and I had that very same
2 discussion with the representative from Arizona Public Service out in Arizona that
3 operates Palo Verde. And he was telling me that they are getting a lot of individuals that
4 have Navy experience.

5 I would offer that it certainly has declined as this country has reduced its
6 Nuclear Naval fleet, but it still is a viable source of individuals. I think your concerns are
7 the same as ours. We do have an aging demographic and so how do you replace and
8 train and establish the appropriate knowledge management and transfer? But we the
9 NRC until -- over the past couple years as we've declined had a pretty viable -- what we
10 call the Nuclear Safety Professional Development Program, for example, where we bring
11 in college graduates and train them in how to be a regulator and give them all sorts of
12 opportunities. And they provided a great pipeline for us. So it's very important once we
13 kind of get over this hump that we're in right now that we make sure we reestablish that
14 for ourselves.

15 And a lot of -- and going around to nuclear plants and talking to the senior
16 managers, many of them have established local relationships with like technical colleges
17 and so on to build the infrastructure and continue to provide the workforce that they need.
18 So there's been a lot of great efforts on the part of industry to do that.

19 FERC ACTING CHAIRMAN LaFLEUR: Thank you very much.

20 Colette?

21 FERC COMMISSIONER HONORABLE: Thank you, Cheryl.

22 Bill, thank you for the great presentation. You have it down to a science.

23 I was watching the lights as you were speaking and you finished perfectly on time.

1 MR. DEAN: Practice, practice, practice.

2 FERC COMMISSIONER HONORABLE: It speaks to your experience.
3 It will be hard to replicate that, speaking of pythons of workers.

4 Though as you gave your presentation, I, too -- and by the way, my
5 questions track Cheryl's, so that's quite interesting. I thought not only about our work in
6 hydro, but also looking ahead and what's new and different, our work with regard to LNG
7 exports compared to your work with small modular reactors. So I want to first start with
8 the existing fleet and the longer life of your facilities and how you're bridging that gap.
9 And I want to invite you to expand more.

10 You and Acting Chair LaFleur spoke a bit about one element of your
11 staff's proactive and in-depth technical work, but I wanted to talk more about the other
12 components because it seems that you are forging ahead in a new territory, a place where
13 we haven't been before and -- or you haven't been before. And I want to hear more
14 about that. I think it could be instructive to us as well with our work on the hydro side.

15 MR. DEAN: Okay. So, yes, I guess we're kind of like the nuclear
16 version of Starfleet, right? We go where people have not gone before.

17 (Laughter.)

18 FERC COMMISSIONER HONORABLE: I was thinking that, but I knew
19 I wouldn't get the saying right. Thank you, Bill.

20 MR. DEAN: So the other three technical areas that we had identified,
21 there is a considerable amount of ongoing research that is looking to evaluate these. So
22 for example, let me take the issue of stress corrosion and other factors affecting vessel
23 internals, which is a critical area.

1 We have partnered very collaboratively with EPRI to develop a Materials
2 Reliability Program. And you may or may not be aware, last year there were some issues
3 identified at Indian Point and Salem with this -- is you call baffle-former bolts, right?

4 Those -- I would consider that to be a success of our collaborative efforts
5 to evaluate as plant's age what are some of the things that we need to look at? So we
6 knew from the type of materials that existed in those baffle-former bolts and the type of
7 irradiation that they were being subjected to over the life of the plant that there was a
8 susceptibility, that they could see some cracking. And so the inspections and the UT
9 evaluations, the ultrasonic testing that was done on those bolts was a direct result of our
10 working with industry to establish new evaluation protocols through an Aging
11 Management Program.

12 So while we did see I think perhaps more cracking indications that we
13 were anticipating, it wasn't like we were anticipating not seeing that phenomena. We
14 were, which is why we're doing that evaluation. So there's a lot of collaborative work
15 going on.

16 The other one that I'll talk about, which is a little bit more challenging, is
17 cable monitoring. I don't think that we have at this point in time a really good approach
18 to be able to predict when a cable might reach its end of life, right? We can monitor
19 them, but at this point in time we haven't quite developed appropriate protocols or testing
20 activities that would give us some predictability about how much longer will that cable
21 last?

22 So some licensees are going to have to make a decision. Do I ever
23 outage go in and test all my cables or do I just bite the bullet and let me just replace all

1 these potentially susceptible cables as part of their decision for subsequent license
2 renewal.

3 FERC COMMISSIONER HONORABLE: Which leads me to a point I
4 wanted to make. I imagine -- and based upon your presentation I glean a tremendous
5 amount of experience and expertise, and I imagine you're leveraging that not only on the
6 NRC staff side, but also very appreciative of the expertise in the industry. And then the
7 overlay of people like EPRI -- I happened to have served on their Advisory Council
8 previously and I'm aware of their unique expertise and their ability to add color to the
9 technical work that we carry out.

10 Are there other entities that we don't typically think of that are aiding your
11 technical work?

12 MR. DEAN: So, obviously EPRI. Department of Energy is heavily
13 involved. I mentioned international cooperation. There's a lot of work that goes on
14 through our international cooperative efforts working with multiple countries: Japan,
15 United Kingdom, France and others, to conduct international research that is beneficial
16 to all of us. So there's obviously a cost savings there that we can leverage. We
17 participate, but others participate and so we can leverage those insights.

18 And so, it's a whole suite of -- it takes a village, I think, kind of concept,
19 but there's a lot of active research going on. I mean, NIST just up the road is doing work
20 related to concrete degradation, for example.

21 FERC COMMISSIONER HONORABLE: Thank you for expanding on
22 that.

23 The second area I wanted to touch on, looking to what lies ahead, going

1 places we haven't gone before, the work that is evolving with regard to small modular
2 reactors, I see from my perspective; and I want to ask you to illuminate my initial thoughts
3 about it, there are tremendous advantages for people that see nuclear as a very costly
4 option, a very long time in construction development, etcetera. Would you speak
5 to -- and I know you're not speaking to any specific proposal or docket, but would you
6 speak broadly to advantages and maybe disadvantages to pursuing this course?

