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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BRIEFING ON THE STATUS OF LESSONS LEARNED FROM
FUKUSHIMA DAI-ICHI ACCIDENT

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TUESDAY,
MAY 17, 2016

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ROCKVILLE, MARYLAND

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The Commission met in the Commissioners' Hearing Room at the Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, at 9:00 a.m., Stephen G. Burns, Chairman, presiding.

COMMISSION MEMBERS:

STEPHEN G. BURNS, Chairman

KRISTINE L. SVINICKI, Commissioner

WILLIAM C. OSTENDORFF, Commissioner

JEFF BARAN, Commissioner

1 ALSO PRESENT:

2 ANNETTE VIETTI-COOK, Secretary of the Commission

3 MARIAN ZOBLER, Associate General Counsel

4

5 NRC STAFF:

6 MICHAEL JOHNSON, Deputy Executive Director for

7 Reactor Preparedness Programs and Fukushima

8 Steering Committee Chairman

9 JACK DAVIS, Director, Japan Lessons-Learned

10 Division, Office of Nuclear Reactor Regulation

11 GREGORY BOWMAN, Deputy Director (Acting), Japan

12 Lessons-Learned Division

13 MOHAMED SHAMS, Chief, Hazards Management Branch,

14 Japan Lessons-Learned Division

15 TROY PRUETT, Director, Division of Reactor Projects,

16 Region IV

17

18 EXTERNAL PANEL:

19 ANTHONY PIETRANGELO, Chief Nuclear Officer, Nuclear

20 Energy Institute (NEI)

21 KEN CANAVAN, Director of Plant Technology, Electric

22 Power Research Institute (EPRI)

23 RANDY BUNT, Chairman of the BWROG Fukushima Response

24 Committee, Southern Nuclear Company

1 PAUL GUNTER, Director, Reactor Oversight Project,
2 Beyond Nuclear

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PROCEEDINGS

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9:00 a.m.

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CHAIRMAN BURNS: Good morning and welcome panelists today to the NRC staff and the members of the public. The purpose of today's meeting is to discuss the status of action that's taken by the NRC in response -- and the industry in response to the lessons learned from the Fukushima Dai-ichi accident, including a discussion of progress on NRC's Tier 1 activities and the status of open Tier 2 and Tier 3 recommendations.

We'll begin with presentations from the external panel, which includes Anthony Pietrangelo, Chief Nuclear Officer of the Nuclear Energy Institute; Ken Canavan, Director of Plant Technology, Electric Power Research Institute; Randy Blunt from Southern Nuclear Company, chairman of the BWR Owners Group, Fukushima Response Committee; and Paul Gunter, Director of the Reactor Oversight Project of Beyond Nuclear.

Following the external panel, we'll have a brief break and then hear from the NRC staff. I look forward to the presentations and discussions this morning. Before we begin, do any of my colleagues have any opening remarks? If not, we'll start with Mr.

1 Pietrangelo with the presentations on the external panel.

2 MR. PIETRANGELO: Thank you Chairman,
3 Commissioners, good morning. In summary, we continue to make
4 good progress on implementing the Fukushima lesson learned. I'll
5 touch on a couple of items in the presentation we think are very well
6 aligned with completion in 2016 and some issues we're still trying to
7 wrestle.

8 Going to Slide 2, we will largely complete with FLEX
9 implementation in the industry by the end of this year, and with respect
10 to the pool instrumentation orders, completion by the end of this year
11 with BWR Mark I and II vents complete in 2018 and '19 as previously
12 laid out.

13 We're continuing to focus on FLEX inspections. I think
14 we know that last time here that we want to make sure that all the work
15 we've done in the previous five years to get our common understanding
16 of what it takes to implement the requirements and the orders carries
17 through to the field inspection and implementation by licensees.

18 We fully support the staff on the disposition of the Tier
19 2 and 3 actions, made excellent progress there. We are committed to
20 completing the majority of the mitigating strategy assessments before
21 the rulemaking. That I think is consistent with our bias reactions since
22 the Fukushima event in 2011, and the rulemaking really aligns a lot of
23 the significant activities that have been undertaken by and the NRC.
24 There's a few issues to discuss, which I'll touch on briefly.

25 Next slide, please. Here's the detailed
26 implementation on FLEX status. 58 units will be complete, are already

1 complete. 29 are finishing up this year. There will be an additional 13
2 that are substantially complete but I'm still dealing with the exception of
3 a severe accident capable event. That's 100 sites including -- or 100
4 units including Watts Bar II.

5 Next slide please. FLEX inspections. The big thing
6 with the inspection process, and I think we noted this last fall, is there's
7 a lot of work that's been done. But we've seen in the past instances
8 where a lot of that work is reinterpreted in the inspection process.

9 So we want to make sure that the knowledge transfer
10 from the folks that have been working on it in the agency here as well
11 as in the industry is transferred out to the field. So what was maybe a
12 couple of 100 people working on the implementation guidance and the
13 rules and requirements etcetera, now it's thousands of people who are
14 expected to implement this going forward.

15 So there's a big knowledge transfer that has to take
16 place. We're committed to doing that in the right way. We've actually
17 established a task force that will meet with some of the folks here
18 tomorrow on the inspection process. We're trying to promote
19 consistency and implementation in the industry.

20 I suspect we'll establish a frequently asked question
21 panel, if you will, on the industry side to share lesson learned. If there's
22 questions on it, interpretations of the guidance in the field, we'll have
23 people who have already been working on these things for the last five
24 years ready to answer questions and share that with the staff.

25 So we're trying to get out in front of this as best we can.
26 The industry task force does represent the entire fleet of plants. So

1 we've got every company playing on that, and we want to make sure
2 that we're learning from the inspections and making adjustments as
3 necessary.

4 I also want to make a point about the use of FLEX
5 equipment here. We all know what its beyond design basis functions
6 are for mitigation. But we are starting to use and will use more
7 frequently FLEX equipment as an additional layer of defense in depth
8 for more traditional things we do.

9 We've actually submitted two white papers to the staff
10 on getting credit for the use of FLEX and notices of enforcement
11 discretion and in the significance determination process. I think that's
12 just the tip of the iceberg of where we intend to apply the FLEX
13 equipment.

14 I think it's a win-win overall because it will get this
15 equipment hooked up and used and more familiarized with the plant
16 staffs, as well as the inspectors seeing us use that equipment in
17 different applications, beyond waiting for the beyond design event to
18 run out and do this. So again I think it's a win-win overall.

19 Next slide, please. This is the projected schedule of
20 the mitigation strategy assessments. Again, before the final rule is
21 issued we'll have basically completed most of the MSAs for flooding this
22 year, and on path with seismic for about two-thirds by the end of 2017.
23 You can see the rest there.

24 This is the major part of the licensee work this year is
25 conducting these mitigation strategy assessments against the
26 reevaluated hazards. They did a lot more detail in the staff's

1 presentation, but we're well on our way to completing the bulk of these
2 assessments this year.

3 Next slide. For the seismic SRAs, the current focus is
4 for those plants in what we call Path 5 of the -- where their GMRS or
5 their ground motion response spectra was greater than two times the
6 safe shutdown earthquake. We think the proposed rule has sufficient
7 language in it to allow a risk-informed approach there.

8 We have to keep in mind that we're utilizing the seismic
9 PRA results to assess the potential reduction for only the extended loss
10 of AC power and the loss of ultimate heat sink. That's the focus of
11 those.

12 For plants that are less than the two times the SSE or
13 the safe shutdown earthquake, we do think there's a limited benefit that
14 we'll get out of those seismic PRAs and if their mitigating strategies
15 assessments are done right, it will demonstrate the effectiveness of
16 those using a deterministic approach there.

17 Next slide. On the flooding integrated assessments,
18 we put a lot of time into the external flooding assessment guidelines
19 and provided that last month to the agency for endorsement. This
20 looks like the methodology, trying to reduce some of the conservatism
21 in the initial methods.

22 Again, we're utilizing the mitigating strategies for the
23 local intense precipitation hazard, and in this one, again we don't see a
24 significant flood risk reduction expected by performing these integrated
25 assessments, given that the MSAs will have been done previously.

26 We are trying to strike some balance of protection in

1 mitigation with this integrated assessment as we go through the
2 process. It's a limited number of plants that will be using that full
3 methodology.

4 Turning to the next slide on the proposed rule, we think
5 again the rule incorporates and all of the requirements from 2012 and
6 beyond. We are focused on the codification of the existing
7 requirements and their integration. This is the beyond design basis
8 framework, regulatory framework. I think this really did address
9 Recommendation 1, that the task force came up with initially.

10 We support issuance of the rule in 2017. We provided
11 comments in February. There's a couple of issues, the implementation
12 schedule, although I think we're on a good path to work those out. We
13 don't want to be in a position where we're asking for exemptions from
14 the rule as these mitigating strategy assessments are completed, when
15 we know how long they're going to take now.

16 So we'd rather have the rule reflect that versus go for
17 exemptions later. The change control process, we believe it should be
18 different from what we do for design basis materials. So we're still
19 working with the staff on that, and there's a couple of nits I think in the
20 reevaluated hazard methodology that we're still working through.

21 But overall, I think the alignment on what we thought
22 was going to be in the proposed rule and the final rule and what the
23 staff drafted. So in summary, we've had significant safety
24 enhancements. We're well on our way to completing the
25 implementation of the Fukushima lessons learned.

26 We've had a focus on safety throughout and I'm very

1 proud of the fact that the industry has maintained a very high safety
2 record in performance, both with reliability and safety, as we've been
3 implementing the Fukushima lessons learned.

4 2016 is a critical year for completion of a lot of our
5 enhancements. I said it last fall and I'll say it again. We're still not
6 done yet though. There's a still a lot of work to do with the mitigating
7 strategies assessments, some of the reevaluated hazard work. So
8 there's still work to do and in particular focus on the inspection process.

9 We are committed to maintaining the focus on our
10 equipment and these safety enhancements going forward, and again
11 we intend to utilize the FLEX equipment for other applications to
12 improve defense in depth and safety. Thank you very much.

13 CHAIRMAN BURNS: Thank you. Mr. Canavan.

14 MR. CANAVAN: Well good morning, and thank you
15 for having me here today to share some thoughts on both the lessons
16 learned and some perspectives on some of the future research that we
17 see. I'm going to sprinkle my lessons learned sort of around the
18 presentation. Hopefully, it's not too distracting.

19 So before I get into the body of the slides, let me share
20 one observation that I had in actually the hours and days after
21 Fukushima, which was when Fukushima occurred, as with most severe
22 accident type situations, there was a scarcity of information. As that
23 information started to become available, there was an interesting thing
24 that I noticed, that some folks understood the severity of the events
25 more than others.

26 One community that understood the severity of those

1 events almost immediately was the risk analysis people at the sites and
2 at other organizations throughout the nuclear industry. In the United
3 States, we have a large community of risk analysis practitioners, which
4 is unusual.

5 We have those because -- as a result of Generic Letter
6 8820 issued in 1988 in response to post-TMI actions. That generic
7 letter required each utility to perform an individual plant examination for
8 severe accident vulnerabilities.

9 One of the stated goals of that generic letter was to
10 develop an understanding of severe accident behavior. These are
11 actions that NRC took that I think provided unique benefit to the U.S.
12 nuclear industry when you think about it.

13 With that appreciation of severe accidents came
14 improvements in the form of hardware modifications, human
15 performance improvements, changes to procedures, severe accident
16 guides all came out of that effort, and you know, in retrospect positioned
17 the U.S. nuclear industry better to handle off-normal events.

18 Next slide. So what's happened since Fukushima?
19 Well, since Fukushima, EPRI and others have performed a significant
20 body of technical work, too much to really talk about all of it today. So
21 I summarized a few of it, put it into categories in the blue, immediate
22 actions, short-term actions and sort of a longer-term understanding.

23 And I'm going to cover some of the highlights. The
24 items in red I have some slides on, and like I said, I'll cover a few of the
25 highlights, my personal favorites actually. So without further ado but
26 before moving on, another lesson learned from Fukushima is that the

1 spent fuel pool and in fact the nuclear plants are very rugged structures.

2 When we look at that, that's supported by the fact that
3 all available evidence currently indicates that after the seismic event,
4 which was the fourth largest recorded seismic event and located just
5 100 miles away, all of the safety systems operated as designed, and
6 research activities to date continue to support the ruggedness of both
7 the fuel pool and the plant.

8 In the area of immediate response, EPRI assisted
9 TEPCO, a long-term EPRI member, in understanding severe accidents
10 and analysis of the spent fuel pools, looking at potentials for re-criticality
11 and quickly helping to design a system to treat water.

12 The shorter-term actions occurred in the months and
13 years after the accident, include updates to severe accident technical
14 basis document, which serves as one input to the severe accident
15 guidelines that the owners groups will talk about in just a little bit, as
16 well as development of strategies to mitigate radiological releases and
17 accelerated seismic activities.

18 Some of the long-term research activities were listed
19 on the previous slide, and we'll discuss them as we walk through the
20 presentation. But for seismic, the post-Fukushima era, we accelerated
21 our existing seismic program, accelerated and expanded to look at
22 improving and understanding of the seismic hazard or the ground
23 motion, all the way from the seismic source through ground motion
24 attenuation and site amplification, to understand the true seismic
25 hazard at the site.

26 Then once understanding the seismic hazard of the

1 site, evaluating components both for the impact of high frequency
2 motions and to better understand component performance and seismic
3 events, commonly referred to as fragility analysis.

4 And all of that's to better understand and then to
5 mitigate seismic risk. Again, first is an understanding. Then there's a
6 mitigation.

7 Next slide, please. So shortly after Fukushima,
8 TEPCO engineers were very interested in all the research performed
9 after Three Mile Island, as we can all understand, another notables
10 accident, and EPRI had just completed a draft archive of the 30-year
11 body of scientific work that had been performed, and the draft was
12 provided to TEPCO, and that draft eventually became an EPRI report.

13 I'll cite it here, 1022186, Technical Foundations of
14 Reactor Safety, Revision 1. But that contains a large body of that 30
15 years of scientific work. The reason why I mention that is because the
16 Fukushima technical evaluation continues on a similar vein.

17 So work continues in that area now, to collect that
18 information again, and to make sure that it's available both to develop
19 a deep understanding of Fukushima, to support sound technical
20 decision-making in the future.

21 One of the lessons learned in that document that I
22 always find very -- those documents because there are several, a
23 Phase 1 and a Phase 2, and several other supporting documents. But
24 one of the most interesting things I always find about that document
25 that's not well known is the fact that Unit 2, which is estimated to have
26 the least amount of core damage and also had no hydrogen explosion,

1 is actually the largest contributor to the radiological release.

2 So if you look at that chart that we see a lot of, that
3 NNSA chart that shows the radiological release in a picture, that's
4 largely due to Unit 2.

5 Next slide, please. So accident tolerant fuels. What
6 would the nuclear industry be like if we had no zirconium in the core,
7 and while there are several definitions of accident-tolerant fuel, they all
8 share a common element, which is an increased ability to tolerate a loss
9 of active cooling for a longer duration than the existing zirconium
10 system.

11 A longer duration means more time for prevention and
12 more time for mitigation, or it means less hydrogen or minimal fission
13 product release. So overall it would look a lot different. There's a lot
14 of different strategies for fuel systems, and a lot of things to consider
15 when designing new fuel.

16 But two of EPRI's favorites are the molybdenum
17 cladding concept, which is actually a Zircaloy-cladded molybdenum
18 both on the inside and outside, because if you think about it, if you take
19 molybdenum, and you clad it with zirc on the inside and outside, a very
20 thin layer. You don't have a lot of zirc, but you do have the water and
21 fuel still seeing zirconium, so you don't change chemistry or physical
22 properties as much.

23 Silicon carbide fuel channels, which again replaces
24 zirconium with a silicon carbide. Both have higher melting points, both
25 have higher resilience and strength. There are other concepts, but this
26 is part of the longer-term research that we see as being potentially a

1 game-changer for the nuclear industry. EPRI's role in this is to
2 accelerate the collaboration and the development.

3 Not one entity will not develop new fuel on its own. It's
4 quite an endeavor. But the goal would be for test assemblies to be
5 available in the early 2020's.

6 Next slide, please. So in summary, there's a
7 significant body of research and development that's been completed
8 since Fukushima by EPRI and others, and much has been learned and
9 implemented and the global nuclear industry is safer as a result. I do
10 want to close with one additional thought, that as we look at future
11 research and development, it falls into two bins really.

12 One is the continuous improvement type of work and
13 through improved understanding and implementation of those
14 learnings, we get better performance in terms of both safety and
15 economics. But also -- and the items in this bucket are things like
16 learning on severe accidents, external hazard analysis in other areas.

17 But there's a second bin that provides a more
18 significant step change such as the accident tolerant fuel we just
19 discussed, as well as things like severe accident prognostics that would
20 allow us to faster than real time simulate accidents and be able to both
21 prevent and mitigate better, and things like a new reactor technology
22 such as molten salt reactors, which I'm hoping is a subject of a future
23 Commission brief. That's the end of my prepared comments.

24 CHAIRMAN BURNS: Thank you. Mr. Bunt.

25 MR. BUNT: Yes. Thank you for allowing me to
26 present today and present on behalf of the BWR Owners Group and

1 our chairwoman, Lisa Hill, who's not able to be here. Do you want to
2 go over a few topics and go to the next slide, talking about the lessons
3 learned and where we stand and what's remaining for the BWR fleet
4 going forward.

5 So we'll give you a brief status of where we stand from
6 our FLEX strategies, then go over severe accident hardware and
7 containment vent systems, our procedures, both the severe accident
8 and the emergency operating procedures and our aids, the TS,
9 Technical Support Guideline documents going forward. And then what
10 are we doing in support of what Tony had already mentioned about the
11 mitigating strategies rule and other elements associated with that.