7 MR. DEAN: So let me -- I'll take a first shot and then I might ask Frank
8 to kind of step up to the plate again.

9 So obviously some of the advantages are the scalability, the simplicity of
10 the designs, right, these -- thinking about the NuScale design, which is most salient most
11 right now since we have an application in-house. So it provides a lot of flexibility. It has
12 potential implications for example in security requirements and emergency preparedness
13 requirements. And that's actually a topic that we expect to put before the Commission
14 in the near future regarding EP for small modular reactors, emergency preparedness
15 planning. So I think those are some of the advantages.

16 In terms of disadvantages, it's kind of this -- and this is probably things
17 that you think about more than we do, is the current nuclear fleet provides this pretty
18 substantial baseload, right, but how to you integrate if you've got 50 here and 50 there?
19 How does that ultimately replace what has been the benefits of having these large
20 baseload plants on things that my colleagues here at the table talked about earlier this
21 morning? And so I think that's kind of an open question in my mind.

22 I don't know, Frank, if you have anything that you want to --

23 MR. AKSTULEWICZ: Thank you again for the question. I realize I

1 didn't introduce myself when I walked up to the microphone, so I'm Frank Akstulewicz.
2 I'm the Division Director for the Division of New Reactor Licensing in the Office of New
3 Reactors. So that's my credentials.

4 I think the question on advantages and disadvantages is really part of the
5 industry rhetoric in terms of how they see things happening. I think our perspective is
6 we're concerned about the overall safety of the designs and in terms of reliability and the
7 impact on the public. But to that end I think small modular reactors provide flexibility for
8 introductions into markets that have previously not been explored in terms of using the
9 heat from these reactors to do other process issues, chemical issues, things like that.

10 But that's an area that's yet to be really evaluated. And we can get into
11 the advanced reactor designs even beyond the water small modular reactors and to
12 whether they be gas-cooled or sodium. There are other applications that may come to
13 fore in terms of their use in parallel with the generation of electricity. So I think I'll stop
14 there because I think that kind of puts it in context.

15 There are some regulatory challenges that we have to face with the
16 construction of reactors away from the actual site, but we have guidance in place that
17 we're -- or developing to try to speak to those matters to make sure that reactors that
18 need to be inspected and the areas they need to be inspected in are performed before
19 they're installed and actually operated.

20 FERC COMMISSIONER HONORABLE: Thank you. And I really think
21 both of your comments speak to our need as regulators to be open to seeing what comes,
22 what the technology bears out, the case that is made for each based upon the impacts of
23 safety, reliability, environmental impacts to communities. I appreciate it very much.

1 And I also harken back to something I believe Mark mentioned about
2 their sensitivities in models that they're running. One is if all of the nuclear goes offline.
3 I sure hope that day never comes.

4 (Laughter.)

5 FERC COMMISSIONER HONORABLE: But I'm very hopeful about the
6 prospect of SMRs in particular and excited about what may come. Thank you.

7 NRC CHAIRMAN SVINICKI: Thank you, both. Bill, you get
8 off easy today. I don't have any questions for you.

9 Do either of my NRC colleagues have questions for Bill?

10 Commissioner Baran?

11 NRC COMMISSIONER BARAN: I don't think so, but just because Frank
12 just sat down, I was thinking in response to Chairman LaFleur's question about
13 standardization, do you want to do like a two-minute discussion of Part 50 versus Part 52
14 and how Part 52 can encourage standardization, or the thinking behind that? It just might
15 be helpful for them.

16 MR. AKSTULEWICZ: Certainly. Thank you, Commissioner.

17 Part 50 was a process that was kind of approved as you go. So you
18 would approve a general framework for a plant. You would start the construction. You
19 would get permission to start general overview. You would be looking at the design as
20 it was in construction. Whatever new regulatory requirements were evolving would be
21 factored into that build as it was evolving, and that's why, as Bill mentioned earlier, you
22 have 90-some reactors with different elements all built into it because of the regulatory
23 time frames they were being constructed in. Ultimately it would lead to an operating

1 license. The time frames roughly were 8 to 10 years to construct from the time they
2 would actually operate, application to operation.

3 So the industry was arguing, and rightly so, that there was a great risk to
4 this investment once they started it, changing regulatory conditions. And so it put their
5 projects at great risk. And so, we -- the industry asked the agency to come up with a
6 process that would kind of make a lot of those decisions early on and reduce some of the
7 risk to the project overall in terms of the ability to construct once the license was
8 authorized.

9 And so Part 52 was established where you would either take a certified
10 design, a design that would be submitted without necessarily a utility applicant wanting to
11 construct it, and you would approve that design or review that design ultimately leading
12 to an approval if appropriate. And then a utility could come in and say I would like to
13 construct that design on this location. And then the NRC review would be looking at the
14 marrying of the site to the actual design interfaces that would have to then -- or that were
15 established as part of the review.

16 So the risk profile was greatly reduced by having to re-review the design.
17 And also Part 52, because it is a regulation, minimizes the impact of changing regulations
18 over the course of the construction. There is -- we have a backfit process we would have
19 to go through if we wanted to impose new requirements on a design that had already
20 been certified. So again, another risk limiter in terms of the overall process.

21 Does that help, Commissioner?

22 NRC COMMISSIONER BARAN: I thought that was good. So the
23 entire existing fleet was licensed under the older Part 50 and -- I think that's right, right?

1 MR. AKSTULEWICZ: Correct.

2 NRC COMMISSIONER BARAN: Yes. And

3 then --

4 MR. AKSTULEWICZ: Except for the Vogtle and Summer units.

5 NRC COMMISSIONER BARAN: And so the new construction has been
6 so far to date under this certified design approach that we have in Part 52 of our
7 regulations, though Part 50 is still an option if someone wanted to come along and take
8 that approach, and some may.

9 MR. AKSTULEWICZ: That's correct. And by way of addition, Watts
10 Bar was completed under the Part 50 process. And the recent disclosures of interest in
11 resurrecting the construction of the Bellefonte units will also be completed under the Part
12 50 process.

13 FERC ACTING CHAIRMAN LaFLEUR: Thank you very much for
14 clarifying that.

15 NRC CHAIRMAN SVINICKI: Thank you.

16 NRC COMMISSIONER BURNS: I was just going to -- just -- Frank,
17 don't go away, because one of the things on this, it's very interesting, because if you go
18 back historically, with -- what I want to leave is Part 52 is an option, Part 50 is an option.
19 We're actually looking -- some of these advanced reactors are talking about probably
20 more Part 50.

21 But one of the things, Frank, could you give maybe just a ballpark
22 estimate of the completeness, if you will, of the design when they were coming in Part 50
23 versus Part 52?

1 MR. AKSTULEWICZ: Okay. So it's a bit of -- I'll try to answer your
2 question as best I can.

3 NRC COMMISSIONER BURNS: Yes.

4 MR. AKSTULEWICZ: So for -- if we were to put percentages around an
5 application, for a construction permit, which is the initial approval to start the construction,
6 you're probably looking at an application that was maybe 40 percent complete. It had
7 the general framework of -- it was going to be a PWR or a BWR, it was going to be at
8 such a power level, it was going to have these types of site requirements in terms of flow
9 for the rivers or you were going to use a lake for cooling, those types of large pieces.
10 Then it would -- the details of what type of instrumentation you would use or what type of
11 turbines you would buy. Those would be built into the application as those procurement
12 specifications were being prepared.

13 So two or three years into that process they would pick their turbine
14 vendor, right? And then you would have -- so they would go back and look at the details.
15 Or there would be some new requirement like TMI where you would have procedural
16 requirements you would have to construct. And so, they would have to go back and build
17 that. And then that would be built into the review going forward. So you get to obviously
18 the 100 percent by the time you get to the OL.

19 For a design certification the initial starting point is about I would say
20 maybe 70 percent of the plant. There is some design finalization that is ongoing, or was
21 ongoing with the AP1000 during its construction in China and in the U.S. And there
22 is -- there were some lessons learned as part of that construction that resulted in changes
23 to the certification going forward.

1 But again, the amount of change that happened over the evolution of the
2 construction so far is minimal compared to the evolution of the change in -- requirements
3 over the construction for an 8 or 10-year period.

4 FERC ACTING CHAIRMAN LaFLEUR: That's really -- so the one I'm
5 familiar with, sort of, like Seabrook and Millstone, those would have been a Part 50
6 process.

7 MR. AKSTULEWICZ: Correct.

8 FERC ACTING CHAIRMAN LaFLEUR: The old process. I wasn't
9 around when they built the Yankees, but I --

10 (Laughter.)

11 FERC ACTING CHAIRMAN LaFLEUR: -- was there -- Chernobyl and
12 Three Mile Island was going on while they were in some cases being built. And the rules
13 were changing. That's what you're talking about.

14 MR. AKSTULEWICZ: That's correct.

15 FERC ACTING CHAIRMAN LaFLEUR: Yes. Thank you.

16 NRC COMMISSIONER BURNS: I'll leave it at that. There's a lot we
17 could talk about 50 and 52.

18 NRC CHAIRMAN SVINICKI: We could. And we could keep Frank at
19 the microphone all afternoon, but we will not do that.

20 (Laughter.)

21 NRC CHAIRMAN SVINICKI: So I think that I will thank Frank for that,
22 but Bill Dean owes him the most, I think in terms of Frank coming to the microphone.

23 Thank you.

1 And with that we're going to take now a brief five-minute recess while we
2 reset for the second panel. So if we could come back at maybe -- oh, gosh, should I give
3 a little more than that? Maybe 20 to, because I know -- let's try to do the best we can to
4 reconvene and get through our next panel. Thank you.

5 (Whereupon, the above-entitled matter went off the record at 11:33 a.m.
6 and resumed at 11:46 a.m.)

7 NRC CHAIRMAN SVINICKI: If I could ask people to take their seats?
8 I often say that one of the benefits of commissions getting together is that it brings people
9 coincident and a lot of good sidebar conversations go on. So I do need to reconvene us
10 for our very, very interesting second panel here, which will focus on cyber security
11 regulation.

12 We will hear first from FERC's Daniel Phillips, an energy industry analyst,
13 Office of Electric Reliability. He will be followed by James Anderson from NRC. Is the
14 Director of the Cyber Security Directorate in our Office of Nuclear Security and Incident
15 Response.

16 So, Mr. Phillips, would you please proceed?

17 MR. PHILLIPS: Sure. Good morning, Chairman Svinicki, Chairman
18 LaFleur and Commissioners. My name is Daniel Phillips. I work as an analyst in the
19 Division of Reliability Standards at FERC.

20 I recently served as a project lead and technical advisor on the two final
21 rules that were issued by the Commission in 2016: Order 822 and Order 829, where the
22 Commission directed modifications to improve the NERC Critical Infrastructure Protection
23 Reliability Standards.

1 These orders represent the culmination of several years of effort by the
2 ERO enterprise and FERC to strengthen the protections of the Critical Infrastructure
3 Protection Standards and adapt to changes that have been occurring in the electric
4 sector's cyber risk landscape.

5 In this presentation I intend to provide a walk-through of those orders and
6 will be happy to answer any questions that you may have about pending updates to the
7 Critical Infrastructure Protection Reliability Standards.

8 Next slide, please. In January 2016 FERC issued Order No. 822
9 approving revisions to the CIP Standards that were developed by the ERO enterprise in
10 response to four FERC directives in Order 791. The revisions eliminated the identify,
11 assess and correct language in 17 standard requirements, provided enhanced security
12 controls for low-impact assets, provided the controls to address the risks posed by
13 transient electronic devices such as thumb drives and laptop computers used at high and
14 medium-impact BES cyber systems, finding that these changes were just reasonable, not
15 unduly discriminatory and improve the baseline security posture of the applicable entities.