12 So next slide, please. So updated status of where we
13 stand with the strategies. Industry-wide, BWR fleet has followed the
14 industry lead and we are very close to being finished by the end of this
15 year in the primary elements that make up the FLEX strategies.

16 We will have a few outstanding items for the vent to
17 enhance that going forward after the summer of '16, and that will take
18 us into the '18 time period. Many units will be coming in '17 and early
19 '18, in accordance with that rule, to enhance their venting associated
20 with that.

21 Approximately about a third of the fleet of the BWRs
22 will submit their final integrated plans for a document in their closure of
23 FLEX by -- in 2016. The remainders will be submitting those after their
24 enhancements to the vents per the schedule that's outlined.

25 We expect two plants to have their FLEX inspections
26 in the 2016 time period, which will lay the foundation for where we're

1 going forward for the inspections for the BWR fleets in the future years.
2 Most of those inspections will come after their FIPs are done, so there
3 will be a little -- the tail end of those inspections, where the PWRs will
4 be the main focus with that.

5 Also looking to establish how the mitigating strategies
6 assessments, both for flooding and seismic are working and the BWR
7 fleet is in line with the schedule that Tony had already presented for
8 most of the flooding to be done in 2016, and then the seismic to be
9 spread out in '16 and '17.

10 Next slide, please. To go into the order of the 109 for
11 the Mark I and Mark II units that are specifically out there, with the
12 hardware part which is the Phase 1 part of that order complete by the
13 2018 time period, and then Phase 2, the strategy completed by '19.

14 Many sites will be doing the strategy earlier than that,
15 but their commitment is in the '19 time period. The impact is that it will
16 have their hardware installed by mid-2018, in compliance with that order
17 and the agreed-to schedule. The strategy part is the water addition
18 and the water management that we'll see.

19 We expect to see the staff evaluation for that integrated
20 plans by this summer. Those integrated plans were submitted last
21 year at the end of the year in December.

22 A very concentrated effort between the staff and the
23 industry to have a consolidated or a very typical submittal on that. So
24 all the sites followed the template. Very good was done for across the
25 industry and having the templates, and trying to look like an industry
26 when we submitted our reports as independents.

1 So we expect to see closure when we go forward with
2 these activities through inspections that will happen in the '18 to '20 time
3 period. Following the compliance with that, we expect to see the
4 integrated plans and the safety -- or the staff assessments to be basis
5 for those inspections going forward. So that's how we see this
6 hardened vents activity going forward.

7 So next slide, please. So this is a brief status of where
8 we stand in the procedure suite of activities for the Owners Group,
9 broken into the three categories of the procedures. The emergency
10 operating procedures. The bulk of those lessons learned have been
11 submitted. They're out there in the current revision, Revision 3.

12 A full implementation of that revision is expected by
13 mid-2017. The majority of the lessons learned required for the FLEX
14 support from the direct application will be -- have already been
15 implemented at the majority of sites in further compliance of their 2016
16 FLEX materially complete.

17 For the severe accident guidelines, the Owners Group
18 committed in their letters last year to be upgraded by the middle of '17
19 for the Rev 3, and they're also -- most units are complying to have that
20 done for their vent order, the 109 order compliance also. So their
21 schedule is ahead of their compliance for a few plants but the majority
22 of plants are there.

23 Several plants, a couple of plants have already had
24 that implementation done as of 2016. For our technical support
25 guidelines, these are the calculational aids that allow the TSC staff, the
26 Technical Support Center staff, to have more tools and also the

1 operating crews to have more tools into how to evaluate.

2 Those are out -- have been issued and workshops
3 have been held in the U.S. this year and there will be more next year,
4 and they also were held internationally for the BWR fleets in 2015. So
5 that's an example of where we're spreading the lessons learned.

6 Those were enhanced through activities and also
7 support from both EPRI and from DOE in some of the activities that
8 support that from a code standpoint and evaluations that go forward.

9 Next slide, please. For the proposed rule out there,
10 the BWRs are in line with the rest of the industry following the same
11 industry schedule. We don't anticipate any changes or any delays that
12 will happen because of the BWR fleets in complying with the rule
13 language and very supportive of that.

14 So we do expect, you know, our documentation
15 enhancements needed for the mitigating strategies, as we do that work
16 in advance of the rule coming out across the industry. Also, how will
17 the demonstrations and procedures be impacted from FLEX going
18 forward, and then what is the full documentation required for the
19 rulemaking going forward, being that most of the compliance will have
20 already taken place prior to the rule coming out.

21 So those are where we see, very consistent with the
22 rest of the industry, the BWR. This is where you asked for the
23 information.

24 Next slide, please. In summary, we feel that the BWR
25 fleet will be materially complete with FLEX, so that we will be able to
26 cope with the mitigation of any external events.

1 Currently, the bulk of the fleet are there. Also the
2 enhancement through the added wet well venting capability and the
3 water addition and water management strategies will be implemented
4 starting in 2016, through the agreed-to schedule.

5 Then we expect to, as I mentioned before, comply with
6 the mitigating strategies rulemaking along with the rest of the industry
7 in a consolidated approach. That's the end of my comments. Thank
8 you.

9 CHAIRMAN BURNS: Thank you. Mr. Gunter.

10 MR. GUNTER: I'd like to thank you for the invitation
11 and open my comments today with an observance that yesterday
12 Michael Mariotte with Nuclear Information Resource Service passed
13 away at his home in Maryland, surrounded by his loving family. I'm
14 sure a number of you know, knew Michael and certainly we in the public
15 interest community are going to miss him.

16 Our concern today turns to some examples of the
17 Fukushima lessons that have been unlearned in the United States.
18 Defense in depth is being whittled away, and sacrifice to the U.S.
19 nuclear industry's increasingly fragile economics.

20 We'll focus on the example of the post-Fukushima
21 regulatory treatment of containment and emergency planning
22 components, as it pertains to one specific biological hazard generated
23 in a severe nuclear accident, radioactive iodine.

24 Next slide, please. Quite simply, the pressure
25 suppression containment system for the GE Mark I and Mark II boiling
26 water reactor is too small to contain the dynamic energy of a severe

1 accident. This inherent design flaw has been known since 1972, yet
2 we continue to see piecemeal approaches and voluntary industry
3 initiatives to allow operators the option to deliberately defeat the
4 containment design function in hopes of saving it from permanent
5 rupture during a severe accident.

6 Fukushima demonstrated a 100 percent containment
7 failure rate for the same containment venting system that is currently
8 deployed on nearly one-third of the U.S. nuclear reactor fleet.

9 Next slide, please. Radioactive iodine is one of the
10 more manageable radioactive isotopes generated by nuclear accidents.
11 It's a relatively short half-life of eight days constitutes a biological hazard
12 for about 80 to 160 days.

13 It can be effectively retained and contained along with
14 other radioactive isotopes by state-of-the-art engineered radiation filters
15 on hardened containment vents to reduce the uncontrolled radioactive
16 releases to the environment and population exposures.

17 Emergency planning can be enhanced by providing
18 safe and effective doses of prophylactic potassium iodide, as is used in
19 common table salt. Pre-distributed in advance to saturate the thyroid
20 gland, particularly in young children for protection from radiogenic
21 diseases of the thyroid.

22 However, in the aftermath of the Fukushima
23 catastrophe, the public interest community has witnessed both of these
24 beneficial aspects for defense in depth dismantled and obstructed by
25 the nuclear industry and the Nuclear Regulatory Commission.

26 Next slide, please. On January 9th, 2013, senior

1 management for the NRC staff presented its broad-based consensus
2 to recommend that the Commission order, the installation of external
3 engineered radiation filters on severe accident-capable hardened vents
4 on the GE Mark I and Mark II's, and the staff studied judgment using
5 established regulatory practice and guidance, the use of filter vents
6 when used in conjunction with containment spray and reactor cavity
7 flooding, as already added by the NEI guidance at reactors in response
8 to the September 11th attacks, represented a cost beneficial and
9 substantial safety improvement.

10 The nuclear industry lobby and its champions in
11 Congress vehemently opposed adding the filters to the containment
12 vents, maximizing decontamination in the small containment by
13 increased water spray and reactor cavity flooding was preferable and
14 sufficient.

15 However, the NRC staff focused their defense in depth
16 concern without the benefit of the external filtration on the uncertainties
17 regarding the effectiveness of internal decontamination in the extremely
18 cramped containment that still needed analysis and provided
19 performance requirements.

20 In anticipation of the Commission vote on adding filters
21 in March 2013, UBS, the global Swiss banking giant that handles
22 nuclear corporation finances, predicted "we increasingly believe that
23 the NRC may not require these added precautions, given the added
24 stress this places on the incumbent portfolio, as well as the fragile state
25 of affairs among existing units."

26 UBS concluded that while not overwhelming, the

1 additional cost would add insult to injury for an industry in difficult
2 economic environment. The Commission majority vote rejected its
3 staff's recommendation for engineered filters and issued an order for
4 just the containment vent and directed staff and industry to develop
5 other non-specific severe accident confinement strategies, such as the
6 industry favored adding and managing of more water in containment.

7 The Commission directed staff to pursue a proposed
8 public rulemaking to solicit further stakeholder comments on radiation
9 filtration, and develop the performance requirements for what industry
10 now describes as severe accident water addition and management.
11 That proposed rulemaking, renamed containment protection release
12 reduction, would never happen.

13 There would be no public comment or independent
14 expert opinion on the benefit of engineered filters and as a result, as
15 the NRC staff had described in its earlier concerns, no NRC or
16 independent vetting of performance requirements on industry severe
17 accident water addition.

18 Next slide, please. In our view, the protection of the
19 American public from the GE containment design vulnerabilities is a
20 least cost base case scenario in favor of industry's hands-off approach
21 to its fragile economics.

22 Next slide, please. In the meantime, the Japanese
23 reformed nuclear regulation authority essentially adopted the NRC staff
24 recommendation for external engineered filters as a prerequisite for
25 restart of the boiling water reactors there. By August 2015, AREVA
26 had announced delivery of its 14th filtered containment vent system for

1 installation in Japanese reactors, initiated by Hitachi-GE.

2 TEPCO has since completed installation of redundant
3 filtration units on its Kashiwazaki-Kariwa nuclear power plant that are
4 both above grade for flood qualification and redundantly below grade
5 for seismically qualified backup systems.

6 Next slide. Moreover, it's our concern that even an
7 NRC order doesn't constitute what the public might think an order
8 should. The NRC can in fact -- the order can be undone with a request
9 for an extension to comply without a single public meeting.

10 Ironically, New Jersey's Oyster Creek Nuclear Station,
11 the first Mark I in the world, Fukushima's prototype, as well as the first
12 unit in line for compliance with the order, also received the first waiver
13 from compliance following this summer's scheduled refueling outage
14 and restart for fall 2016.

15 The NRC staff waived Oyster Creek's compliance until
16 after Exelon plans to permanently close the reactor on December 31st,
17 2019. None of Exelon's proffered compensatory actions addressed
18 the post-fuel damage requirement in the order. Based on this
19 precedent, other industry waiver requests are now anticipated.

20 Next slide, please. Though recommended by the
21 Kemeny Commission in October 1979, the NRC would not propose
22 optional voluntary stockpiling of potassium iodide within the ten mile
23 EPZ until 2001.

24 Next slide, please. As of today, 25 of 34 eligible states
25 are participating in NRC's voluntary initiative for voucher distribution
26 within the ten mile EPZ. However, according to public health surveys,

1 the current KI emergency plan is ineffective, as only 5.3 percent of
2 residents respond to the voluntary pickup.

3 Next slide, please. The American Thyroid Association
4 has repeatedly appealed to the NRC to expand the distribution of KI by
5 direct delivery to all residents within 50 miles and wider stockpiling out
6 to 200 miles.

7 Next slide, please. Moreover, the Canadian Nuclear
8 Safety Commission required that by December 31st, 2015, pre-
9 distribution of KI by direct delivery to every resident within the six mile
10 primary evacuation zone around Canadian nuclear power plants would
11 be completed. The Canadians have further expanded public
12 awareness for KI out to 31 miles from their nuclear power stations.

13 Next slide, please. The chief lesson from Fukushima
14 for us, according to Japan's National Diet's Fukushima-Dai-ichi Nuclear
15 Accident Independent Investigation Committee, determined that the
16 catastrophe was profoundly man-made and the result of regulatory
17 capture.

18 The combination of willful negligence, the collusion of
19 government regulator and industry to advance corporate production
20 and financial agendas over public safety and regulatory deferral of
21 enforceable standards to voluntary industry initiatives adds up to a
22 recipe for the next disaster. Thank you.

23 CHAIRMAN BURNS: Thank you. I will begin the
24 questioning this morning with Commission Baran.

25 COMMISSIONER BARAN: Well thank you all for
26 being here. I appreciate your comments. In the last few years, five

1 U.S. reactors have permanently shut down and three more have
2 announced plans to close. Licensees are actively considering shutting
3 down an additional four units of Clinton, Quad Cities and Fort Calhoun
4 in the near-term.

5 I want to get the panel's thoughts about how these
6 announcements will affect compliance with post-Fukushima safety
7 requirements. Paul noted just a couple of minutes ago that Oyster
8 Creek, which plans to shut down in 2019, was granted an extension on
9 implementing Phase 1 of the order requiring severe accident-capable
10 hardened vents.

11 Essentially, Oyster Creek got an exemption from the
12 requirement to install a wetwell vent by fall of this year. Recently,
13 Entergy submitted a request for an extension for Fitzpatrick to comply
14 with the mitigating strategies and spent fuel pool instrumentation
15 orders.

16 Paul, let me start with you. If NRC gets similar
17 requests for other plants in the future related to vents or another
18 requirement, how do you think NRC should evaluate such a request?

19 MR. GUNTER: Well you know, thank you for that.
20 It's our concern that the NRC has to draw a line in terms of what an
21 order means, and you know, clearly in the case of Oyster Creek, when
22 the order was issued the agency had provided Exelon with an
23 opportunity to address the NRC's calendar date schedules for
24 compliance, and then they took a pass on that.

25 It wasn't until later that they announced that they would
26 seek an extension to comply on a schedule change that, you know,

1 disingenuously puts the reactor, you know, takes them through an
2 exemption process without any public oversight or transparency.

3 I think that, you know, clearly in terms of the severity of
4 the Fukushima disaster and its consequences, we're asking the NRC to
5 hold the line on the orders that it issues and its schedule, and I think
6 that's reasonable.

7 COMMISSIONER BARAN: Well, let me explore that
8 a little bit with you. So what do you think the standard should be in a
9 situation like that? How do we weigh or how do you think NRC should
10 weigh the length of time the plant will be open and would be benefitting
11 from a safety enhancement with, you know, with the benefit of a safety
12 enhancement?

13 How do we weigh that? You know, if the plant would
14 close a month or six months or a year after a particular safety
15 enhancement came on line, how do you think we should weigh that?

16 MR. GUNTER: I think one clear guideline would be no
17 more refueling cycles. I mean right now we're looking at Oyster Creek
18 going through one plus fuel cycles, and I don't think that it's reasonable
19 to extend that kind of undue risk to public health and safety.

20 COMMISSIONER BARAN: I'm interested in what the
21 rest of the panel thinks about this issue. Tony or Randy, do you have
22 thoughts about how NRC should approach extension or exemption
23 requests related to the post-Fukushima requirements at plants that are
24 shutting down?

25 MR. PIETRANGELO: On a case-by-case basis.

26 COMMISSIONER BARAN: Anything beyond that? I

1 mean so that's -- I think that's basically the approach right now. The
2 NRC's staff's taking a case-by-case look at it.

3 MR. PIETRANGELO: I think that's appropriate
4 because the circumstances are different for each site. You have an
5 exemption process specifically to deal with case-by-case things like
6 that. So I would exercise that process.

7 COMMISSIONER BARAN: Do you think there are
8 any, and I want to hear Randy's thoughts on this too, if he has any, are
9 there key factors you think the NRC staff should be looking at when
10 they're evaluating these on a case-by-case basis?

11 MR. PIETRANGELO: I think you have to look at the
12 magnitude of risk and the time exposure.

13 COMMISSIONER BARAN: And time exposure, you
14 mean how long the plant will be operating?

15 MR. PIETRANGELO: Yeah.

16 COMMISSIONER BARAN: Ken, I didn't mean to
17 exclude you.

18 MR. CANAVAN: Yeah. I just wanted to add to
19 Tony's comment. So all forms of electrical generation have some form
20 of hazard associated with them. So if we assume Oyster Creek's
21 replaced by coal-burner or another generation like gas unit, are carbons
22 produced? There are health effects from other sources of electrical
23 generation, and you can do trade-offs with period of time and exposure
24 to the hazard and other health effects from other forms of generation.

25 MR. BUNT: To address your question, I think you do
26 have to consider the time constant here and the total time constant of

1 the activity that was being requested. So if you look at the end date
2 for this particular application of the 109 order, the end date was summer
3 of '18, which had already been evaluated from a risk standpoint.

4 So the extension time then has to be looked at, the
5 consequences of the event, and also the mitigating actions that were
6 put in place and what were there. Those all have to be factored in on
7 a case-by-case basis as Tony mentioned, along with a risk impact and
8 the other economics that Ken had mentioned, as well as other hazards
9 that are dominant by having a plant shutdown or have something
10 prematurely done.

11 COMMISSIONER BARAN: Any closing thoughts
12 from any of you on this topic? I'll ask the staff about this too and we'll
13 get their thoughts. Randy and Ken both discussed the development of
14 accident-tolerant fuel, and this question for both or either of you. When
15 do you think it's likely that these technologies would be ready for NRC
16 review?

17 MR. CANAVAN: There's been discussions of well
18 accident-tolerant fuel is a wide area. There are several different
19 systems that are being discussed. All have pros and cons, difficulties
20 in manufacture. These things haven't been done. All those caveats
21 in place, it looks like early 2020's.

22 So some time in that time frame. Test fuel assemblies
23 or test pins would be available for insertion. Currently, that's the
24 thought. Prior review would be us submitting something to the NRC in
25 the 18s or 19s I would assume.

26 COMMISSIONER BARAN: Okay. Do you anticipate

1 any challenges for NRC in being prepared to review those?

2 MR. CANAVAN: Yes.

3 COMMISSIONER BARAN: And talk a little bit about
4 that please.

5 MR. CANAVAN: Well with all new technology, you
6 know, this is a system and one of the things I missed in my notes was
7 it's a cradle to grave type of thing, which is one of the reasons why
8 molybdenum with coated Zircaloy is a preferred system. Every time
9 you change something, you'll move other dynamics.

10 So you'll have other chemistry effects if you use
11 different materials. Most people don't know that silicon carbide is
12 actually soluble in water only a little bit, but still soluble and what are
13 those long-term impacts. So I think, you know, careful review would
14 be required in the first of a kind technology, which always creates some
15 challenges for the regulatory environment.

16 COMMISSIONER BARAN: Do you think, and I know
17 this is a little bit of prognostication, but would you anticipate that the first
18 technologies we received here for review would be ones where you
19 didn't have a change in chemistry or not a very significant change or not
20 necessarily coming in that order?

21 MR. CANAVAN: As a researcher, I would hope that
22 regulatory thoughts didn't play too significantly in the technology
23 chosen. But in reality it does. So again, the molybdenum concept
24 that's coated with Zircaloy on both sides is a very positive one, because
25 it doesn't change those chemistries. It changes things less.

26 So one of those things I think when making a submittal

1 or one of the considerations would be things that don't change the
2 regulatory regime as much.

3 COMMISSIONER BARAN: Randy, do you have any
4 thoughts you might add? Okay.

5 MR. GUNTER: Commissioner Baran, can I just add
6 one more comment to your original question? I think it's important to
7 recognize that an order modifies the operating license of these nuclear
8 facilities, and that's a critical legal question, and you know, it needs to
9 be redressed through the legal process.

10 So I think it's disingenuous to essentially avoid an order
11 on a schedule change when in fact there is this obligation to meet the
12 modified operating license.

13 COMMISSIONER BARAN: Thanks. Thank you Mr.
14 Chairman.

15 CHAIRMAN BURNS: Thank you. Commissioner
16 Baran covered an area I was interested in at the beginning with respect
17 to the process that Mr. Gunter and others spoke to. I will return first to
18 Mr. Canavan. I was interested in your comment with regard to the
19 contribution of radioactive release from the Fukushima accident.

20 That is mostly Unit 2, and yet unit -- I think what I
21 understood you to say, Unit 2, relatively speaking, was less -- if that's
22 the right way of saying, less damaged or more integral. Could you just
23 refresh me as to what the reason or what the understanding of that is,
24 that was?

25 MR. CANAVAN: I can walk you through some of the
26 statuses very quickly and again, no one has seen where the cores are.

1 This is all based on modeling and simulation, although to date we're
2 fairly confident in that simulation.

3 CHAIRMAN BURNS: Sure, sure.

4 MR. CANAVAN: Unit 1, 1F1, lost core cooling very
5 early. It's expected that about 10 to 12 hours into the accident the
6 melted core exited the vessel and is in the containment. Unit 3
7 similarly lost cooling late, but also for a sustained period of time and
8 again, some of the core is expected to be exited the vessel.

9 However for Unit 2, while again this is all based on
10 modeling, it would appear that the cores would be in the vessel
11 according to modeling. So it hasn't exited the vessel, yet the timing
12 and releases correspond with the largest radiological contamination
13 actually line up with that NNSA diagram that we all see.

14 Largely, that's probably a result of extremely high core
15 temperatures at the same time that a drywell headlift occurred. So it's
16 suspected that pressure in the containment, the hardened vent or the
17 vents were not utilized at that time. Containment exceeded twice
18 design at that point.

19 The drywell bolt stretched and the head relieved.
20 Fission products were relieved off the top of the structure, and that
21 resulted in the contamination that we see, combined with adverse
22 weather conditions. It was raining.

23 CHAIRMAN BURNS: Okay, thanks. Let me stick
24 with you for a moment. Can you tell me a little bit more about the
25 international benchmarking efforts and analysis activities that are going
26 on with respect to evaluation of the accident, and what the nature of

1 your participation for EPRI is?

2 MR. CANAVAN: Well, various organizations have
3 done their own simulations using their own codes or other predictive
4 methodologies, and EPRI participates through a number of forums,
5 IAEA and some others, WG Risk in Europe, to discuss some of the
6 outcomes of our analysis and compare and contrast.

7 I think largely benchmarking efforts have been
8 between -- in the U.S. between the MAAP code, which is an EPRI-
9 owned severe accident code, and MELCOR which is a U.S. DOE code.
10 Those comparisons have been the subject of much effort and a lot of
11 work. The international ones are really in their earlier stages of
12 comparison.

13 CHAIRMAN BURNS: All right, thanks. So I want to
14 turn to you with respect to a couple of issues -- with respect to the
15 rulemaking effort that's underway.

16 One of the things you noted and I'd appreciate a little
17 more granularity on this, is that you noted that the change control
18 process with respect to I think the FLEX equipment or the beyond
19 design basis strategies, ought to be different.

20 I'd like you to explain that a little more and compare
21 that to what I'll call the normal process or what I call the norm or what I
22 can at least conceive of as the norm for operating reactors.

23 MR. PIETRANGELO: So for operating reactors, we
24 have 10 CFR 50.59, changes, tests and experiments. You do a
25 licensing check basically of the change or experiment you're making to
26 determine if you have an unreviewed safety question.

1 CHAIRMAN BURNS: Right.

2 MR. PIETRANGELO: Okay. There's criteria
3 established in that rule. If you exceed the criteria, you come in for a
4 license amendment. You ask for prior NRC approval before you
5 implement the change. So that's what we do for the traditional design
6 basis material. This is beyond design basis, so I think it's wrong to
7 apply the same tests to it.

8 We think it should be something less than that. One
9 idea was to say that the licensee evaluate the change, keep the record
10 at the plant for inspection. So I think when the NRC's conducting its
11 baseline inspections it can see whatever changes were made and
12 whether they agree with the evaluation that there's still compliance with
13 the rule.

14 So it's very, very simple. There is no submittal made.
15 It's just an evaluation that the plant staff does, the licensee does that's
16 available for inspection. So that's kind of the other end of the
17 spectrum. Is there a 50.59 like process?

18 I haven't heard of one yet, but I think for the kind of
19 safety significance of these beyond design basis things, I think the
20 approach where the licensee evaluates it and keeps the record for
21 inspection is probably appropriate for this category.

22 CHAIRMAN BURNS: And how -- what is it that
23 assures, that maintains the fidelity of the equipment or processes that
24 were intended to implement the design basis?

25 MR. CANAVAN: Yeah. There's --

26 CHAIRMAN BURNS: It's 50.59. It's saying wait,

1 there's not a requirement in 50.59 that those processes, 50.59 the
2 licensee does the evaluation. We know I think historically on close
3 calls, it may be submitted to the NRC. We know that 50.59 doesn't
4 require that.

5 MR. CANAVAN: I think that would still be in place for
6 the areas where the interfaces with the safety systems, where the
7 connections are made for the FLEX equipment. Those would still be
8 subject to 50.59. But for all the rest of those things on the mitigation
9 strategies, I think the licensee can evaluate that and keep the record of
10 the change.

11 We could submit like we do for FSAR updates,
12 50.71(e), a record of those changes that were done and a short basis
13 for why we think we're still in compliance and that could be subject to
14 inspection. So it would be a much less burdensome process for this.

15 CHAIRMAN BURNS: Okay. Mr. Gunter, do you
16 have any thoughts on that or reactions?

17 MR. GUNTER: I think there's -- I think there's a real
18 foggy situation here between license amendments and 10 CFR 50.59
19 that are -- we would appreciate more clarity by providing public with
20 standing.

21 CHAIRMAN BURNS: One other thing kind of I want
22 to talk about is the process and had some discussions in some of my
23 plant visits is the question of the credit for use of FLEX equipment and
24 other applications. I know there have been a couple of instances
25 where it hasn't worked out.

26 Well, it isn't the credit but in term of the application or

1 indication of the FLEX equipment, if you will, hasn't worked out as well
2 as properly intended or thought. I would appreciate what -- give me an
3 idea of what it is that we're crediting or how does that -- how would that
4 work and again ensuring this overall fidelity in terms of undertaking
5 activities at the plant.

6 MR. CANAVAN: Right. So I put them in two
7 categories. The first category is what you can use the FLEX
8 equipment for. I'd say in a qualitative way, modeling it in the PRA or
9 anything like that. So it's just kind of another layer of defense in depth
10 that you could apply to whatever the situation is.

11 Two white papers we've submitted to the staff for
12 consideration and discussion are notices of enforcement discretion and
13 the significance determination process. That's the more short-term
14 applications. Longer term, I think there is discussions already on how
15 you would model FLEX in the PRA.

16 We believe that's going to take longer to work through
17 to determine what's acceptable for that. But in the interim, we think we
18 can use a lot of these qualitative applications. They're not like
19 Regulatory Guide 1174 or it's an amendment you submit, none of that.

20 This is using FLEX equipment. I think one of the
21 cases you may have heard of chairman is a specific licensee used it as
22 defense in depth during an outage using the FLEX equipment. I think
23 that's a terrific application. It allows the plant to have to get their
24 equipment out in the field, hook it up, get familiar with it, in addition to
25 the normal surveillance it's going to get.

26 So the more familiarization you can get with equipment

1 that's not going to be used very often, I think is a win-win. For the staff
2 and the residents and the regions to see the licensee utilize that
3 equipment is a good thing.

4 CHAIRMAN BURNS: Thanks, and my last question
5 Mr. Bunt. Regarding mitigation strategies for the U.S. BWR fleet, it is
6 expected to materially complete by the end of 2016. So for -- give me
7 some flavor for BWR Mark I's and II's. What will be in place at the end
8 of 2016?

9 MR. BUNT: I understand. What will be in place will
10 be their procedures, their connection points for those equipment. The
11 thing that won't be in place is their enhancements to their wetwell
12 venting. The majority of these sites already have hardened wetwell
13 vents that they installed as part of their generic letter back in the 90's.
14 They all have venting capabilities and procedural compliance on how to
15 do that.

16 So what wouldn't be done is the material or the
17 equipment and the enhancements that are done under the 109 order,
18 which would come in at a later date.

19 CHAIRMAN BURNS: Okay, thank you.
20 Commissioner Svinicki.

21 COMMISSIONER SVINICKI: Thank you Mr.
22 Chairman, and I want to thank all the presenters for being here today.
23 My colleagues have covered a number of issues that I was interested
24 in exploring. I think I'll begin by turning to the two questions that
25 Chairman Burns asked, but I am having some difficulty in bringing the
26 two concepts together. This is for Mr. Pietrangelo.

1 On the one hand, the Chairman asked about change
2 control and these are my words, not yours, so I'm paraphrasing. It
3 seems that the industry is setting an expectation that they would like to
4 have some kind of a graded regulatory treatment for change control on
5 some of the mitigating strategies measures and equipment.

6 But at the same time then he -- the Chairman's next
7 question was about perhaps crediting for the existence of some of these
8 strategies and equipment. I know you mentioned that as further
9 defense in depth.

10 But it seems to me a reasonable person could hear that
11 as on the one hand I want a lighter regulatory footprint, and on the one
12 hand, I want to have some kind of underlying acknowledgment of this
13 equipment for fundamental issues within the design basis.

14 So do you acknowledge that it could be heard that way,
15 and if so why is it not that that you're advocating for?

16 MR. PIETRANGELO: I think you've characterized it
17 very, very well. I think you have a new rule that requires us to have
18 these mitigation strategies in place with all this equipment, backed up
19 by the National Response Centers. We want to leverage that
20 equipment to improve safety in certain situations during normal
21 operations.

22 So the lighter regulatory touch, I think, is for any
23 changes in the mitigation strategies the rule requires, as I think
24 appropriate, for the beyond design basis part of the framework. For
25 the existing framework, we're just simply using the equipment as
26 additional safety measures.

1 So I don't see a conflict there myself, but I could
2 understand how it could be construed that way.

3 COMMISSIONER SVINICKI: Well I suspect, and I
4 can explore this with the NRC staff, but in some of the discussions
5 you're having with them, I suspect this is a core issue for them, and that
6 something that is going to be credited, although I don't like that term,
7 maybe acknowledged in underlying or incorporated into underlying risk
8 analyses, I think that it is likely that that will bring with it then a heavier
9 regulatory treatment of whatever it is that you're crediting in other risk
10 analysis.

11 So I think that's going to -- I think a lot of this resolution
12 is going to turn on that question is how much is enough, and I think if it
13 were, you know, the equipment exists. Don't get me wrong. I've been
14 to a lot of plants. I've gone and looked at it and it's substantial and it's
15 physical and you can go look at it.

16 So I would understand a mindset that said but it is here,
17 and it would be usable and used in the event. But on the other hand,
18 I know this sounds profoundly bureaucratic to say, but if it is credited in
19 certain analyses, I think that will have to be a consideration in the
20 regulatory treatment for change control and configuration management
21 and other measures, knowing that it is beyond the design basis and I
22 understand that.

23 But I think it gets a little murky, you know, once we start
24 kind of having it not design basis, it's beyond design basis and yeah,
25 for some fundamental analysis of risk and hazard, we're going to credit
26 its use and existence. I don't know. It's just tricky. It's uncharted

1 territory and that's really all I'm saying. I don't know the answer. I
2 don't think the staff has made up its mind one way or another.

3 MR. PIETRANGELO: My only caution is don't make it
4 harder to improve safety.

5 COMMISSIONER SVINICKI: I think it's likely we can
6 begin with that as a mutual objective for the NRC and the industry.
7 Since we can't solve that one, I'll turn to Mr. Canavan. One of the
8 things that we have an opportunity to do here is to do a validation of
9 modeling and simulation.

10 You had a slide, I think it was Slide 4, that talks about
11 embarking on a long-term in depth technical understanding of the
12 accident. A lot of our severe accident codes, and the Chairman
13 touched on this, are based on our expectation of the behavior of
14 materials and systems.

15 Does this long-term in depth technical understanding,
16 it seems to me this could be a multi-decade kind of research plan. Is
17 it taking that kind of shape?

18 MR. CANAVAN: I think there are -- there's probably a
19 multi-decade research plan, but there's also on-ramps and off-ramps to
20 that that are sooner. So there have been some -- I mentioned that the
21 technical evaluation project, if you go to the first report of that, which is
22 publicly available by the way, and you flip through the executive
23 summary, you'll note that there's a simulation line that has what we think
24 occurred during the event via simulation, and then there's the actual
25 data points that are plotted.

26 And when the data fits well, we know the conclusions

1 that are modeled in the code are probably accurate. So we can -- we
2 have an understanding already of how to model and simulate. We
3 have a very good match, actually, of the core dynamics that occur.
4 There are some things we don't know yet that we make educated
5 guesses on, based on the prevalence of data.

6 For example, did a safety relief valve fail at a certain?
7 Did the head of the drywell lift to produce the consequence that we
8 talked about earlier in radiological terms?

9 So improving that understanding and refining those
10 models and getting higher fidelity is part of the process, and as we learn
11 more about Fukushima and as the Japanese do more and more work
12 to get into the containments and then into the vessels and then
13 eventually remove core debris, we will continually learn lessons that will
14 continually refine those models.

15 Are those models good enough now to do quite a bit of
16 work? Yes, I believe so. I believe that they're substantially the
17 containment and the core models are very good.

18 COMMISSIONER SVINICKI: In terms of the core, if
19 refinement comes through having physical data points, when does one
20 begin to draw physical data out of Fukushima, and I'm reflecting on the
21 fact that the Three Mile Island damaged core ended up in Idaho. I did
22 work out there, not on the core but I had a chance to see detailed video
23 surveys and things that were produced.

24 If you really want to validate a model, being able to
25 have access to the physical thing is how you can know whether your
26 models are at all close. When might the nuclear science and

1 technology sector begin to draw any type of data like that from
2 Fukushima? I guess that's what I mean by a multi-tech study saying it
3 will take a long time to ever be able to have access to that.

4 MR. CANAVAN: Well, since you're familiar with TMI,
5 it took many, many years to get all the way into the core, and if you're
6 familiar with TMI and you go to the site and the control room of Unit 2,
7 there's actually a cutaway mockup of the core. You can see how it
8 melted and relocated.

9 It wasn't until they actually physically saw that and
10 mapped it. They actually mapped it with a laser to get that, to get that
11 model. That provided a lot of insight.

12 So I think it's a discovery process, and we don't
13 normally like those. But it is a discovery process where as we move
14 in, as radiation dies down and we're able to get closer into the
15 containment and then eventually the cores, we'll learn more and more
16 as we go.

17 For example, we'll learn if the head relieved when we
18 can inspect the head bolts. We'll learn more about whether a safety
19 valve failed when we can see it. So for now, we strongly believe that
20 the safety valve failed due to severe accident loads in Unit 2, but we're
21 not positive. So we will have to -- and I meant Unit 3.

22 But we will eventually see. So I think it's a journey is
23 the best answer.

24 COMMISSIONER SVINICKI: Well, I think that for the
25 community of practitioners, there will be a tension dynamic between our
26 desire to have access to data and information with the need of those

1 who are doing the decommissioning will seek to have a timely
2 decommissioning and proceeding along.

3 However, an opportunity to inform our knowledge
4 about something like this is rare, we hope never again. So I think it
5 would be deeply regrettable if we couldn't begin with a very conscious
6 plan of what are those key opportunities to glean these kind of accident
7 insights, and if those can be somehow communicated to those who
8 have the primary responsibility for decommissioning.