16 FERC also directed NERC to develop certainly modifications to improve
17 the CIP Reliability Standards including the development of mandatory controls for
18 transient devices used at low-impact BES cyber systems, the development of mandatory
19 controls to protect communication components and data between bulk electric system
20 control centers and a clarification of the term "low-impact external routable connectivity"
21 in the NERC glossary of terms.

22 Regarding the protection of transient devices used at low-impact BES
23 cyber systems, the Commission concluded that the adoption of controls for transient

1 devices used at low-impact BES cyber systems, including low-impact control centers,
2 would provide an important enhancement to the security posture of the bulk electric
3 system by reinforcing the defense-in-depth nature of the CIP standards at all impact
4 levels.

5 The Commission was ultimately not convinced that the security controls
6 in CIP-3 would adequately address the potential propagation of malicious code and other
7 unauthorized access stemming from transient devices used at low-impact BES cyber
8 systems, so it directed NERC to develop modifications to the standard to address those
9 items. The order granted NERC flexibility in developing the appropriate controls to
10 respond to this directive.

11 Regarding the development of mandatory controls to protect
12 communication networks and components and data between bulk electric system control
13 centers, the Commission concluded that modifications were needed in light of the critical
14 role that communication control centers play in maintaining bulk electric system reliability.

15 Specifically, the Commission found that additional measures to protect
16 both the integrity and availability of sensitive bulk electric system data were warranted.
17 The Commission has granted NERC flexibility in responding to this directive and found
18 reasonable several principles that were outlined by NERC in their comments: that the
19 protections should not have an adverse effect on reliability, recognizing that introduction
20 of latency could have negative results in certain cases, that they should account for the
21 risk levels of assets and information being protected, and require protections that are
22 commensurate with the risk presented, and that they should be results-based in order to
23 provide flexibility to account for the range of technologies and entities involved in bulk

1 electric system communications.

2 Lastly, regarding the Commission's directive to revise the low-impact
3 external routable connectivity definition, the Commission concluded that a modification
4 was necessary to provide clarity to the definition and eliminate ambiguity surrounding the
5 term "direct" as it was used in the definition.

6 Next slide, please. I'm going to now turn to FERC Order 822 -- or 829,
7 rather, which was issued in July of 2016.

8 So subsequent to that we held a technical conference and the
9 Commission followed up on its July 2015 Notice of Proposed Rulemaking and 829 and
10 directed NERC to develop a new or modified reliability standard to address supply chain
11 risk management for industrial control system hardware, software, and computing and
12 networking with standard services associated with bulk electric system operations.

13 The standard that was directed is intended to mitigate the risk of a cyber
14 security incident affecting the reliable operation of the bulk power system. Specifically,
15 the Commission directed NERC to develop a forward-looking objective-based reliability
16 standard, and the Commission found that the new or revised reliability standard should
17 address the following security objectives: Software integrity on authenticity, vendor
18 remote access, information system planning and vendor risk management and
19 procurement controls.

20 With respect to software integrity on authenticity, the Commission found
21 that the new or modified reliability standard must address the verification of the identity of
22 the software publisher for all software and patches that are intended for use on BES cyber
23 systems, the integrity of the software and patches before they're installed in the BES

1 cyber system environment.

2 The objective was to reduce the likelihood that an attacker could exploit
3 legitimate vendor patch management processes to deliver compromised software
4 updates and patches to the BES cyber system. Similar attacks were noted by the NOPR
5 which occurred in 2014.

6 With respect to vendor remote access, the Commission found that the
7 new or modified standard must address the responsible entity's logging and controlling of
8 all third-party-initiated remote access sessions. This objective covers both user-initiated
9 and machine-to-machine vendor remote access and this objective was intended to
10 address the threat that vendor credentials could be stolen or used to access a BES cyber
11 system without the responsible entity's knowledge, as well as the threat of a compromise
12 to a trusted vendor that could traverse an un-monitored connection to a BES cyber system
13 environment. In addition, the controls adopted under this objective were intended to give
14 responsible entities the ability to rapidly disable remote access sessions in the event of
15 system breach.

16 With respect to information system planning, the Commission found that
17 a new or modified reliability standard must address how a responsible entity will include
18 security considerations as part of its information system planning processes, and system
19 development life cycle processes. This objective was intended to ensure that the
20 responsible entities anticipate and evaluate security issues that may arise in their network
21 architecture or during the technology and vendor transitions.

22 Finally, with respect to vendor risk management and procurement
23 controls, the Commission found that the new or modified reliability standard must address

1 the provision and verification of software, security concepts and future contracts for
2 industrial control system hardware, software and computing assets associated with bulk
3 electric system operations.

4 Specifically, NERC was directed to address controls for the following
5 topics: Vendor security event notification, vendor personnel termination notification,
6 product services vulnerability disclosures such as accounts that are able to bypass
7 authentication or the presence of hard coded passwords, coordinated incident response
8 activities and other related aspects of procurement.

9 This fourth objective addresses the risks that a responsible entity could
10 enter into contracts with vendors who pose significant risk to their information systems,
11 as well as a risk to the products procured by the responsible entity fail to meet certain
12 minimum security criteria. In addition, this objective addresses the risk that a
13 compromised vendor would not be able to provide adequate notice of a related incident
14 to the responsible entities that -- whom they're connected.

15 So, next slide, please. In the time since the final rules were issued last
16 year NERC has developed an action plan to address Order 822 and 829 directive areas.
17 NERC has established two standard drafting teams which are working tirelessly to
18 address the cyber security issues that were described in the 2016 orders, and I'm happy
19 to report that these teams are currently on track to make their filing deadlines in March
20 and September of 2017, respectively.

21 In another positive development the electric industry has also decided to
22 embark upon several other self-identified issues with new revisions to the CIP Standards
23 that were documented by the industry during the CIP Version 5 transition study.

1 Some of the topics that are now under consideration at the standard
2 drafting team level are virtualization, CIP exceptional circumstances and revisions to
3 certain NERC glossary terms in order to streamline the application of CIP Standards and
4 promote technological innovation.

5 We look forward to working with the industry-led standard drafting teams
6 in the coming months to ensure that an appropriate balance of security, flexibility and
7 compliance costs are maintained when developing revisions to the CIP Reliability
8 Standards. This concludes my presentation. Thank you.

9 NRC CHAIRMAN SVINICKI: Thank you, Mr. Phillips.

10 Jim, would you please proceed for the NRC presentation?

11 MR. ANDERSON: Thank you and good morning. I still got -- I can still
12 say that. And thank you for the opportunity to discuss the status of cyber security plan
13 implementation for nuclear power plant licensees.

14 My name is James Anderson, and although we're undergoing a
15 reorganization at the moment, I will be the Director of the Division of Physical and Cyber
16 Security Policy within the Nuclear Regulatory Commission shortly.

17 During this presentation I plan to discuss the NRC cyber requirements,
18 some of the lessons learned, the next steps for the NRC staff related to operating nuclear
19 reactors. I also plan to discuss some of the other NRC cyber activities, including NRC
20 interagency and international work.

21 Next slide, please. After the terrorist attacks in 2001, the NRC started
22 focusing on cyber requirements related to commercial nuclear reactors. First, in the
23 2002 to 2003 time frame NRC included cyber requirements in physical and design-basis

1 threat orders to all the operating plants. Later in 2009 the NRC issued cyber
2 requirements for power reactors through the 10 CFR 73.54 rulemaking.

3 The NRC then worked with the industry on a schedule to implement the
4 requirements. This entailed using a two-phased approach, which I will discuss later in
5 more detail. In addition, in 2015 the NRC issued requirements for reporting cyber
6 security events with specific reporting time requirements depending on the significance
7 of the event.

8 Next slide, please. After the NRC issued its cyber requirements in 2009,
9 there were discussions with FERC on potential gaps and regulatory overlaps. As result
10 of several interactions and meetings with the nuclear industry it was agreed that there
11 would be one regulator overseeing cyber at the nuclear plants and a bright line was
12 established between FERC and NRC oversight.

13 Memorandums of Understanding or Agreement were signed between
14 NRC and FERC and between NRC and NERC, and the NRC Commission issued its
15 interpretation that the scope of the NRC cyber security requirements include protecting
16 plant digital assets in the balance of plant that have a nexus to radiological health and
17 safety. At the staff level NRC and FERC continued to work together to update each other
18 on agency activities in order to provide consistent messages to nuclear plant licensees.

19 Next slide, please. As I mentioned earlier, power reactor licensees are
20 following a two-phased approach for implementation of the cyber security requirements.
21 During the first phase, or Milestones 1 through 7, as they are referred to, licensees
22 implemented cyber security controls to protect the most significant digital components
23 from the most significant threat vectors. This phase was completed by all the licensees

1 prior to December 31st, 2012, and the NRC completed the first phase inspections at all
2 the facilities by 2015.

3 Next slide, please. Based on these inspections a number of lessons
4 were learned. Specifically, some licensees did not identify critical digital assets, or CDAs
5 as we refer to them, because they did not completely understand the internal functionality
6 or components of the devices. If CDAs were identified but functionality was not identified
7 in some cases, some licensees did not apply adequate security controls as mitigation for
8 potential attack pathways or vulnerabilities.

9 In addition, based on discussion between industry and NRC staff it was
10 determined that specific guidance was needed for devices that interconnect with CDAs
11 to perform a support function. And I'm referring there to maintenance or testing type
12 equipment: laptops and things like that.

13 Second, it was determined that additional guidance was needed in
14 selecting specific security controls since CDAs are not all created equal. Some digital
15 transmitter program codes can't be altered, they do not have an operating system, and
16 configuration changes can only occur when the device is removed from service.
17 Therefore, a few security controls would be needed for this type of device. Other CDAs
18 that run Windows 10 for example have a much larger attack surface and a significant
19 number of security controls would be needed to ensure this complex device is protected
20 from cyber attacks.

21 Third, the industry and NRC staff determined that specific guidance was
22 needed to ensure data integrity when transferring information using portable media. For
23 example, guidance was needed on how to transfer information from a vendor or the

1 Internet to media that would be inserted into a CDA, such as software updates. And
2 Daniel mentioned that just a minute ago.

3 Lastly, the industry was interested in guidance on how they should
4 perform effectiveness reviews. For example, how does the licensee ensure that the
5 implementation of the security controls adequately protect the important safety, security
6 and emergency preparedness functions of the CDAs against cyber attacks? The NRC
7 and industry are in the final stages of incorporating these lessons learned into guidance
8 documents.

9 Next slide, please. The second phase, or Milestone 8, relates to the full
10 implementation of the licensee's cyber security plans. Milestone 8 adds additional
11 defense-in-depth including the full implementation of technical controls, monitoring and
12 detection capabilities, incident response, training and exercises.

13 In 2016 the NRC staff worked with industry to conduct a number of
14 tabletop exercises in preparation for full cyber security implementation. These tabletop
15 exercises included NRC regional inspectors to improve the consistency in oversight
16 activities. The exercise covered monitoring assessment controls; detection, response
17 and elimination requirements; supply chain requirements; and drills and testing
18 requirements.

19 Lessons learned from the exercises have been captured and are currently being
20 incorporated into guidance documents or other means as appropriate. The staff
21 anticipates initiating full implementation cyber security inspections in July of 2017, and all
22 plants will be inspected over the next few years.

23 Next slide, please. Looking beyond 2017 and full cyber security

1 implementation, the NRC staff plans to work with all stakeholders as lessons are learned
2 from the industry fully implementing the requirements and from the NRC inspections.
3 These lessons learned will be used to evaluate the cyber security requirements and
4 guidance documents, the NRC inspection team composition, the NRC inspection
5 procedures, and how often the NRC should inspect the site.