9 Like I said, that will be in some tension. So I think that
10 I would hope that the international R&D community would come
11 together to realize that there will be some very significant opportunities
12 here, and if that -- that should be communicated, I would hope, to those
13 who are planning and executing the decommissioning at the site.

14 MR. CANAVAN: Yes. TEPCO is very interested in
15 that, and they pursue capturing that information and sharing it as they
16 go, as well as participating in the international communities that are
17 trying to capture data and model and simulate.

18 COMMISSIONER SVINICKI: Thank you, and Mr.
19 Bunt, if I have a moment, I was just going to ask. You provided a fairly
20 detailed status on a number of implementation activities. But
21 specifically on severe accident hardened containment vent systems,
22 what would be the key schedule uncertainty or, if you will, the long pole
23 in the tent in completing those activities on the schedules currently
24 projected?

25 Sometimes it's design, sometimes it's procurement.
26 Is there anything there that you would identify as having the greatest

1 association with schedule uncertainty for completing those plant
2 modifications as currently projected?

3 MR. BUNT: Thank you. The longest pole for half the
4 plants is design. I believe the other half of the plants are really
5 modifying what they already have to some degree. So our going in
6 there, going forward, design is well underway. We're sharing the
7 lessons learned from the early design plants to the later ones. So we
8 are --

9 COMMISSIONER SVINICKI: Has that been official?
10 It strikes me that the plants have gone to it. It's extremely plant-specific
11 and they have to look at the impact of the integrated system and things
12 like that. So is there much benefit in sharing design lessons between
13 the plants, or are they so plant-specific?

14 MR. BUNT: There is several elements that are good
15 for the sharing from the missile capability to some of the structural
16 impacts for where people are putting their vents, to the procurement of
17 radiation monitors or the indication systems.

18 So we have periodic every two week or every monthly
19 calls within the industry to share their issues or their concerns. But
20 there is a lot of plant-specific design elements that go into when you run
21 the codes for your particular design of your plant site.

22 But the overarching guidance on how you would
23 address some of the unknowns or some of the other areas within the
24 design process, we're doing that collectively as a BWR fleet.

25 COMMISSIONER SVINICKI: Okay, thank you. I'm
26 sorry, Mr. Chairman. I went over by a bit.

1 CHAIRMAN BURNS: Thank you, Commissioner.
2 Commissioner Ostendorff.

3 COMMISSIONER OSTENDORFF: Thank you,
4 Chairman. Thank you all for being here and for your presentations,
5 very helpful. I appreciate the questions of my colleagues. Very
6 thoughtful. I want to start out just maybe by reacting to a comment I
7 think Mr. Pietrangelo made, and I think you're talking about the use of
8 FLEX equipment during an outage. Is that --

9 MR. PIETRANGELO: That's one example.

10 COMMISSIONER OSTENDORFF: Yeah. So I just -
11 - every now and then there's something. That resonated with me for
12 the following reason. Early on, the S5W Westinghouse submarine
13 reactor plants had an emergency cooling system, and that emergency
14 cooling system was routinely used -- well, the design of the system was
15 to provide flow, be it natural circulation in the event of loss of all AC
16 power.

17 Yet that system was also used routinely when the
18 plants were cooled down during an upkeep or refit period, and the
19 operators got experience, I think -- I'm looking at Pat Castleman back
20 there, you were on an S5W submarine in your first, back in, yeah.

21 So we use this a lot just during the upkeep periods, and
22 I think it enhanced the operator awareness of how the system operated.
23 You actually operated the valves, the temperature indications. I had to
24 -- over my 16 years of sea duty, I had to use a system once for real life
25 casualty.

26 I know that I was glad to have had the actual routine

1 operating experience of having used it under non-emergency situations
2 before it was presented as engineering directing issues in a very critical
3 situation. So I just -- I'm not sure what it's worth, but just it's an analogy
4 that I personally, from operating and maintaining submarines, think
5 that's a good thing to enhance operator awareness and familiarity with
6 the system.

7 MR. PIETRANGELO: Just to add a little bit, I think the
8 arena we're talking about here is compensatory measures for
9 something that's going on in the plant. This equipment's all the same
10 across the industry. We've got EPRI collecting data, failure data on
11 the surveillances we're doing on this equipment, so that we can later on
12 start to model it in the PRAs with some actual data and not just on
13 assumptions.

14 I think, you know, to your point, getting your hands on
15 it, using the hooking up is a very, very positive thing, and I don't want to
16 get hung up on the treatment as required by rule. We have EPRI
17 development preventive maintenance templates for these pieces of
18 equipment.

19 So we've already got a pretty good program in place
20 for that. I don't see why it should be different to support comp
21 measures in some of these other areas.

22 COMMISSIONER OSTENDORFF: Thank you. I'm
23 going to stay with Mr. Pietrangelo here. In your Slide 4 inspections, I
24 think your last bullet you indicated there's a concern with potential for
25 growth in inspection scope without careful management oversight. Do
26 you have any details or specifics there or things that are of concern?

1 MR. PIETRANGELO: Not at this point Commissioner.
2 It's just based on experience, and I think I used the maintenance rule
3 example last time I was here. You know, we got a rule. We had five
4 years to implement it. Tremendous industry effort along with the NRC
5 to get ready to implement it, and then when it went to the field for the
6 baseline inspections, the average was four Level 4 violations after all
7 that preparation work.

8 The concern is really based on there's a whole different
9 set of people that's going to have to implement now and interpret the
10 new rules and guidance, etcetera, that weren't engaged with the front
11 end of this. We're keeping around this task force just to maintain that
12 knowledge level.

13 I know NRR has plans to do the same thing with
14 valuable lessons learned within JLD. So it's just a big effort. It's new
15 piece of the regulatory framework, subject to interpretation. So I don't
16 have any specific examples for you at this point. It's just we want to
17 make sure that we capture the operating experience and let all the other
18 licensees in on it, and share it with the NRC on a regular basis, so that
19 the implementation is smooth.

20 COMMISSIONER OSTENDORFF: Well I encourage
21 you that if there are issues that come up, that that be raised to our staff.
22 Does anyone else want to comment on that? Okay. Mr. Canavan, let
23 me ask on the EPRI experience here.

24 I set the clock back to 2012 at this table. When
25 Commissioner Svinicki and I were here, the number of Fukushima
26 issues that come out of SECY-11-0137, looking at the Tier 1, Tier 2,

1 Tier 3. Seismic were some of the hardest issues at that time.

2 There was discussions four years ago at this table
3 about concerns on being able to conduct the seismic hazard
4 reevaluations based on lack of seismic human capital expertise. What
5 can you say about how would you characterize the health and welfare
6 of the seismic expert community at this point in time?

7 MR. CANAVAN: They are very tired. To be in all
8 frankness, that's actually not that far from the truth. My staff, and I
9 know the NRC staff puts a lot of work into continuing to solve some of
10 the more difficult seismic research issues. It's time-consuming. It's a
11 process that tends to evolve.

12 So for example, we look at hazards. We determine
13 that hazards may have increased in certain areas, but only in a certain
14 part of the curve they're a high frequency motion. So we go into a high
15 frequency motion testing program that's quite extensive in, you know,
16 express delivery.

17 So we're working very hard to get that research
18 completed. The research gets completed. We understand the
19 impacts on equipment very well. But then we start looking at
20 structures, and because there's a -- the models originally built for
21 analyzing structures don't handle high frequency motions very well.

22 So now there's another. So it's a discovery process
23 that has continued until recently, and it's been since Fukushima that
24 we've been looking. So I would say that the burden, the demand
25 remains high and we continue to work very hard on the next set of
26 issues.

1 COMMISSIONER OSTENDORFF: Do you think as a
2 result of Fukushima, and I'll also throw in there the Dominion Resource
3 August of 2011 earthquake in southern Virginia, do you think that in
4 2016 there is greater consensus on the approach for seismic than there
5 was before Fukushima, or the seismic hazards?

6 MR. CANAVAN: I think so. I think we're moving in
7 the right direction, and I think we're getting better understanding about
8 seismic motion. However, it is an evolving area. It continues to move.

9 One of -- and actually I'm going to answer a different
10 question if I might, which is what one of my worries is that we continue
11 to analyze issue after issue, and we generally just position those issues
12 to an understanding of higher capacity or significant robustness of the
13 structures.

14 There's a lot of resource spent in evaluating what
15 seems to be a smaller hazard. I know we need that understanding to
16 understand the risk from seismic events. However, there are other
17 hazards as well.

18 So we need to balance resources with what we think
19 the commensurate risk is with the hazard, and in seismic, we probably
20 put a lot of resource in right now for a hazard that's sort of lower.

21 COMMISSIONER OSTENDORFF: Okay.

22 MR. CANAVAN: Or has been show in the past to be
23 lower. I should be more clear.

24 COMMISSIONER OSTENDORFF: Okay. Mr. Bunt,
25 from the experience of the BWR Owner Group arena, has NRC kept up
26 with promulgation of guidance in a time period to facilitate

1 implementation of the various orders?

2 MR. BUNT: Yes. We've worked very diligently with
3 the staff on getting guidance out and getting frequently asked questions
4 for the BWR fleet. We've issued several guidance documents and
5 position papers that support the order.

6 We have had a lot of professional conversations, some
7 candid discussions and come up with a reasonable working element,
8 realizing where each one of the groups come from. Just recently, as
9 part of the Phase 2 work with the 109 order issued a Revision 1 that got
10 endorsed and had a very concise and documented template for the
11 implementation of that.

12 I believe it's speeding up the NRC's review of that, so
13 that we'll get the evaluations in a timely manner to support our design
14 elements.

15 COMMISSIONER OSTENDORFF: Okay. Thank
16 you all for being here. Thank you, Chairman.

17 CHAIRMAN BURNS: Thank you. I want to thank the
18 panel again for their presentations and the discussion this morning, and
19 we'll take a brief break. We'll reconvene at about 10:25 and hear the
20 staff presentations at that point.

21 (Whereupon, the above-entitled matter went off the
22 record at 10:16 a.m. and resumed at 10:26 a.m.)

23 CHAIRMAN BURNS: Okay. We'll call our meeting
24 back to order. And we'll now have a presentation from the NRC Staff.

25 We'll discuss progress on implementing Tier 1
26 recommendations and overview of the Staff's assessment on some Tier

1 3 recommendations. As well as a status update on the remaining Tier
2 2 and 3 recommendations.

3 And the Staff will also discuss plans for NRC oversight
4 of post Fukushima safety enhancements. And I'll turn it over to Deputy
5 Executive Director for Operations, Mike Johnson. Mike?

6 MR. JOHNSON: Thank you. Good morning,
7 Chairman and Commissioners. We appreciate the opportunity to
8 report on -- report to you on the status of our Fukushima lessons
9 learned activities.

10 As a result of the March 2011 accident at Fukushima,
11 we began a race. And at that time we recognized that it wasn't a sprint,
12 and it wasn't a solo activity or individual sport. It was really a long
13 distance relay.

14 And we anticipated that at times the terrain would be
15 rough. We anticipated that sometimes we would see adverse weather.

16 We knew fatigue would set in due to the length of the
17 race and the struggle associated with it. We knew there would be
18 distractions that we'd need to persevere if we were going to be
19 successful.

20 Well, five years into that race here we are. We've
21 come quite a distance. We've made -- the industry has made
22 numerous safety improvements that have been implemented at the
23 facilities. Plants are safer because they are better prepared to deal
24 with extreme natural hazards.

25 And they're better prepared for other design
26 basis -- beyond design basis events. And as the previous panel

1 discussed, I think they're safer because there are margins associated
2 with being able to deal with design basis events.

3 We've made substantial progress. The progress that
4 we made is really a testament to the dedicated and capable folks on the
5 staff and in the industry.

6 And through active stakeholder engagement, external
7 stakeholder engagements. And engagement for example with the
8 Advisory Committee on Reactor Safeguards.

9 I would note we keep count, at this point we've had over
10 250 public meetings. So, we've had an active engagement with those
11 stakeholders.

12 We've also benefitted greatly from our collaboration
13 with our international partners in a variety of interactions. We've had
14 active engagement in the International Atomic Energy Agency and
15 through Nuclear Energy Agency activities as well.

16 And so, I would say we're on the final leg of the race.
17 And the end is within sight. Most of the safety enhancements directed
18 by the Commission will be realized by the end of 2016. Of course we'll
19 give you a detailed description of where we are in each of those
20 individual enhancements.

21 And so we've made great progress. But I want to
22 emphasize that there's still work that remains. And we'll talk about that
23 work that remains as well.

24 And it remains that we need to be focused and
25 provided leadership both on the part of the NRC and the industry in
26 order to be ultimately successful. Slide two, please.

1 Our approach in addressing the lessons learned from
2 the accident has evolved substantially, I would say, from the issuance
3 of the Near Term Task Force report in 2011. For every box on this
4 slide, starting with the Near Term Task Force, we learned from the
5 efforts that proceeded it.

6 And when it was appropriate, we modified our actions
7 based on new information. And based on lessons that we learned from
8 performing our activities.

9 For example, the original hardened vent orders. With
10 those orders we expanded to address severe accident conditions. And
11 to acknowledge the importance of water addition and containment
12 during those circumstances.

13 Ultimately, we added nine additional recommendations
14 from the Near Term Task Force report. And expanded the scope of
15 several others. In some instances we combined issues and in other
16 instances we looked at what was recommended.

17 We did an evaluation. We considered actions that
18 were planned or implemented based on Tier 1 and Tier 2 items. And
19 we decided not to pursue additional action.

20 And of course at the end, the Commission put its -- you
21 put in place, made a decision on each of those actions as we've moved
22 forward. And we've been implementing those actions.

23 We continue. We will continue to learn as we
24 complete our post-Fukushima actions. And we'll continue to make
25 changes, propose changes as appropriate as we go forward. Next
26 slide, please.

1 This slide is really intended to provide on a single
2 picture if you will, the work that we've done. And the work that remains
3 as we move forward on implementing the Near Term Task Force
4 recommendations again as modified by the Staff, approved by the
5 Commission.

6 Our focus today really is on the actions that remain to
7 be closed. We're going to discuss the progress made thus far and the
8 pathway, our pathway for closing those items.

9 But I don't want to lose sight of the fact that a number
10 of the items, many of the items on this slide as indicated in blue, have
11 already been closed. Next slide, please.

12 And so I want to turn to the folks at the table, introduce
13 them briefly. Starting with Jack Davis, who is the Director of the Japan
14 Lesson's Learned Division. And Jack will provide an update on the
15 status of lessons learned activities, particularly to Tier 1 activities.

16 Mohamed Shams, all the way to my right, is the Chief
17 of the Hazard Management Branch. He'll provide an overview of the
18 status of flooding and hazard -- flood and seismic hazard reevaluations.

19 Greg Bowman, who is the Acting Deputy Director for
20 the JLD, will discuss the status of Tier 2 and Tier 3 recommendations.
21 And last but not least, Troy Pruett, who is the Director of the Division of
22 Reactor Projects in Region VI, will discuss the regional activities. And
23 in particular transition to long term oversight.

24 And so with that, I'll turn to Jack.

25 MR. DAVIS: Thanks, Mike. And good morning
26 Chairman and Commissioners. I'm happy to be here again to report

1 up to you the status of where we're at with these activities since we've
2 last met several months back.

3 As Mike said, we continue to be on or ahead of
4 schedule on all the activities. And we have a clearly defined path
5 forward for the remaining items that go beyond the 2016 time frame.

6 If I can have the next slide? Yes, that, thank you.

7 So, starting at the top there, just I'll run some through
8 some of the stats for you just so you know where we're at. As you
9 heard from the industry for mitigation strategies, we're approaching 75
10 percent in compliance.

11 We'll have the remainder coming due this year. And
12 in fact we've already started verification inspections on several of the
13 facilities that Troy's going to talking to you in more detail, gives you a
14 flavor of the things we've been finding out there.

15 The spent fuel pool instrumentation order, about 85
16 percent are in compliance now. And again, with the reminder due the
17 end of the year. And we're also doing the verification inspections of
18 those in conjunction with the mitigation strategies inspections.

19 The hardened vents, you heard Randy talk about
20 almost a third will have phase one, which is the wet wall vent, this year.
21 We're expecting about 75 percent next year. And then the remainder
22 by the 2018 backstop date.

23 And likewise for phase two. They're coming in on a
24 staggered scheduled. But again, most plants will be in compliance
25 with that order. About a year ahead of the backstop date of 2019 that
26 the Commission set.

1 With regard to the reevaluated seismic and flooding
2 work, again by design this goes past the 2016 time frame. We're
3 making good progress in that area.

4 The majority of the plants will have completed their
5 mitigation strategy assessments as we call them by the end of this year.
6 And again Mohamed is going to go into a lot more detail. He'll give you
7 the break out of some of the areas that we're having somewhat of a
8 challenge with.

9 On emergency staffing and communications, the
10 assessments and upgrades are in place for most licensees. And
11 again, the few that are remaining will be done by the end of the year.
12 We see no problem with them making that date.

13 On rulemaking, we recently published the proposed
14 rule for comment. We received a lot of comments. We're in the
15 process of looking at those comments, trying to address those
16 comments.

17 We are on track to deliver the final rule to the
18 Commission by the end of the year. We don't see any problem with
19 making that date. On the next slide I'll talk a little bit more detailed
20 about some of the comments that we had.

21 In 2015 we took the insights as you had instructed us
22 to do on the Tier 1. And we started applying those to the Tier 2 and
23 Tier 3 items. And we were able to adjust our schedules to get to an
24 earlier disposition of those items.

25 And following the Commission's approval, we've
26 closed all group one items now. And just recently closed group two.

1 And again, we're on track to close the remaining group three items by
2 the end of this year. And again, Greg will provide you more information
3 on that.