6 Next slide, please. Looking beyond operating reactors, the NRC staff is
7 updating the cyber security road map which also describes NRC staff activities related to
8 other types of NRC licensees. The staff is currently developing cyber security
9 requirements for fuel cycle facilities through the rulemaking process. It has completed a
10 best practices document for small, non-power, test and research reactors and is currently
11 evaluating next steps for independent spent fuel storage installations and byproduct
12 licensees. The staff is also evaluating needed cyber requirements, as Bill mentioned
13 earlier, for operating reactor licensees that have recently decided to shut down and enter
14 the decommissioning process.

15 Next slide, please. The NRC is also actively engaged with other federal
16 entities. The NRC chairman led the cyber security forum for independent and executive
17 branch regulators from 2014 to 2016. This forum, in which FERC also participates,
18 enhances communication among regulatory agencies, regulated entities and other
19 organizations by sharing best practices and gathering experience in this rapidly changing
20 field.

21 Included areas include cyber security risk assessment, information
22 sharing and both voluntary and regulatory approaches to cyber security. The NRC also
23 works with other agencies to keep abreast of cyber security threat information and uses

1 the information for notifications or actions that may be required for our licensees.

2 Next slide, please. Lastly, the NRC participates in the International
3 Atomic Energy Agency expert consultancy meetings on computer security regulation.
4 The objective of these meetings is to enhance knowledge and information sharing
5 regarding good practices and lessons learned and developing and implementing
6 computer security regulation.

7 NRC staff participate in these consultancy meetings to assist the
8 International Atomic Energy Agency in generating reports to assist member states in the
9 application of computer security concepts and controls and in order to provide protection
10 from cyber attacks for instrumentation and control systems at nuclear power plants.

11 That concludes my presentation and I guess both of us are ready to
12 answer your questions.

13 NRC CHAIRMAN SVINICKI: Thanks, Jim. We'll begin the questions
14 for this joint panel with our colleagues from FERC.

15 Chairman LaFleur?

16 FERC ACTING CHAIRMAN LaFLEUR: Well, thank you very much,
17 both of you. That was terrific.

18 I was fortunate to participate in that cyber security forum with Chairman
19 Macfarlane, and at that time at least the bulk electric system and the nuclear fleet were
20 the only two elements of critical infrastructure that had these mandatory standards. And
21 I think if I could choose two elements to protect, those would be a very, very good place
22 to start.

23 And it strikes me how parallel our work is. I've frequently said that our

1 cyber regulations are like the iPhone, right? When you think you've got the best one,
2 then you have to buy your kids a new one. And your I would say Order 822 is like CIP-6.
3 So like iPhone 6, we're just right on track.

4 And it sounds like your process has similarly been learning lessons and then refining the
5 regulations.

6 I just wanted to, Daniel, to clarify one thing. And if you could explain a
7 little bit about -- the big thing in Order 822 was it encompassed all the assets, not just the
8 high-impact assets with tiered protections for high, medium and low-impact assets. If
9 you could explain a little bit about how we categorize assets?

10 And, James, Mr. Anderson, if you could explain a little bit about the most
11 risk-significant assets. Like how do you prioritize in your -- what you regulate, what's the
12 most important? It seems there's some parallelism.

13 MR. PHILLIPS: Sure. So as some of you may know, the CIP
14 Standards in CIP-2 adopt a tiered protection model with low, medium and high assets
15 based on BES reliability operating services functions as well as impact criteria and the
16 bright line criteria that was established by the industry.

17 So at the lower level you tend to have things more like generation not
18 meeting 1,500 megawatts, substations under 500 kV. At the medium impact level you
19 have larger generation plants, larger substations and things like that. And then at the
20 high level you have kind of high-impact control centers. And so, as you move up the
21 scale, the protections -- there are more controls, more mandatory controls that are
22 applied.

23 The CIP Standards also adopt what is referred to as like a 15-minute

1 impact rule. So once you identify your facility, you then look at the systems within the
2 facility to determine will this -- if I lose this component, if I lose the system, will it have a
3 15-minute impact on the bulk electric system? And if it does, then that system is in and
4 it becomes subject to mandatory protections. So there's a lot of engineering analysis
5 that goes into it.

6 I'm not sure if you want to jump in.

7 MR. ANDERSON: Sure. It's interesting when I look back towards
8 2009, 2010 when we implemented the rule and then we began the discussions with
9 FERC, that expanded the number of digital assets considerably at nuclear power plants.
10 It basically just almost doubled the digital assets when we started including the balance
11 of plant.

12 So at that point in time I think it was recognized that the NRC and the
13 industry needed to come together and try to figure out some graded approach for how
14 you address all these different assets. And we continue to work on that. And there's a
15 Nuclear Energy Institute document that we've endorsed which kind of describes how you
16 evaluate each critical digital asset and try to determine is it -- what's the priority, what's
17 the significance?

18 And if I could try to give you some examples, the emergency cooling
19 system, if that has a digital component in it, that would be considered an asset that
20 would -- could impact the safety function. So that would be a very high priority-type thing.

21 When you start getting into a balance of plant or an emergency
22 preparedness asset, it has a less impact on safety of the public, if you want to take it down
23 to that level. So we started tapering down the controls that would be needed or the areas

1 that licensees would have to evaluate as part of addressing those assets.

2 And that brought us back into discussions with FERC back in 2015
3 because we wanted to make sure -- as we were trying to do this graded approach and
4 looking at the balance of plant assets, we wanted to be fairly consistent with what they
5 were doing from -- on their side. So we said here's what we're doing, here's what -- and
6 they said what they're doing. And we kind of merged the two together and we came up
7 with these are the set of controls that we thought were appropriate for balance of plant.

8 So it's been a continual learning experience from that, and I think we've
9 gotten to the place where it's a graded approach for how we deal with the significance of
10 the asset.