4 So, really what we have left with Fukushima now,
5 where our real focus is, is the seismic, the flooding, the vent work.
6 We're completing our safety evaluations for all of this work so we have
7 a durable record from a regulatory standpoint.

8 And then of course we've been over the last couple of
9 months, perhaps even a year, transitioning some of the activities back
10 to the line. And of course transitioning to oversight.

11 And I would mention, you know, you heard Tony talk
12 about he's concerned about inspections. We've been doing a lot of
13 lessons learned, a lot of acknowledgment management with the
14 Regions. They've been hand in hand with us throughout this process.

15 So, if we can have the next slide, please. So, just a
16 little bit of detail on some of the comments we got. We received about
17 20 comment letters.

18 And these included hundreds of individual comments.
19 Many of the comments are going to help us further improve the clarity
20 of the rule and get a higher quality product that can get approved.

21 The four common areas that I've show here, it's really
22 to give you a flavor of some of the comments that we're receiving. And
23 also, some of the ones that perhaps have a little bit of a stickiness to
24 them that we have to take pause and think about before we move
25 forward with.

26 So, starting with the loss of all AC power. There's a

1 bit of a disagreement I guess between commenters on the concept of
2 the loss of all AC power.

3 In mitigation strategy we talked about it in terms of you
4 lose offsite power concurrently with losing your emergency diesel
5 generators. But, we allowed them to take credit for inverters for motor
6 control centers and so on, as long as those items could be protected
7 from the external hazards.

8 The language that we had in the Orders we carried
9 through to the Rule. So, some people have challenged us to say that
10 well, that's not a strict interpretation to the loss of all AC power, right?
11 Because you're using inverters, you really haven't from the DC busses,
12 and you're turning it into AC.

13 We feel that, you know, the strict interpretation of that
14 we can still deal with. And we still have contingencies for that where
15 they have portable equipment that they can take readings from. And
16 they have alternate means of powering this equipment if those
17 particular centers weren't available.

18 And again, as I said before, that we specifically looked
19 to make sure that for instance if we had flooding and you were going to
20 flood out your distribution center, well, that's not acceptable to us. So,
21 I think we can just clarify the Rule language somewhat more. And I
22 think we would be okay in that area.

23 On multi-source term dose assessment, we received a
24 comment from industry that the backfit justification that we had for that
25 was not sufficiently developed to justify the backfit. We went back.
26 We took a look at what they had provided to us.

1 And we feel that the initial look perhaps, there's some
2 validity to that concern. If that stands, if that conclusion is
3 substantiated, then perhaps a voluntary regulatory approach may be
4 appropriate. Because we still feel that there's significant safety added
5 by having these particular multi-source term assessments.

6 We received regulatory commitments from all
7 licensees back in 2014 that they were going to do this. So, we don't
8 really see an issue with relaying on a different regulatory tool if we need
9 to go the voluntary route.

10 On reevaluated hazards, we received comments that
11 the Rule language could be improved to better reflect the means of how
12 we're addressing reevaluated hazards. And then also to incorporate
13 risk informed approach for these hazards.

14 We feel that we're very receptive I guess to the risk
15 informed approach. We've done risk informed approaches with the
16 mitigation strategies Order. And really, we believe that it's already
17 there in the Rule. We think it's just another way for them to be saying
18 that -- what we're already currently allowing.

19 Nevertheless, we think that maybe the best approach
20 here would be to put in the statements of consideration to have better
21 clarification that risk informed approaches would be an acceptable way
22 of dealing with some of the hazards. And then on the clarification
23 points, we would just take those comments and put them into the Rule
24 language itself.

25 With the change control, I heard a lot of discussion with
26 the previous panel on change control. We receive comments

1 suggesting that NRC should include some more rigor, some more
2 specific requirements in the Rule.

3 Currently, we have it set, as you heard Tony talking
4 about that the plants can do an evaluation. They would keep that
5 onsite. It's certainly inspectible by the agency at any time it wants to
6 look at those things.

7 And we felt that that was the best way to deal with the
8 beyond design basis nature. The fact that it's a very flexible approach
9 so that it's really at the highest level of the strategy.

10 That's really concerned about that they not change.
11 And then the other things that they can change them below if they follow
12 the normal process, would be acceptable to us.

13 There certainly are pros and cons to putting more detail
14 into the Rule that say here's some more explicit criteria to use. And
15 we're going to have to go through that.

16 We haven't even had a chance really yet to work this
17 up the chain of leadership to get some different ideas about how we
18 might do this. We have some options. And we're going to present
19 those and then we'll figure out how it goes before we owe you the Rule
20 at the end of the year.

21 And finally, on implementation, it's another key area I
22 think for consideration of the Rule. We have a lot of moving parts right
23 now. A lot of different schedules with things coming into compliance.

24 So, to -- the more that we can anticipate that and the
25 more that we can design in if you will, the flexibility in the Rule, the better
26 off we're going to be. Where we can avoid unnecessary burden, you

1 know, of having people coming in and asking for an exemption when
2 we already know that they're going to be on a certain schedule.

3 So, we're trying to build that into the Rule as well with
4 the language. And with that, I'll turn it over to the next speaker.

5 MR. SHAMS: Thank you, Jack. Good morning
6 Chairman and Commissioners. It is my pleasure to be here today
7 reporting on seismic and flooding. And what we're doing on these
8 activities.

9 My first slide, I thought to put up a flow chart to describe
10 the overall picture of how we're proceeding with flooding and seismic.
11 It is more for the benefit of someone that might not be as familiar with
12 the Commission is with this activity.

13 So, last year the Commission directed the Staff to
14 develop an action plan to ensure that the mitigation strategies address
15 both the timely completion of the 50.54(f) letters and the insurance that
16 the mitigation strategies addressed the reevaluated hazard. This slide
17 provides the overview for that plan.

18 The action plan consisted of two, as you can see, two
19 parallel paths. One associated with ensuring that the mitigation
20 strategy is developed in response to Order EA-12-049 can be
21 implemented under the reevaluated hazard conditions.

22 The other path is associated with completing the
23 50.54(f) letters and to identify opportunities for further safety margins.
24 The NRC and the industry are proceeding aggressively along those
25 both paths.

26 Developing the necessary guidance. And completing

1 the associated assessments. I would say that the NRC Staff has clear,
2 well-defined approaches for completing both actions.

3 I also want to take an opportunity to indicate that as the
4 Commission directed us in carrying out the 50.50(f) letter assessments,
5 we always seek opportunities to focus the scope on those plants that
6 would benefit from the safety enhancements.

7 For example, last year we rescreened the plant's doing
8 the SPRAs. And the Staff informed the industry that only 20 sites need
9 to complete these detailed seismic probabilistic risk assessments.

10 Also, with the revised guidance and flooding, we
11 anticipate that fewer than 10 plants would need to do integrated
12 assessments. The original count was more like 50 plants would be
13 doing that.

14 The remaining sites will either screen out from further
15 evaluations or perform limited scope evaluations to complete the
16 information request. Next slide, please?

17 So, getting to the specifics and the statistics of what
18 we've done. What we can see on the slide is that the Staff and industry
19 have made substantial progress in completing the flooding and the
20 seismic hazard reevaluations.

21 In the seismic areas as we can see, all licensees
22 completed the hazard reevaluation. And the Staff provided feedback
23 on the adequacy of the reevaluated hazards.

24 Licensees with an increase in hazard completed an
25 interim act evaluation known as the expedited approach. And it's
26 intended to ensure adequate seismic margin existed while the detailed

1 risk assessments are underway.

2 We've issued staff assessments for all central and
3 eastern United States sites. And we are on schedule to issue the
4 remaining three Staff assessments for the western U.S. sites. And that
5 should be completed by the end of this year.

6 In the flooding review area, with the exception of two
7 sites requiring assistance from the U.S. Army Corps of Engineers, all
8 sites have submitted their reevaluated flood hazard information. And
9 the Staff is providing feedback on the acceptability of that hazard.

10 To date we've issued 51 letters asserting the
11 acceptability of the hazards submitted by the licensees. The remaining
12 ten sites needed additional time to implement the U.S. Army Corps of
13 Engineers information or to finalize calculations or licensee initiated site
14 layout changes.

15 The Staff expects for the remaining ten sites, we expect
16 to provide feedback letters for the majority of them by the end of this
17 year. There maybe one by -- in next year.

18 We can also see on the slide, at the bottom right corner
19 that work remains in documenting the flood reviews and staff
20 assessments. To date we've issued only 15 staff assessments for 25
21 percent of the sites.

22 And I should say that this was done by design as part
23 of our recovery plan for the flood reviews. Over the past nine months,
24 we have directed the Staff's efforts to focus on issuing hazard letters in
25 lieu of Staff assessments to provide the licensees with the needed
26 information to proceed with their mitigation strategies assessments.

1 And as a result of this movement, the vast majority of
2 licensees are now able to and on track to complete their mitigation
3 strategies assessments. In the coming months we will shift our focus
4 back to issuing the remaining Staff assessment. And we will do so in
5 an expedited manner. Next slide, please.

6 As I indicated, we're proceeding down two parallel
7 paths for both the seismic and flooding reviews. This slide captures
8 the ongoing activities in the flooding review area to support both the
9 mitigation strategies and the closure of the 50.54(f) letter.

10 In addition to the progress and the hazard as I indicated
11 on the previous slide, the Staff and the industry have made significant
12 strides in developing the guidance necessary to complete the remaining
13 assessments.

14 And the Staff recently endorsed their revision to the
15 industry's guidance for mitigation strategies NEI 12-06 in order to
16 provide guidance to the licensees for performing the mitigation
17 strategies assessments or MSAs at the reevaluated hazard level.

18 All licensees will perform this evaluation. And the
19 majority of them will complete it by the end of 2016. In fact Mr.
20 Pietrangelo indicated this morning that 50 of them will be completed by
21 the end of this year.

22 I should say that last April we've actually received the
23 first submittals of the MSAs. So, licensees are not waiting until the end
24 of the year. They've already been submitting them to us. And we're
25 in the process of reviewing them right now.

26 To support the 50.54(f) letter, the other path, the

1 industry submitted a revised integrated assessment -- guidance, also
2 known as the Phase One Guidance. As directed by the Commission,
3 this guidance provides a graded approach for performing integrated
4 assessments such that the integrated assessments are focused on
5 those plants where there is the greatest opportunity for additional safety
6 enhancements.

7 This graded approach will enable most licensees to
8 demonstrate an effective plant response to the reevaluated hazard by
9 submitting a focused evaluation. The limited number of sites needing
10 to submit integrated assessments will complete them by the end of
11 2018.

12 In terms of endorsing the Phase One Guidance, the
13 Staff has issued a public document, it's a draft guidance to endorse this
14 Phase One Guidance. The Staff also met with the ACRS and
15 discussed the Guidance and received feedback a couple of weeks ago.

16 After addressing the public comments and the ACRS,
17 the Staff will finalize its endorsement of the Guidance. And will inform
18 the Commission in June prior to implementation.

19 Another guidance document that we've been working
20 on is the so called Phase Two Guidance. That's the Guidance on
21 carrying out additional actions as necessary based on the integrated
22 assessment results.

23 We're progressing well on this Guidance as well.
24 We're on track to complete it in October. And again, inform the
25 Commission of its completion. Next slide, please.

26 This slide outlines the steps in the seismic hazard

1 reevaluation process to support, to gain the two activities, mitigation
2 strategies assessments and the 50.54(f) letter. We're taking an
3 approach that's similar to the flooding reevaluation approach.

4 Again, in support of the 50.50 letter closure, since we
5 met with the Commission last time, the Staff has endorsed the industry's
6 guidance for performing high frequency and spent fuel pool
7 confirmation. And the industry is proceeding to complete these
8 confirmations on schedule.

9 With respect to the mitigation strategies, again similar
10 to flooding, all licensees will complete this assessment to ensure that
11 the strategies can be implemented under the reevaluated hazard.

12 In January of this year, the Staff endorsed Appendix H
13 to NEI 12-06, which provides guidance to most licensees on performing
14 this strategies assessment. And as we've seen this morning on the
15 chart that Mr. Pietrangelo presented, the majority of licensees will be
16 done by the middle of next year completing this assessment.

17 I should indicate that a number of licensees are aiming
18 to leverage insights from their probabilistic risk assessments into their
19 mitigating strategies assessment. The guidance for those sites are
20 under development.

21 It has been a focused area for the Staff and the industry
22 over the past few months. NEI plans to submit this guidance to the
23 Staff in the third quarter of this year. And that's intended to support the
24 schedule for the final mitigation of beyond design basis events rule.

25 Also, in terms of Phase Two, the Staff is also working
26 on the seismic guidance in that area. And we plan to submit it to the

1 Commission along with the flooding guidance in October.

2 With that, I'll turn the briefing over to Greg to talk about
3 Tier 2 and Tier 3 recommendations.

4 MR. BOWMAN: Thank you, Mohamed. As we
5 discussed at our last commission meeting in November, Committee
6 resolution on the open Tier 2 and Tier 3 recommendations has been a
7 high priority for the Staff over the last year.

8 We provided SECY-15-0137 to the Commission back
9 in October with proposal for resolving each open item. And our goal in
10 developing that paper was to identify disposition plans for each open
11 recommendation in a timely and efficient manner while ensuring a
12 strong technical and regulatory basis exists for our ultimate disposition
13 approach.

14 As we discussed in SECY-15-0137, the majority of the
15 open Tier 2 and Tier 3 recommendations were evaluations to determine
16 if there's a need for specific regulatory action, like issuance of an order
17 or 50.54(f) letter, rather than a recommendation -- excuse me, there
18 were evaluations determined that there was a need to take regulatory
19 action rather than a recommendation to actually take a regulatory
20 action.

21 So, given that, our focus has been on completing those
22 evaluations and identifying whether additional regulatory action is
23 needed beyond what's already been done. When we briefed you on
24 SECY-15-0137, we discussed that the recommendations fit into three
25 groups.

26 Group one recommendations were those we believed

1 could be closed. Group two recommendations were those where our
2 initial assessment identified what we felt was a sufficient closure basis.
3 But where we felt there would be benefit to additional interaction with
4 stakeholders before finalizing that assessment.

5 And the group three recommendations were those that
6 we felt required additional evaluation or development before we were
7 ready to provide the Commission with our closure recommendation.

8 As you know, the Commission approved the Staff's
9 plan for the open Tier 2 and Tier 3 recommendations earlier this year,
10 including the closure of the group one recommendations.

11 Since that time we've completed our evaluation of the
12 group two recommendations. Incorporating insights from our
13 interactions with ACRS, the public and the ongoing state of the art
14 reactor consequence analysis.

15 We provided our final assessment to the Commission
16 on these recommendations at the end of March. And they are now
17 closed.

18 In the next few slides I'll discuss our basis for closing
19 the group two recommendations. And then I'll provide a brief status
20 update and next steps for the group three recommendations.

21 Before I do that, I did want to take a minute to highlight
22 the fact that we completed an evaluation of these modified, or
23 potassium iodine distribution practices as part of SECY-15-0137, since
24 that issue came up on the previous panel.

25 As part of that evaluation we considered the
26 radiological impacts in Japan from the Fukushima accident as

1 documented in a number of recent studies. We ultimately concluded
2 that insights from the accident did not call into question the KI
3 distribution practices in the U.S.

4 So we recommended and Commission approved
5 closure of that recommendation. Next slide, please.

6 So this is the first group two recommendation and it
7 came from ACRS. ACRS recommended that we assess the need to
8 upgrade certain reactor and containment instrumentation such that it
9 can survive the conditions that might exist during a beyond design basis
10 event.

11 In SECY-15-0137 we discussed that based on the
12 results of our initial assessment, there will be only a small additional
13 safety benefit from opposing new requirements in this area. The
14 primary factors in that conclusion included insights from the mitigation
15 of beyond design basis events rulemaking.

16 And post Fukushima safety enhancements, which in
17 addition to providing new capabilities to prevent core damage, also help
18 ensure continuity of important instrumentation from the onset of an
19 event at least until core damage begins.

20 Our initial assessment also considered existing
21 guidance for treatment of instrumentation that may be impacted by
22 severe plant conditions. This guidance includes provisions for the use
23 of alternate instrumentation if primary instrumentation becomes
24 unavailable, treatment of instrumentation uncertainties that may exist in
25 environmental conditions, the use of computational aides when direct
26 measurement of plant parameters can't be obtained, and actions to take

1 if conditions in the plant degrade such that there is no reliable
2 instrumentation.

3 Our more recent interactions with ACRS and other
4 stakeholders have further supported our initial assessment and led to
5 our final assessment, which closed the recommendation. The primary
6 change from the initial to a final assessment with the addition of further
7 discussion of the approaches that licensees would use in the event
8 installed instrumentation is unavailable due to environmental
9 conditions, including the use of analytical techniques.

10 It also reflects recent developments associated with
11 the Severe Accident Management Guidelines. Including the submittal
12 of SAMG-related commitment letters from power reactor licensees, and
13 the Staff's progress in developing the oversight program for SAMGs.

14 Our recent paper also notes that we will continue with
15 ongoing work to update guidance that could be used on a voluntary
16 basis by the industry if they choose to make instrumentation
17 enhancements. Next slide, please.

18 The next group two recommendation came from the
19 Near Term Task Force recommendation 5.2. And it involved an
20 evaluation of the need for hardened vents on containments other than
21 Mark I's and Mark II's.

22 SECY-15-0137 provided a containment by
23 containment initial assessment of this recommendation along with
24 plants to obtain input from external stakeholders and the ACRS before
25 finalizing that assessment.

26 Our initial assessment considered a substantial

1 information that was available pre-Fukushima studies on containment
2 performance such as the Containment Performance Improvement
3 Program from the 1980s.

4 We also considered the post-Fukushima Mitigating
5 Strategies Order, EA-12-049. This includes requirements for
6 maintenance of the containment function under extended loss of AC
7 power conditions.

8 This Order applies to licensees of all containment types
9 and addresses the primary objective of the initial Mark I and Mark II
10 containment vent order specifically to remove heat and pressure from
11 the containment.

12 For example, for Mark III containment types,
13 compliance with the Mitigating Strategy Order requires licensees to put
14 in place measures to remove heat from the containment, generally
15 through repowering suppression pool cooling equipment using portable
16 power supplies.

17 Finally, insights from the graph containment protection
18 and release reduction regulatory basis for Mark I and II containments
19 supports the finding that any risk benefit resulting from enhanced
20 venting capabilities for other containments would likely be orders of
21 magnitude below the quantitative health objectives.

22 Meaning that we would not be able to justify such
23 action as a cost beneficial substantial safety benefit under the backfit
24 rule.

25 Since providing the Commission with our initial
26 assessment, we've enhanced that assessment based on interactions

1 with the ACRS and the public. And we've also incorporated insights
2 from the ongoing SOARCA study for Sequoyah, an ice condenser plant,
3 in additional analysis we've done for Mark III containments.

4 As with the previous recommendation, the work we've
5 done since completing our initial assessment, further supports the
6 staff's initial conclusion that further regulatory action in this
7 recommendation is not warranted. Next slide, please.

8 The final group two recommendation, recommendation
9 six, came from the Near Term Task Force. And it recommended that
10 the staff evaluate the need for enhancements for control and mitigation
11 of hydrogen inside containments in an adjacent structure based on
12 insights from the accident.

13 In evaluating this recommendation, we were able to
14 take advantage of significant information available from previous
15 studies as well as from a recent international effort to study hydrogen
16 control practices.

17 As with the previous recommendation the October
18 SECY paper provided a containment by containment initial assessment
19 of this recommendation. And we concluded that additional study is
20 unlikely to identify the need for further regulatory action.

21 That conclusion was based in part on existing
22 requirements in 10 CFR 50.54 for containment hydrogen control. And
23 the fact that the mitigating strategies order provides a layer of defense
24 against core damage and the resulting hydrogen generation that didn't
25 exist before the Fukushima accident.

26 Our initial evaluation also considered a number of

1 containment specific factors. For example, in the case of Mark III and
2 ice condenser containment types, compliance with the Mitigating
3 Strategies Order includes provisions for repowering hydrogen ignitors
4 from portable power supplies.

5 The analysis we've done have shown that the
6 availability of the hydrogen ignitors can significantly improve
7 performance of the containment under severe accident conditions.

8 Finally, as with the previous recommendation, studies
9 completed for the containment performance and release reduction
10 rulemaking show that imposition of additional requirements in this area
11 beyond those already in place, wouldn't be justified under the backfit
12 rule.

13 So, we've enhanced our initial assessment based on
14 interactions with ACRS and the public. And we've also incorporated
15 insights from the ongoing SOARCA analysis for Sequoyah, and some
16 additional analysis for Mark III containments.

17 As with the previous two recommendations, the work
18 we've done since our October paper further supports the staff's initial
19 assessment that this recommendation should be closed. Next slide,
20 please.

21 So, in addition to our focus on the group two
22 recommendations, we've also been working on completing our
23 evaluation of the group three recommendations, which are listed on this
24 slide.

25 In our October SECY paper we described a four step
26 screening process for evaluation of external hazards other than seismic

1 and flooding. We're nearing the completion of a paper that will provide
2 the Commission with the results of the second step of that process,
3 which will identify a list of hazards that will require additional review.

4 We held a public meeting on that subject in early April.
5 And we recently met with the ACRS full committee and subcommittee.
6 We plan to provide our paper to the Commission at the end of this
7 month. And then our overall assessment of that issue at the end of the
8 year.

9 We've also been working on developing an approach
10 that can be used going forward to systematically assess new
11 information related to external hazards. This project is related to Near
12 Term Task Force recommendation 22, although it's been expanded to
13 include more than just seismic and flooding hazards as was originally
14 envisioned.

15 We've begun developing a proposal to address this
16 recommendation. And we're planning to engage with stakeholders,
17 including the public, the industry, other governmental organizations and
18 the ACRS in the coming months. Our approach for resolving this
19 recommendation is due to the Commission at the end of this year.

20 The final group three recommendation involves an
21 assessment of the need for real time radiation monitoring in the
22 emergency planning zones and onsite. We've been actively evaluating
23 this recommendation since October and we're on schedule to have the
24 final assessment completed by the end of this year.

25 So, in summary we're on track to complete our
26 evaluation of all the group three recommendations later this year

1 consistent with the initial plans we provided to the Commission. And
2 with that I'd like to turn to -- I'd like to thank the Commission first for the
3 opportunity to brief you on this important activity, and turn the
4 presentation over to Troy to discuss oversight activities.

5 MR. PRUETT: Thanks, Greg. Good morning,
6 Chairman and Commissioners. Today, I'll be discussing the Regions'
7 role in oversight. The NRC Staff conducted onsite audits to review
8 technical issues and observe modifications to the plant. Following
9 notification by a licensee that compliance has been achieved, the NRC
10 Staff will complete a safety evaluation to document its assessment of
11 licensee's final integration plan for compliance. This safety evaluation
12 will be used to provide regulatory assurance and support completion of
13 the NRC inspection activities. TI-191 is being used to verify
14 compliance.

15 Staff from JLD, who are responsible for the safety
16 evaluations, will be assisting the Regions in the initial inspections.
17 Additionally, Headquarters staff may all assist in the inspections.
18 Cross-regional teams are being utilized during the initial inspections in
19 each Region. The Staff is using cross-regional panels, along with
20 established process, such as the significance determination process, to
21 disposition any performance issues identified with these inspections.

22 A draft Manual Chapter 0609 Appendix O is out for
23 industry comment. In it's current form, Appendix O would have a
24 detailed risk evaluation performed if one of the three safety functions of
25 core cooling, spent fuel pool cooling, or containment is unavailable for
26 more than 72 hours. So what that will do is kick it out to a Phase 3

1 analysis. Next slide, please. Inspections will be scheduled shortly
2 after the Staff issues the safety evaluation for each plant. And just as
3 a side note, that's about four to six months from the time we get the
4 safety evaluation in-house. That gives us time to notify the licensees
5 through traditional processes that we're planning an inspection activity.

6 A pilot inspection was completed at Watts Bar in 2015.
7 More recent inspections have been completed at North Anna,
8 Robinson, and Cook. The majority of inspections conducted under
9 TI-191 will be completed in 2017. Inspection issues to date have
10 involved the adequacy of procedures for storing and testing FLEX
11 equipment, calculations for room heat-up following a loss of ventilation,
12 and labels marking deployment locations or hall paths. All of the
13 observations have either been minor or of very low safety significance
14 or green. With more plants coming into compliance with the new
15 requirements, inspection and oversight activities will increase from this
16 point forward.

17 The Staff has developed a transition to oversight plan.
18 The transition plan outlines roles and responsibilities and ongoing
19 activities. The plan ensures consistent implementation through
20 engagement and alignment of management. For example,
21 cross-regional panels and cross-regional participation in development
22 of programmatic tools. The plan provides for enhanced knowledge
23 transfer opportunities. For example, visits to sites and the response
24 centers, training at regional counterpart meetings, and bi-weekly calls.
25 And the plan also provides for development of knowledge management
26 tools. Those involve training modules and the development of a

1 SharePoint site to exchange knowledge items.

2 Once all initial inspections have been completed, a
3 longer term inspection process will be developed using TI-191 as a
4 basis and incorporating any lessons learned. Normal processes will
5 be used for long term oversight, such as the Baseline Inspection
6 Program under the Reactor Oversight Process. The Staff is currently
7 conducting training and creating a conduit for sharing information
8 among the Regions and other NRC Staff. We are also working with
9 industry representatives to prepare for our onsite activities.

10 A number of related activities are ongoing with long
11 term oversight. For example, the Staff is developing the oversight
12 program for the National SAFER Response Centers using the vendor
13 inspection program. Findings at the SAFER Response Centers are
14 expected to be dispositioned by issuing Notices of Nonconformance to
15 the vendor overseeing the facility. The Staff plans to develop the
16 inspection approach for the hardened vent order and for any changes
17 made to the mitigation strategies in response to the reevaluated
18 flooding or seismic hazards.

19 All licensees submitted commitment letters in 2015 to
20 integrate severe accident management guidelines, or SAMGs, into their
21 emergency response procedures. The NRC Staff will review the
22 generic BWR and PWR SAMGs, implement the necessary training for
23 Staff, and revise inspection guidance. Changes to inspection
24 guidance for site specific SAMGs should be completed by December
25 2020. That's all my comments, Mike. I'll turn it over to you.

26 MR. JOHNSON: Thanks, Troy. Slide 19, please. So

1 as you can see, we have achieved significant progress on implementing
2 the safety enhancements as a result of the Fukushima accident. As
3 outlined in the presentation, we're on track to ensure that the majority
4 of those safety enhancements are in place by 2016, the end of 2016.
5 As we -- finishing with the point that I made at the start, our work's not
6 done. Hopefully we've reemphasized the importance that we push to
7 the finish line those activities in seismic and flooding, for example, that
8 we do the transition to oversight, that we capture knowledge as we go
9 forward.

10 We're going to continue to monitor research activities
11 and work that might be coming from other Lessons Learned activities
12 as they happen in our country and around the world. We'll continue to
13 engage effectively with stakeholders, as I think we have in the past, to
14 solicit their input and consider them in our activities. We're going to
15 continue to stay attuned to what happens in the international community
16 and make adjustments, proposed changes should they be warranted.
17 So, again, I think we've made good progress, we'll continue to stay
18 engaged as we go forward as a result of the items that have been raised
19 as a result of the lessons -- associated with the Fukushima Lessons
20 Learned, to ensure that we do in fact make plants safer. This
21 concludes the Staff's briefing and we look forward to the question that
22 you may have.

23 CHAIRMAN BURNS: Thank you, Mike. And, again,
24 we'll begin questions with Commissioner Baran.

25 COMMISSIONER BARAN: Well, thanks everyone for
26 your work and for your presentations. One of the ongoing Tier 3 efforts

1 is focused on developing a system for proactively evaluating new
2 external hazard information on a routine basis. The goal is basically to
3 actively seek out new scientific information that may deepen and refine
4 our understanding of external hazards. I think it's an important effort,
5 particularly in light of the expected impacts of climate change on some
6 hazards, like flooding, extreme temperatures, and drought. Greg
7 provided a brief update on the status of this work, but I would be
8 interested in hearing a little bit more about where we are on that. I
9 know you have all year to do it, but I'm curious about where we are.

10 MR. BOWMAN: Yes. So, we are in the, sort of the
11 early phases of developing the process and we don't have internal
12 alignment yet on how it will look. Our thoughts right now, we have a
13 framework put together that would consist of essentially three
14 components. The first being knowledge management, where we take
15 the Lessons Learned from Recommendations 2.1 and 2.3, we take the
16 things we've learned about plant response to those hazards and
17 incorporate them into sort of a -- sort of memorialize them so we can
18 use them going forward.

19 The second component would be to sort of either
20 establish new or reestablish relationships with other federal agencies
21 and with the industry that are involved in hazard assessment. Things
22 like -- groups like NOAA, the Army Corps of Engineers, EPRI, to support
23 us going forward in that initiative. As part of that, we would be looking
24 to establish routine interactions with those organizations so that we can
25 gain insights from the work they're doing.

26 And then the third component of it would be sort of the

1 implementation component of the process, where we take new hazard
2 information in, we screen it against established criteria, we decide if
3 further regulatory action is needed. So those are the three main
4 components we're looking at. We do have some work left to do sort of
5 to align internally and then to get input from external stakeholders
6 before we're ready to propose an approach to the Commission.

7 COMMISSIONER BARAN: Okay. Well, thanks for
8 that update. I think there are at least two approaches one could take
9 to assessing external hazards. One is to do a periodic reevaluation
10 after a set number of years. And another approach is what you all are
11 looking at right now, which is, is there a way to do it on a more ongoing
12 basis? It sounds like, based on the work you've done to date,
13 that -- well, I'll just ask it as a question. Does it look like doing this on
14 more of an ongoing basis is going to be a feasible thing to accomplish?

15 MR. BOWMAN: I think it is feasible. There are a
16 number of challenges, though. I mean, I'll give one example and then
17 Mo might have additional examples, but the tools that we have available
18 to us to assess hazards are not fully developed for all types of hazards.
19 You heard that our work in seismic has benefitted greatly from the fact
20 that that was a very well developed field. Flooding is not quite at the
21 same place. And so, going forward, we're going to be challenged, I
22 believe, in the maturity of those tools and applying them going forward.
23 So that will be a challenge. I think it's feasible for us to develop an
24 approach, but we want to make sure that that approach is consistent,
25 predictable, and not overly resource burdensome.

26 COMMISSIONER BARAN: Okay.

1 MR. BOWMAN: So, I think it's feasible. I think there
2 are challenges that are going to require attention from the management
3 team at the NRC.

4 COMMISSIONER BARAN: Well, I'm looking forward to
5 seeing what you come up with over the next several months. I really
6 appreciate that you're doing this work, I think it's important and I think
7 it's an interesting approach that's a little different than what people were
8 originally suggesting --

9 MR. BOWMAN: Right.

10 COMMISSIONER BARAN: -- here, but it may have
11 some real benefits of going that way. Mike, I also wanted to follow up
12 on the discussion I had with the first panel about how announcements
13 of plant shutdowns will affect compliance with post-Fukushima safety
14 enhancements or requirements. On the first panel, we talked a little bit
15 about the example of Oyster Creek essentially getting an exemption
16 from the requirement to install a wetwell vent. I just mentioned
17 Fitzpatrick recently submitted a couple of requests. Are we expecting
18 to receive more exemption or extension requests of this type, either for
19 the vent requirements or for other post-Fukushima requirements?

20 MR. JOHNSON: Thanks, Commissioner. I don't really
21 know whether or to what extent we might get additional requests for
22 relaxations. I would say certainly it's possible or feasible that we
23 would, but we don't know of any today. But, if I can just go forward
24 then with that notion, one of the things that I want to point out, as I was
25 listening to the discussion in the previous panel, is that for the majority
26 of plants that we know about between now and 2018, the majority of

1 those will be in compliance with the mitigating strategies rule, for
2 example, with the spent fuel pool instrumentation order. So, those
3 plants we know about.

4 For plants that have to put in vents, severe accident
5 capable hardened vents, those orders become effective around, or
6 those implementation dates are around 2018-2019, which is when
7 those plants would be shutting down. So we have a good understanding
8 about the folks who are on the plate, if you will, with respect to their
9 intentions. And I think because we, for example, had built into the
10 mitigating strategies rulemaking actually provisions for plants in
11 decommissioning, once that rule is effective, we'll be in a stable place
12 from a regulatory perspective dealing with those, should they happen
13 after that fact.

14 COMMISSIONER BARAN: Right now, in the absence
15 of having gone final on the mitigating strategies rule, can you talk to us
16 a little bit about how the Staff evaluates these exemption or extension
17 requests?

18 MR. JOHNSON: Sure, Commissioner. If I could, I'm
19 going to ask Jack to do most of that discussion. I do want to point out
20 that, as you are aware, because you made this point actually in the
21 earlier panel, it is a case-by-case evaluation. When we look at what is
22 requested, it's often plant specific. When we look at what we would
23 consider, in fact, it is plant specific, case specific. And so, because
24 plants give us lots of leeway typically for those requests, we have
25 enough time to look at what their rationale is, what their justification is,
26 what compensatory things they might be doing, and that enables us to

1 be very thoughtful and deliberate about making a decision. So, Jack,
2 do you want to add to that?

3 MR. DAVIS: Sure, thanks, Mike. Yes. And I think it's
4 important to point out too that really we've had two sets, if you will, of
5 different kinds of exemptions. From the mitigation strategy order, the
6 majority of those, all of them, I take it back, all of them have been just
7 to extend some time for them to complete it. It's still meeting the
8 backstop date. The few that go beyond there are related to the plant
9 shutting down. So for the -- you mentioned Oyster Creek, I think it's
10 important to recognize, we look at those very seriously, we expect them
11 to have compensatory measures in place to essentially accomplish the
12 same thing they would have accomplished with the order.

13 In Oyster Creek's case, in particular, the wetwell vent
14 that they currently have, they still have to be able to operate those
15 valves, open and close that vent without any mode of force, without any
16 a/c power. So they had to have additional commitments put in place
17 to have, like, nitrogen bottles, for instance. Those questions that we
18 asked of them were all done in the public's eye. So the RAIs that went
19 out, their responses that came back, were all publically available.

20 So we take it very serious, we do it on a one-off basis,
21 and we have to make some engineering judgment as to, as Mike said,
22 they're shutting down right around the time that the plant would have to
23 be in compliance anyway, does it really make sense to have them do
24 that upgrade or is it better to go with a compensatory measure?

25 COMMISSIONER BARAN: Some of these
26 requirements, including the vent requirement, were determined by the

1 Commission to be necessary for adequate protection of public health
2 and safety. How does that effect play into the Staff's evaluation of an
3 extension or exemption request?

4 MR. JOHNSON: Well, so this is another one I'll start
5 and then, if you guys want to join in, please do. So even at the time
6 when the orders were effective, adequate protection basis, we
7 recognize that there would be time necessary for licensees to come into
8 compliance with those, because they needed to do designs, if you will,
9 or purchase equipment, do training, and all of those things. So, we
10 always recognized that there would be some amount of time needed.
11 Relaxation requests are adjusting that period of time based on what
12 they might encounter on a plant specific basis.