11 FERC ACTING CHAIRMAN LaFLEUR: Thank you very much.

12 FERC COMMISSIONER HONORABLE: Thank you both for your
13 presentations. I wanted to ask James -- thank you for -- oh, let me say at the outset that
14 I'm very pleased that a cyber discussion is part of our joint meeting here today. I think
15 any joint meeting we might undertake would be incomplete without this discussion, so I
16 want to thank my colleagues for being open and thank the gentlemen for their
17 presentations.

18 James, you spoke about the NRC's efforts with regard to preparedness
19 tabletop exercises. I think on our bulk power system side and the electric system broadly
20 about our GridEx exercises. I wanted to ask you to talk more about your preparedness
21 efforts. You spoke about the involvement of your regional NRC personnel. Who else is
22 involved? Is it similar or different from, if you're aware, our GridEx exercises? Thank
23 you.

1 MR. ANDERSON: It's different. And I think either -- I didn't quite
2 communicate fully the intent. I talked about tabletop exercises. And in these tabletop
3 exercises we were basically looking at our guidance documents for how you implement
4 the controls. So a lot of our guidance documents might be at a higher level and when
5 the actual engineer or IT specialist is trying to follow the guidance, they're saying, well,
6 what about my situation?

7 So these tabletop exercises were to look at the guidance and try to
8 answer or maybe put more guidance or better guidance on what exactly did we mean,
9 what's adequate from a regulatory perspective, and those type of things? So that's when
10 I mentioned the tabletop exercises.

11 We do do emergency preparedness exercises. That's in a little bit
12 different area. And we exercise our Emergency Preparedness Program with FEMA and
13 things like that.

14 And then as part of our cyber regulations, we also require our licensees
15 to do exercises for cyber. We're still at the beginning stages of requiring that they do
16 these exercises. And that was one of our tabletops we had is to discuss our exercises
17 and what they'll look like and what the licensees' exercises will look like. It will pretty
18 much be licensee-driven. You can't really -- and most of it's going to have to be
19 simulated because you really can't do exercises on the operating system.

20 FERC COMMISSIONER HONORABLE: Thank goodness, yes.

21 MR. ANDERSON: So it will probably be more so of exercising the
22 procedures, exercising -- making sure that people are available, making sure that the right
23 notifications are made at the appropriate times. So that's where we are at this point. In

1 the future it could -- licensees could start interacting and doing something different as we
2 learn more in our lessons learned. So hopefully that addressed --

3 (Simultaneous speaking.)

4 FERC COMMISSIONER HONORABLE: Thank you, James, for
5 unpacking that. I'm very pleased to hear of your focus specifically on cyber
6 preparedness and drilling down in that area rather than lumping it in other contingencies
7 because of the potential for the greatness of the threat. So thank you.

8 NRC CHAIRMAN SVINICKI: Thank you both. I might ask the two of
9 you to respond to the following: I agree with the assertion of Chairman LaFleur that there
10 is this constant evolution and re-looking that we need to do in the cyber area. I refer to
11 it sometimes as chasing the threat, meaning we keep an eye on the threat environment.
12 I know our Commission meets with the elements of the U.S. Government that monitor
13 that very, very consistently. We make sure to test our actions against that
14 understanding.

15 But your adversaries tend to be pretty innovative people. And so it
16 sounds like it's an endless enterprise. In my view what that has necessitated is this
17 graded approach that both commissions have talked about and also a continuous
18 evolution of checking and monitoring of events.

19 So knowing that we have the processes in place to do that, are both of
20 you confident that the -- of the sufficiency of the measures that the two Commissions has
21 put in place for its areas of jurisdiction? And if you're confident of that today, what do
22 you assess as the biggest challenge going forward to make sure that we maintain the
23 confidence and the sufficiency of our regulatory response?

1 Mr. Phillips, would you like to go?

2 MR. PHILLIPS: Sure. I think with some of the recent changes that
3 we've been working with the ERO enterprise on I think we're arriving in a good place, but
4 with this technology change constantly occurring, we're going to face new challenges in
5 the future. And it will be potentially stranger things, things like virtualization, things like
6 cloud computing, and some of the people, the organizations performing some of these
7 functions may change, and frankly they may be in places that we don't have direct control
8 to regulate as a Commission.

9 So it's -- I think in general the information security principles that we've
10 had and we try to work against have been consistent for roughly 40 years, sort of like the
11 Orange Book principles. I think as -- if we work to make our standards more
12 objective-based around those information security principles as opposed to having a
13 specific technology focus, I think that will kind of in the future make it so that there's not
14 so much churn in the regulation.

15 NRC CHAIRMAN SVINICKI: Thank you.

16 Jim?

17 MR. ANDERSON: Yes, thank you. I guess I would give credit a lot to
18 the people who wrote our initial rulemaking. It's more of a performance-based concept;
19 at least that's the way I like to think about it, where we basically ask our licensees to
20 protect the digital assets and we give them a bunch -- a whole thing -- a bunch of controls
21 to look at as possible measures that would mitigate attack vectors and things like that.

22 So as new challenges come about, that's all part of the process in which
23 they're required to evaluate operating experience. They're required to maintain

1 interactions with information that's put out both by the NRC and DHS. So if DHS puts
2 out something regarding a new threat or a new virus or a new malware, licensees are
3 required to look at that and consider or evaluate whether it impacts their specific critical
4 digital assets. So that gives me some confidence in that we can help, we can maintain
5 the ongoing challenges of the changes on a daily basis that are going on.

6 Going forward, like I said, I think from my perspective we do need to
7 evaluate the lessons learned after we've fully implemented all these controls and the
8 scope of the rule and our inspections. And I think we can probably refine that better to
9 be more efficient and effective. So that would be the biggest challenge going forward is
10 can we focus the resources the best way we can to get the biggest bang for the buck
11 going forward?