13 And so, we think it's reasonable, actually, if it can be
14 justified, to grant those adjustments. So we're not determining
15 whether or not they come into compliance, we're determining how long
16 it takes. And then, someone mentioned, I think on an earlier panel,
17 we'd be looking at, among other things, the risk and the exposure
18 period, compensatory actions, and a number of things that we
19 considered in granting those.

20 MR. DAVIS: Yes. I would just add, Commissioner,
21 that, in the case of Oyster Creek, they still have to comply with the order,
22 just because we extended the time, right? So, let's say they shut
23 down, then they need to come with an exemption request and we
24 needed to evaluate that to determine whether we would allow that to
25 occur. In other plants similar to that, if they're shut down, they still have
26 a component, right, that they'd have to protect, and that's the spent fuel.

1 So, it's not just that we're allowing them to not have to comply with the
2 order, it's the timing of when they would comply with it. And we look at
3 that on a case-by-case basis.

4 COMMISSIONER BARAN: Well, and I don't want to get
5 in and spend a lot of time on the kind of semantic element of it, but if we
6 have a plant, Oyster Creek we'll just take as example, a plant that's
7 planning to shut down in a certain year --

8 MR. DAVIS: Yes.

9 COMMISSIONER BARAN: -- 2019, and they get an
10 extension on the wetwell requirement until after the point they're shut
11 down, whether we call that an extension or we call it an exemption, I
12 mean, practically speaking, it's going to be the same thing, right? I
13 mean, they're going to have to shut down by that point, I don't think
14 anyone thinks at that point we're going to require them to put in a wet
15 well after the plant's shut down, right? I mean, that's --

16 MR. DAVIS: Yes. But you wouldn't need it at that
17 point either, right?

18 COMMISSIONER BARAN: Right. But, I mean,
19 that's --

20 MR. DAVIS: But you would still have --

21 COMMISSIONER BARAN: That's kind of my point,
22 right?

23 MR. DAVIS: -- other components of --

24 COMMISSIONER BARAN: Is that for all practical
25 purposes, the extension is an exemption, it's saying that, for this plant
26 shutting down in a few years, you don't need to do a wetwell vent.

1 MR. DAVIS: If they chose to stay in operation, they
2 would have to --

3 COMMISSIONER BARAN: Oh, well that's a fair point.

4 MR. DAVIS: -- it would be required, right?

5 COMMISSIONER BARAN: If the announcement
6 turned out not to --

7 MR. DAVIS: Right.

8 COMMISSIONER BARAN: -- be effectuated, then
9 that --

10 MR. DAVIS: And then there's other components of that,
11 I think is the key point. Like, for instance, on mitigation strategies, and
12 they still have certain pieces of the order that they would still have to
13 comply with, even though they're in a shutdown state, because they still
14 have fuel onsite. So, it's not a complete -- again, that's why it has to
15 be looked at and they have to ask for rescission or relaxation of certain
16 components.

17 COMMISSIONER BARAN: I'm a little over on time, but
18 I just want to ask one thing. It came up a little bit, I think, maybe on the
19 first panel. If additional requests for an exemption or extension or
20 relaxation, however we're talking about it, are submitted for other plants
21 that are shutting down, will the Staff consider seeking public comment
22 on those?

23 MR. JOHNSON: So, we don't, as you well know, as a
24 part of that process, seek public comment. I would hasten to add that
25 we've provided, and I tried to illustrate the high level of stakeholder
26 interaction that we've had from the time the orders were issued, from

1 the time we were crafting guidance for how those orders would be
2 implemented, through interactions that we've had with licensees as
3 we've tweaked guidance based on lessons learned, and in fact,
4 someone made the point, when we issue an RAI, those are publically
5 available. So there's good public visibility, there's not a formal way in
6 our process today by which we would go beyond that. There is a 2.206
7 process that could be used by individuals who want to request action of
8 the Agency. We've seen that used in a number of instances and would
9 encourage folks to continue to use that if they see fit.

10 COMMISSIONER BARAN: Well, and I'll wrap up, these
11 are pretty significant decisions and I would imagine that, for many of
12 them to be pretty significant stakeholder interest. Even if we're not
13 required to seek public comment, even if we haven't done so as a matter
14 of practice in the past, is there any reason we shouldn't think about
15 doing that going forward in cases of significant exemptions that would
16 have significant stakeholder interest?

17 MR. JOHNSON: So, I would just say in response to
18 your question that, we will look, we look to try to provide as much
19 visibility as we can through the process. There are downsides, there
20 are concerns that we would have by engaging in sort of a protracted
21 interaction as a part of the decision process on some of these actions.
22 So, personally, I'm comfortable with where we are, we could make sure
23 through additional actions that we provide greater visibility if there were
24 a concern that that's not the case.

25 COMMISSIONER BARAN: Okay. Well, it's
26 something to think about, we can talk about it down the road. Thanks.

1 Mr. Chairman?

2 CHAIRMAN BURNS: Okay. Thank you. One of the
3 questions I would have is, and we talked about in the first panel and as
4 well as in the Staff presentations, talk about ongoing engagement in the
5 international community in terms of research, other types of activities
6 that are ongoing that contributed to further understanding of the
7 Fukushima Dai-ichi accident, as well as strategies to basically respond
8 to it or to prevent or mitigate such actions.

9 Are there particular deliverables, I would say, over the
10 next few years we're looking at, obviously I think and Commissioner
11 Svinicki talked in the discussion we had on things like looking at some
12 of the research on the fuel will obviously of necessity have to extend
13 out a number of years. But are there particular deliverables we're
14 looking for from IAEA or from the NEA or even bilaterally that might
15 inform us? Thanks.

16 MR. LEE: Thank you.

17 CHAIRMAN BURNS: Just identify yourself for the
18 record and --

19 MR. LEE: Richard Lee from Office of Research. First
20 is that I want to say the MELCOR code is an NRC code, it's not a DoE
21 code. In terms of international efforts, the --

22 CHAIRMAN BURNS: It's our brand.

23 (Laughter.)

24 MR. LEE: The NEA just finished what Steve was
25 participating in, the so-called -- I have to read it --it's the Senior Expert
26 Group on Safety Research Opportunity Post-Fukushima. The report

1 will be coming out sometime in June. And they have identified two
2 issues that in the near term, between three to four years, that they will
3 look into that will have a bearing on how to advise the Government of
4 Japan on the forensic. Those two activities have to do with the study
5 of the field debris using similar debris and analysis. That is to help
6 them, how do you develop tools for decommissioning?

7 CHAIRMAN BURNS: Okay.

8 MR. LEE: That will be useful for them because when
9 we do the analysis, the predictions of the fuel behavior is different, but
10 when the cool down, it's completely different. It's a very difficult
11 material to cut, as we have learned from TMI. Another one has to do
12 with -- the second activity has to do with getting rid of the contaminated
13 water in the buildings, especially the turbine buildings, in all the three
14 units, so they can stage the recovery, that the staff can work in a
15 reasonable dose environment.

16 So, those two activities are proposed for the next three
17 to five years. During that period, they will also try to, how do you call
18 it, fine tune what type of information that during the decommission that
19 the TEPCO can look for that can help us to evaluate our severe accident
20 analysis code worldwide. So those are the two activities near term that
21 NEA will propose by the regulatory agency from Japan.

22 CHAIRMAN BURNS: Okay.

23 MR. LEE: Another thing is that the U.S. DOE also
24 established a bilateral so-called Civilian Nuclear Working Group, that
25 we do track. And one of the activities has to establish an international
26 framework for doing the forensic, just like the TMI international efforts.

1 CHAIRMAN BURNS: Okay. Thanks very much.
2 That's helpful. One of the other things I'll ask, with respect to
3 international evaluations, I think as you know, last year, I think, around
4 the time of the General Conference at the IAEA, the IAEA's report on
5 the accident was issued. I think we had done sort of at least a survey
6 on it with respect to comparability or whether, I think, there's a match in
7 terms of actions to staff, or at least the Commission had looked at. Is
8 there anything more you would want to say on that in terms of where
9 we are? I don't know, in terms of any further look with respect to that
10 or insights we've had from that report?

11 MR. BOWMAN: So we have completed our evaluation
12 of the report and we did not identify any gaps or any areas where we
13 felt additional regulatory action was warranted based on insights from
14 the report. I think, as you know, we had representatives from the NRC
15 participating on the working groups that developed the report itself, so
16 I think --

17 CHAIRMAN BURNS: Yes.

18 MR. BOWMAN: -- we were pretty well informed on
19 what the report was going to say. And we had things pretty well
20 captured when the report ultimately came out.

21 CHAIRMAN BURNS: Okay. And, Greg, while we're
22 there, with respect to -- this is a question I think Commissioner Baran
23 touched upon, about trying to create a framework for ongoing
24 evaluation of hazards and natural hazards versus a periodic. What do
25 we know about in terms of other regulatory bodies and what they do?
26 My guess may be that they have gone, given their other framework for

1 licensing and oversight to this periodic review or whatever.

2 MR. BOWMAN: So, I don't know if where we are in the
3 process we've had a chance to gain insights from what the international
4 community does. But I think it's a very fair point that, other regulatory
5 bodies have extensive experience doing PSRs, for example, and we
6 can gain insights from that as we move forward and develop our
7 process. So that's a very fair point, I think.

8 CHAIRMAN BURNS: Okay. It's an interesting
9 concept, because on the one hand, what I've also heard in terms of
10 what some of them like about our process is the notion of the back-fit
11 experience of it and use of the back-fit rule, which they may not
12 necessarily be able to apply during the, for example, ten year period or
13 the five year period.

14 MR. BOWMAN: And I guess the one thing I would point
15 out is, we developed the process for evaluation of other hazards. One
16 of the things we're thinking is, not making it -- we're thinking it might not
17 be an ongoing review, a stand-alone ongoing review, but an ongoing
18 review plus a periodic look at what we've compiled over the last X
19 number of years, so we can see if cumulatively things have changed.

20 CHAIRMAN BURNS: Okay.

21 MR. BOWMAN: So it's more than just a continuum, it's
22 points in --

23 CHAIRMAN BURNS: Or if you have stop points or --

24 MR. BOWMAN: That's correct.

25 CHAIRMAN BURNS: -- hold points in the process?

26 MR. BOWMAN: Yes.

1 CHAIRMAN BURNS: Okay. I think that's going to be
2 interesting. And I know that's a good issue to work on. One of the
3 things I think Tony Pietrangelo mentioned, and I think in some of the
4 Staff presentations as well, is this notion of an effective knowledge
5 transfer and knowledge management, particularly as you get to a point
6 where we've been in, let's say the last four to five years, we've been
7 particularly in an implementation of additional requirements or
8 evaluations or the like. Those are now coming behind us, partly
9 because the requirements are there, they need to be implemented, they
10 will be implemented. What do you see as a, and reflecting on what I
11 think I heard Tony say, what do you see as particular challenges in that
12 transfer? And how do you intend to manage that?

13 MR. DAVIS: So, one of the things that we see as
14 potentially a challenge is, the group of folks that have been involved on
15 the industry side have been, they're Fukushima leads, if you will, and
16 they have a group of people that do the Fukushima work, allowing the
17 regular plant folks to keep their focus on safety. As they're
18 transitioning back to the line and we're starting to get into inspections,
19 those folks now have to pick up where the Fukushima guys left off, if
20 you will. And so, we're concerned that the knowledge there is not
21 necessarily transferring perhaps as quickly as we would like.

22 So, we've already been in communications with
23 industry and we're talking about having a workshop later this year where
24 we can kind of influx them, if you will, with the understanding of what
25 we know, because we've been in the trenches for quite a few years.
26 We're doing the similar thing with the TI. After so many of the TI, we're

1 going to step back and take a look and say, okay, is there any Lessons
2 Learned here? We're doing the same thing with the SEs, we're about
3 four or five SEs in now and we want to have a workshop and kind of
4 work through, what are some of the things that we're seeing on either
5 side?

6 We've been doing a lot of the work, again, as I
7 mentioned before, with the Regions. We've been bringing them all
8 along throughout this process. In fact, they've helped us a lot of times
9 with the audit process. So they're already very, very familiar with what
10 Fukushima is, what beyond design basis things are, and how we're
11 going to inspect to those. So, we feel pretty comfortable from that
12 perspective. But, again, there are some challenges with perhaps
13 pockets as we move forward.

14 CHAIRMAN BURNS: Okay. I mean, one of the things
15 is, looking back at the Three Mile Island accident, as we sit here today
16 and a few of us were around at the time, but is there something -- in
17 reflecting on this, do I wish I knew something better about what we did
18 or what we were trying to get at about TMI today, is there anything like
19 that, because you almost have -- it seems to me it may be worthwhile
20 asking the question of ourselves, what are we still asking ourselves
21 about in terms of TMI or understanding what we did at that time and
22 does that help inform how we might sort of capture that knowledge or
23 capture --

24 MR. DAVIS: I mean, certainly, you saw from Mike's
25 presentation that throughout this process we've continually adjusted
26 ourselves. We're in a continuing learning mode, so as we learn new

1 information, we say, perhaps what we originally thought might have
2 been might have been something of value is not as much, we adjust
3 ourselves. And I think what Tony said and what Commissioner
4 Ostendorff said about using this equipment in other capacities helps us
5 to better understand and integrate it, if you will, and be ready for, if that
6 time ever happened, it would be tragic, but if it ever happened, we'd be
7 ready for it.

8 CHAIRMAN BURNS: Okay. And last question, I'll
9 ask --

10 MR. JOHNSON: Can I just -- on that --

11 CHAIRMAN BURNS: Sure.

12 MR. JOHNSON: -- also note that we have, in fact,
13 reaching back over the years, captured sort of the higher level
14 learnings, if you will, in preparing for the unknown, keeping a
15 questioning attitude, those kinds of things. And those are captured
16 actually in documents that we've written, published, they are already a
17 part of our NUREG knowledge capture series, if you will. We've done
18 seminars for the Staff. And when I look internationally, there have
19 been similar sorts of activities. Those are a part of the very practical
20 detail things that we've done, like writing essays, like doing hand-offs
21 along the way, the kinds of things that Jack and Troy talked about. So
22 it's all of that stuff, I think, that we have to continue to do as we go
23 forward.

24 CHAIRMAN BURNS: Okay. And if my colleagues will
25 indulge me, what I was going to ask Troy is, if you could just give maybe
26 some better detail in terms of what the Temporary Instruction focuses

1 on? What are we asking our inspectors to go look at or how to
2 accomplish that? I think that would help others in the audience and me
3 as well.

4 MR. PRUETT: Sure. So the first thing is the safety
5 evaluation that the Staff prepares informs the inspection team as to
6 what activities need to be looked at. And in practice, they go out, they
7 discuss the strategies with the licensee's teams, they do field
8 walk-downs, they'll watch simulations to make sure things can be
9 hooked up, they do inventories, they have all the right equipment, they'll
10 go out to the SAFER Centers, but the onsite storage centers. In some
11 cases, they observe testing and maintenance of the equipment. They
12 compare the procedures back to the operator's use, they can take the
13 procedures back to the technician's understanding of how the
14 equipment operators and how it will be deployed at a high level. They
15 also look at emergency preparedness, communication links. I don't
16 think that will leave anything out.

17 Most of my team leaders, at least in Region IV, our
18 team leaders went out with the audit teams on a few occasions to
19 understand how the process was evolving. We're using the same core
20 team to do all of the inspections in Region IV, plus the Resident
21 Inspector from each site. And our team leaders, before they start in
22 Region IV, they go out and participate in the team inspections at the
23 other sites. So, John Mateychick, who is one of my team leaders, was
24 at Cook recently doing the inspection up there, and my other team
25 leader, Ryan Alexander, will be at, I forget which site, somewhere in
26 Region II, in a couple of weeks doing the same kind of thing.

1 CHAIRMAN BURNS: Okay. Thanks very much.
2 Commissioner Svinicki?

3 COMMISSIONER SVINICKI: Well, thank you for your
4 presentations. And my colleagues have asked some good questions,
5 but I'll just make some comments and ask some questions in no
6 particular order. But, I guess, I think I will start, Mike, with your context
7 and kind of scene setter, a brief overview of how we got to where we
8 are today. It's hard not to step back and reflect on that a little bit. I
9 think you mentioned over 250 public meetings, if I jotted down the
10 number correct.

11 I hesitate to tell this story, because people who have
12 smartphones, some in the audience are going to pull out their
13 smartphones and do this as soon as I say it, but someone pointed out
14 to me just yesterday that if you go to Google Search, I have the Google
15 app on my phone, but if you go to Google Search and click on an image
16 search, if you type in the search chain, public meeting Japan, so that's
17 it, there's no nuclear, there's no Fukushima, an interesting thing comes
18 up. It is almost entirely, at least the first couple of pages, are pictures
19 of NRC Commission public meetings.

20 I don't -- that might be maybe a commentary on other
21 public meetings in Japan, but it's interesting to me that -- so the thing
22 is, the very first picture, Commissioner Ostendorff, you and I are in it.
23 It's a picture of this side of the table at a Commission meeting. Not that
24 I go Googling for image searches that yield images of me, there's
25 people like Dave Skeen and others in there, but I think that's -- now,
26 that may have to do -- someone's going to email me later today about

1 like Google search algorithms and the fact that it was me who searched
2 and someone Google has a big portfolio on me and knows that I want
3 to have the return be a picture of me, which I actually don't want. And
4 that may all be true, but I think it has been quite an evolution and
5 development.

6 To this day, some have a very singular focus on the
7 Near Term Task Force, but the truth is, we've had at this point many
8 hundreds of NRC analysts and experts that have contributed to the
9 NRC's regulatory response to the events in Fukushima over the course
10 of the last number of years. Every stage in this process has posed a
11 unique set of challenges, I think, for the NRC. Different challenges,
12 some the same, for the industry, but I'm more focused on what's the
13 long pole in the tent for us. So I see this moment in time, as reflected
14 in all of your presentations, is that really important inflection point where,
15 for years we have been in issue identification, exploration, analysis,
16 coming up with whether or not there was a regulatory response, what
17 that should be.

18 And, yes, the Commission has shaped some of those,
19 I think, in some instances. I voted to adopt your recommendation,
20 others of my colleagues have not, and we ended up doing something
21 different. At times, I've been part of the majority that indicated that,
22 although the Staff considered many things, the appropriate regulatory
23 response was something different. I think that's actually indicative not
24 of a weakness in this process, but a strength in it. If the Commission
25 were merely here to pass through everything the Staff developed, that
26 would be a very different NRC than it is.

1 The preponderance of things have been adopted, and
2 many things didn't require the Commission's endorsement at all, they
3 fall under the delegated set of Staff actions. Where things are going to
4 fundamentally change the regulatory framework, the Commission of
5 course has been involved in those. And I think that a lot of good work
6 has been. It's interesting, we've had turnover on our side. When Jack
7 came in, I thought, boy, we are asking this individual to come in and this
8 is a difficult, awkward time for a hand-off. It had more to do with an
9 important opportunity for your predecessor, but I want to credit you and
10 many other individual contributors at NRC and, Jack, you did step in at
11 an important time.

12 But the challenge, or one of the key challenges I see
13 now is, we've done all this identification and analysis, decisions have
14 been made, and as a body of decision making, it reflects what we
15 thought needed to be changed and areas where we thought we were
16 well served by what we had. And I would remind people that the Near
17 Term Task Force, in general, felt that we were well served in terms of
18 what we had. I don't think that they were calling for a fundamental sea
19 change in NRC's regulatory philosophy.

20 So we've had the intervening years, many, I think at
21 this point probably hundreds of thousands of hours of NRC Staff
22 analysis, and we've had a chance to shape that. But the truth for
23 anyone who knows how NRC regulates is that, now as we move into
24 compliance oversight and inspection of this body of decisions and then
25 the manifestation of those decisions, it's going to come down to
26 individual NRC inspectors, men and women in the field at these plants,

1 a lot of the guidance and interpretation falls on their shoulders. And
2 so, I appreciate the acknowledgment for all of the gentlemen sitting on
3 the other side of the table that you and other supervisors who report to
4 you will play a very outsized role in making sure that there is coherence
5 between -- you've been here at Headquarters, except for Troy,
6 appreciate you coming here today, you've been here to observe the
7 development of the evolution of where we are, very much up close.

8 But we can't leave those people to kind of figure it out
9 on the ground. And so I hear -- I appreciate that the previous panel
10 identified this as a challenge. I hear from you that we're well along in
11 our thinking about it, but I think that will require a very active
12 management and supervision. And so, I think that's what the
13 knowledge management comes down to, is this, maybe not a capturing
14 of knowledge, but making sure that there's a transfer of knowledge.
15 And I appreciate and, again, am comforted, that you're on top of that.

16 I would turn to Mo on flooding, because people haven't
17 asked you a whole lot about it. So, I was at a U.S. nuclear power plant,
18 doesn't matter which one, a few months ago, and they were giving a
19 status on their compliance with Fukushima actions, as a lot of them do
20 when I visit. And there was a discussion about their flooding
21 assessment and they said, we're still getting input on the XYZ Dam.
22 And I said, well, what state is it in? And I don't happen to know. And
23 more relevant, I said, and how far away from this plant is that dam?
24 And it was over 900 miles away.

25 Now, I don't know if you're a hydrologist, I'm not a
26 hydrologist, but I think as a lay person, do you share my difficulty in

1 wrapping my mind around how a dam failure 900 miles away impinges?
2 I can create hypotheticals, I'm like any other creative person, my mind
3 can try to figure -- I realize a lot of these are river systems and so we
4 have to look at it that way, but then I try to think about it and say, if that's
5 the level of conservatism, perhaps it just reflects uncertainty in
6 conservatism. It does affect how one would approach a periodic
7 review of hazards. Because the one way to handle the need to
8 constantly relook at something is to look at it less frequently, but with
9 an abundance of conservatism. Because then, the need to reanalyze
10 it would need to be something that fell entirely outside of that bubble.

11 And I guess, I'll let you speak to the 900 mile away
12 dam, but I do want to say, this is the other -- so I see two key challenges.
13 One is the knowledge transfer. The other one is, the fact that, as we
14 move forward, we really need to understand, as we've learned all along,
15 that every action we've taken then has an effect on whether or not
16 regulatory action is probably needed on other actions. And I don't want
17 to draw -- I think in anything we look at in the mitigation of severe
18 accidents, if you implement some measures, other measures are then
19 less recommended than they otherwise would be.

20 And I see the whole of the last five year journey as
21 reflecting that idea, is that Tier 1 made Tier 2 and Tier 3 -- I know that
22 our most persistent critics might say, well, time went by and NRC thinks
23 that the public's forgotten about this and that's why Tier 2 and Tier 3 are
24 getting short shrift. I don't share that view at all. And, I think, it does
25 require some study of all that we've done, but the fact that items in Tier
26 2 and Tier 3 are less recommended on the basis of the Tier 1 actions, I

1 think we knew that all along, and so, this isn't something that happened
2 accidentally five years later. Okay, Mo, I've got one minute. What
3 about -- why does that dam 900 miles away make a difference?

4 MR. SHAMS: So, I'm not a hydrologist, let's start with
5 that. I would say, it's just the amount of water behind that dam, the fact
6 that it is 900 miles away, it still has an impact on the site. I do share
7 the view that, it does lend itself to a certain perception of a level of
8 conservatism that we are looking and we are implementing and
9 calculating these hazards. And that goes without saying for flooding,
10 just the probabilistic risk assessment framework is not at hand yet, and
11 it's several years away if not a decade.

12 COMMISSIONER SVINICKI: And I can't remember
13 whether this site needed input from the Corps of Engineers. I know
14 some sites need that. Can I just ask you quickly, do we have -- do
15 those sites get good transparency into that data? I had heard a couple
16 of years ago that the Corps didn't want certain information underlying
17 the inputs about flooding hazards to be shared with licensees or,
18 frankly, anyone outside the government. It does raise, I'm the only
19 non-lawyer on this Commission or someone without a law degree, but
20 it raises issues of if I can convict you on evidence that I don't allow you
21 to see, there's a kind of a, what I would call as a non-lawyer, a due
22 process issue there. Have we resolved that?

23 MR. JOHNSON: So, Commissioner, Andy Campbell is
24 at the podium. He's been in the teeth of this issue and so if he can talk
25 to your question?

26 MR. CAMPBELL: Commissioner Svinicki, I'm Andy

1 Campbell, I'm the Deputy Director of the Division of Site Safety and
2 Environmental Analysis. And I've led all of the visits, except for the
3 initial ones, to the Army Corps sites. We interact with them weekly.
4 We set up a process that allowed the licensees to ask any question they
5 wanted through an early meeting, before they got their hydrographs
6 from the results. And through interactions, if they had additional
7 questions, we've provided opportunities for them to submit those to the
8 Army Corps.

9 It is important to recognize that it is not only the Army
10 Corps, but all the organizations that are responsible for dams, protect
11 certain information that in the wrong hands could be detrimental to
12 property and life. And that includes dams in Canada, by the way. So,
13 we work through a process of working with the Army Corps, making
14 sure the licensees have an opportunity to get any and all the information
15 that they want to be able to take the hydrographs and the other
16 associated information and do the flooding analysis for their sites.

17 It's an ongoing process, we're working currently on the
18 last site, which is on the Columbia River. That involved treaty
19 negotiations with the Army Corps and Canada, because that's all under
20 the U.S.-Canada treaty on the Columbia River. And, yes, a large dam
21 900 miles away can cause a lot of damage. And that's the kind of
22 information that is protected. Now, the screening process that we use
23 eliminated thousands, no, I'll say tens of thousands of dams that are in
24 the National Inventory of Dams from further consideration in all the
25 watersheds that we've looked at. In the end, there are only a handful
26 of dams that are of concern, and they are the very big ones, or they're

1 very close.

2 So, that's the kind of thing you have to keep in mind
3 when you're discussing, and I'm careful not to talk about any particular
4 dam or river system or what the flooding could be, but those are the
5 kinds of considerations. I will point out that the review that we've done
6 is consistent with what the Army Corps does, what the Bureau of Rec
7 does, what FERC does, and we've had a lot of cooperation with those
8 agencies in this process. And the licensees have been able to see all
9 that information. It's just the transfer of information of a particular
10 nature to licensees or to anybody outside that sphere is controlled.

11 COMMISSIONER SVINICKI: Okay. Thank you, Mr.
12 Chairman, I'm over my time.

13 CHAIRMAN BURNS: Thank you, Commissioner.
14 Commissioner Ostendorff?

15 COMMISSIONER OSTENDORFF: Thank you,
16 Chairman. Thank you all for being here and for your work and the work
17 of your teams. I'll also echo Commissioner Svinicki's thanks to Troy
18 for representing the Regions here and it's just very good to see you,
19 Troy. Not surprisingly, I'm going to follow my colleague Commissioner
20 Svinicki in doing some reflection here for, I think, some important
21 reasons.

22 That we were the two that were here when this started
23 off and, at least I'll be here another few weeks, but this is my last chance
24 publically to thank the Staff for all their work on all the Fukushima
25 issues, whether it be at Headquarters or in the Regions, but also to
26 provide just some individual Commissioner perspectives on this.

1 Because I think it is important to take stock of where we are today in
2 2016. And I'm going to make a couple of comments, some of which
3 are to add my voice to that of Kristine Svinicki's here.

4 I remember very clearly when, in the week after
5 Fukushima, when the Commission voted to not shut down nuclear
6 power plants in the United States because we believed they were safe.
7 I think that gets, that whole historical fact gets missed in many
8 discussions today. Along with Commissioner Svinicki, I was here
9 when the Commission unanimously endorsed having a Near Term Task
10 Force effort to look at areas that we ought to look at. But not just say,
11 yes, go out there and immediately implement everything that this Task
12 Force does.

13 And I think that has been mischaracterized in a number
14 of Congressional hearings. The Commission did not go forth and say,
15 go tell us what to change in our regulations. It says, go look at those
16 areas and recommend what areas of our regulatory process and
17 substantive regulations should we explore based on what we know in
18 2011 on Fukushima. That has been mischaracterized so many times,
19 I felt it was important to try to clarify it today. These are areas to look
20 at and then we'll decide what regulatory actions, if any, are appropriate.
21 That's probably the most single significant inaccuracy I've seen in the
22 press the last five years.

23 In July 2011, I remember Bill Borchardt was sitting
24 exactly in your spot, and I said, Bill, what were the key Lessons
25 Learned, and Chairman Burns hit on this briefly in his questions today,
26 what were the key Lessons Learned from our experience as a regulator

1 based on Three Mile Island? And I remember very clearly Mr.
2 Borchardt saying, a lot of things were ordered by the NRC, a lot of those
3 activities added safety value, a lot of them did not. And it was that, a
4 lot of them did not, that kind of resonated with Commissioner Svinicki
5 and I and led in the fall of 2011, when SECY-11-0137 came out, when
6 Marty Virgilio had your job, that we led to this Tier 1, Tier 2, and Tier 3.

7 And I completely agree with Commissioner Svinicki
8 that we knew at that time that all things are not created equal here, there
9 are some that were really of safety significance, some that we needed
10 to look at, but would not rise to that same urgent safety issue. And
11 that's exactly how it's played out. Yet, there are those critics of the
12 NRC who would suggest that we didn't do all the stuff that was listed
13 line item, 35 separate areas in the, if I remember right, in the Near Term
14 Task Force report. Well, there was a reason for that.

15 I'm not going to ask this question, Mike, but I think you'll
16 at least nod your head, I'm not trying to ask a leading question, I do
17 have a law degree, I'm not an experienced attorney, but in a leading
18 question format, I think that there's been, if you look at the amount of,
19 I'm going to use this as a visual, this amount of work, effort done by the
20 Near Term Task Force report, and I magnify that by probably a factor
21 of at least a hundred of the number of hours and effort expended by the
22 NRC Staff to look at all of this, but to more fully explore various areas.
23 Is that a fair characterization?

24 MR. JOHNSON: Yes.

25 COMMISSIONER OSTENDORFF: Okay. And so,
26 that plays into this not being a static approach, it's a dynamic approach.

1 And I think that dynamic approach has served this Agency
2 extraordinarily well. It's evolved with time as knowledge has been
3 learned and as new things looked at and as risk assessments have
4 changed. And the fact that we've made some decisions in 2013, and
5 2014, and 2015 that were backing off maybe some things we thought
6 might originally be appropriate is not a bad news story, I would say it's
7 a good news story and it confirms that we've used solid science,
8 engineering practices, analytical methods to assess the risk and used
9 that to inform our decision making. Again, that piece has also been
10 mischaracterized a number of times in the press.

11 The communications piece, and I appreciate that you
12 talked about the 250 meetings and I look at my service at the
13 Department of Energy, Department of Defense, and Commissioner
14 Svinicki's talk about the Google hits on public meetings, and in talking
15 to colleagues in the international community over the last five years and
16 two months since Fukushima, it's been my personal view that we could
17 not have been more transparent. That there's no other country that's
18 been as transparent as the United States in discussing these issues
19 and engaging stakeholders.

20 At the end of the day though, I expect our professional
21 staff, the technically competent staff, to take all of that into account and
22 to be able to render decisions. And I think you have. And in
23 preparation for a recent speech, I looked at the number of votes I've
24 cast on SECY papers on Fukushima, along with Commissioner Svinicki,
25 it's 25. And all of our votes are on the websites. I think the record of
26 public meetings is very open and transparent.

1 So for the American public, even though there may be
2 times when people will disagree with decisions we've taken, and that's
3 a fair comment and I'm not asking for everybody to agree with us, but
4 at least I think it's a fair statement to say that there's been transparency
5 as to how we've arrived at those decisions. And whether somebody
6 agrees or not, you can at least see how individual Commissioner came
7 out on different SECY papers. And I think that's a real strength.

8 The last, I'd say, six or eight, maybe ten or 15,
9 Congressional testimonies that I've had an opening statement for, I've
10 been proud to say that I think we're in a good place on Fukushima
11 issues and that we have relied upon solid principles of science and
12 engineering. I feel that way today and I have confidence that years
13 from now, when you look back upon your legacy at the NRC, you'll be
14 able to say that's the case. And I also acknowledge there's a lot of
15 work left to be done, as Mike Johnson said.

16 Earlier, people have commented, and I'm going to do a
17 little sidebar here, but I think it's important, on the concept of periodic
18 safety reviews, and I've recently discussed these on the international
19 trip with other international regulators just last week over in Spain. I
20 am not a critic of the periodic safety review process, but I think when
21 people ask, Ostendorff, why don't you do that in the United States, I'd
22 say, well, here's why. And it's been, look at our Baseline Inspection
23 Program, look at the Resident Inspector's report to Troy Pruett and
24 Mark Dapas and Kriss Kennedy down at Region IV.

25 Seldom is that rigorous Baseline Inspection Program,
26 from my experience, fully replicated elsewhere. It's not a criticism, it's

1 just, I think, an accurate observation. Look at our Component Design
2 Basis Inspection Programs, where every three years, every plant has a
3 detailed focus area on engineering performance specifications, that
4 looks in an ongoing fashion with a deep-dive at a particular aspect of
5 plant safety. Our Reactor Oversight Process. I could go on and on
6 down the path, I won't do that, but I'd say that for other countries,
7 periodic safety reviews work well for them and I respect that, I think our
8 systems work well for us. And it's not a -- when one looks at what we
9 do in the United States, you have to look at the details and do a
10 deep-dive on what we do for our inspection program, otherwise, there's
11 not -- I don't think you'll have an accurate comparison.

12 Mike, I would encourage you, now this is not something
13 you need Commission direction for and that need not capture this in the
14 SRM, but I think it's important at some point in time, you and Vic McCree
15 can do this, I think it's important to consider capturing the Lessons
16 Learned from Fukushima, regulatory Lessons Learned, not the details,
17 but more the process, the high level senior leadership engagement that
18 you're uniquely equipped to lead in your position as having lead the
19 Fukushima Steering Committee for so many years and so forth.

20 The other piece that -- the second sidebar I'll offer is, I
21 don't think there's been a full articulation, by industry or the NRC or I'll
22 use the phrase nuclear enterprise, of the importance of operator training
23 in all this. We don't talk about that enough and I don't think industry
24 talks about it enough either. And I know that a few years ago, I don't
25 know if Commissioner Svinicki will recall, at one of these meetings,
26 there was a question about, well, we don't know that operators would

1 carry out these steps. Remember that? Where there's a debate
2 maybe three years ago on this topic?

3 And I think that was -- any question is a fine question,
4 but I think it did not get fully answered from the standpoint that I have
5 complete confidence as a former nuclear plant operator on submarines
6 for many years that the operators in the U.S. industry are highly
7 qualified, are proficient, they're ongoing training every X number of
8 weeks, there's a very strong aspect of their preparation to deal with any
9 casualty. And I think that's one piece that has not received the visibility
10 that's appropriate. Okay. I'm going to stop there, but I appreciate you
11 listening to one Commissioner's perspectives. I thank you for all that
12 you and your teams have done. Thank you, Chairman.

13 CHAIRMAN BURNS: Thank you, Commissioner. And
14 before we close, any other comments from my colleagues? Well,
15 thanks. I'm pleased we've had this opportunity to discuss the progress
16 to date on the Fukushima Dai-ichi Lessons Learned activities, as well
17 as the plans for the actions that remain before us to be completed, to
18 hear the perspectives of both the Staff as well as other external
19 stakeholders on these issues. Again, we appreciate the informative
20 presentations today and with that, we'll stand adjourned.

21 (Whereupon, the above-entitled matter went off the
22 record at 11:58 a.m.)