12 NRC CHAIRMAN SVINICKI: Thank you. And thank you both for the
13 important work you do.

14 I will turn to my colleagues now. Do you have questions, Commissioner
15 Baran?

16 NRC COMMISSIONER BARAN: Sure, just a couple to follow up on kind
17 of the issue of grading the assets and their significance.

18 I think it's fair to say that getting the right set of critical digital assets
19 identified has been one of the tougher issues that NRC's had to work through in
20 developing cyber security requirements.

21 Daniel, I wanted to get a sense. Is that something that FERC and NERC
22 have struggled with identifying the right universe of critical cyber assets? Is that
23 something that you see evolving over time, the actual -- the procedures by which one

1 identifies the assets, or is that something that you think has kind of come to a rest and
2 that's where it's going to stay in the latest CIP?

3 MR. PHILLIPS: That's a great question. No, I mean, I think that that
4 will be something that continues to evolve. Just like with the technology, as new
5 capabilities emerge, you're going -- the focus of the controls may need to be in different
6 areas than they are today.

7 So some of the calculus behind where you place those controls, it's a risk
8 equation. What kind of risk are you willing to live with? I think the electric sector right
9 now, we kind of said we've drawn the line at if it has an impact within 15 minutes, that's
10 where we're going to apply our protection. In the future that could change depending
11 upon how the grid evolves, what kind of time-sensitive processes come into place,
12 industrial automation, things of that nature which may be -- things may be occurring at a
13 much quicker pace. We may need to reevaluate that in the future.

14 NRC COMMISSIONER BARAN: Okay. Thank you.

15 NRC COMMISSIONER BURNS: I just want to echo what Chairman
16 LaFleur said about the cyber forum. I took it on and -- took the baton from Chairman
17 Macfarlane, and then Norm Bay also participated in that regard. I think it was obvious to
18 me coming into it even after it had started that I think both FERC and NRC were good
19 examples, good models for some of the other agencies, and potentially in the financial
20 sector and some of the others, food and drug regulation, things like that where there is
21 work to be done.

22 And but on that I want to acknowledge the work that James and Joan
23 Rolf did on in effect providing the secretariat for the forum and sort of help guiding it

1 through during the time that I had the privilege of chairing it. And now that's gone onto
2 the -- I think the FCC, if it continues. But I want to just thank them and acknowledge their
3 participation and their support for the forum when it existed. Thanks.

4 NRC CHAIRMAN SVINICKI: Well, with that I think we thank both of the
5 presenters and I would turn to Chairman LaFleur for any closing comments she and her
6 colleague from FERC would like to make.

7 FERC ACTING CHAIRMAN LaFLEUR: I have very little to add other
8 than to say if there's one thing we learn from today it's the necessity to keep working
9 together on these things. It's very good that we work together at a staff level, which is
10 obviously where all the work gets done, because now we don't even have a quorum and
11 FERC is going on.

12 (Laughter.)

13 FERC ACTING CHAIRMAN LaFLEUR: No, but that we work together
14 at a staff level between these meetings, because this is just the sort of tip of the iceberg,
15 because there's so much we have in common. So thank you all very much for that.

16 FERC COMMISSIONER HONORABLE: Thank you, Madam Chairman.
17 And I want to thank all of the members of staff who presented here today and I want to
18 thank our colleagues for your hospitality.

19 And I think if I leave with one thing today it is that we are on the case
20 collectively. Doesn't mean we have it all figured out, but I'm confident that -- and I know
21 from my colleague and my former colleagues and I at FERC we have all been very
22 focused on issues associated with the reliability and resilience. I'm sure we each have
23 participated in the ESCC, a number of us in GridEx exercises, etcetera, and very engaged

1 with NERC.

2 And it's very apparent that our colleagues at the NRC are equally, if not
3 more so, dedicated and have made these issues a priority, which gives me comfort.
4 You've also given me a lot to think about going forward. Thank you for informing our work
5 in the ways in which we carry it out. Thank you very much.

6 NRC CHAIRMAN SVINICKI: Thank you. Do either of my colleagues
7 have closing comments?

8 Commissioner Baran?

9 NRC COMMISSIONER BARAN: Just thanks again for being here and
10 for those of you who have presented. And I don't want to do anything to stand between
11 us and lunch, so --

12 (Laughter.)

13 NRC CHAIRMAN SVINICKI: Okay. Well, I'll stand between us and
14 lunch just very briefly.

15 I want to add my thanks to our colleagues from FERC for joining us here
16 today and for all of the important work you, your former colleagues and your entire staff
17 of experts and professionals are bringing to these important missions. I similarly thank
18 the NRC staff.

19 I'd like to thank the secretariats of both commissions for all of the
20 logistical support. This is times two kind of logistics that have to be done for a meeting
21 like this.

22 And Commissioner Honorable was talking about take-aways from today.
23 I have a couple, and my colleagues know I get philosophical like this. But I'll say one is

1 that -- kind of about our side of the table is -- I was former congressional staff, and so
2 sometimes I think about the wisdom of lawmakers. And often they have reflected a
3 wisdom to say certain issues it would be good to have enduring continuity handling these
4 issues, and so they provide for a commission or board structure for some government
5 entities.

6 And what that allows is in a time of change in political appointments
7 across departments and agencies we get some continuity on our side of the table, which
8 again doesn't do all the work, but it helps those experts who are doing all the work to have
9 some continuity in their leadership.

10 So I thank all my colleagues for their service and for the role we play in
11 providing some policy continuity in a time when our counterparts at the many
12 interagencies that we deal with in the government -- we're getting new colleagues there,
13 getting them in place hopefully soon in some instances, and we will move forward in that
14 way.

15 The second thing to reflect on is just again this tremendous body of work
16 that goes on between our organizations, the importance of the continuity of that. And
17 again, if anything that our engagements can foster that, I know we all step up and are on
18 the case, as Commissioner Honorable stated. So thank you.

19 And with that, we are adjourned.

20 (Whereupon, the above-entitled matter went off the record at 12:24 p.m.)