

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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MEETING WITH ADVISORY COMMITTEE
ON REACTOR SAFEGUARDS

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THURSDAY,

OCTOBER 6, 2016

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ROCKVILLE, MARYLAND

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The Commission met in the Commissioners= Conference Room at the Nuclear Regulatory Commission, One White Flint North, 11555 Rockville Pike, at 10:00 a.m., Stephen G. Burns, Chairman, presiding.

COMMISSION MEMBERS:

STEPHEN G. BURNS, Chairman

KRISTINE L. SVINICKI, Commissioner

JEFF BARAN, Commissioner

ALSO PRESENT:

DENNIS BLEY, ACRS Chairman

MICHAEL L. CORRADINI, ACRS Vice Chairman

RONALD G. BALLINGER, ACRS Member

DANA A. POWERS, ACRS Member

JOHN W. STETKAR, ACRS Member

MARGARET CHU, ACRS Member

JOSE A. MARCH-LEUBA, ACRS Member

MATTHEW SUNSERI, ACRS Member

ANNETTE VIETTI-COOK, Secretary of the Commission

MARGARET DOANE, General Counsel

P R O C E E D I N G S

1
2 CHAIRMAN BURNS: I want to welcome our new members, and now I
3 think we'll join the other speakers and the Commissioners will join at the table and we'll
4 begin our meeting. I'll call the meeting to order. I want to welcome members of the
5 Advisory Committee on Reactor Safeguards, the NRC staff and members of the public
6 who may be in the room or who may be watching us remotely.

7 Today, this is one of our periodic meetings with the Advisory Committee.
8 These meetings provide the Commission an opportunity to hear directly from the
9 Committee about their work in general over the past six months, and in more detail about
10 several key safety matters recently reviewed by the Committee. The presentations will
11 be followed by a question and answer session with the Commission. Before we begin,
12 would any of my colleagues like to have any opening comments?

13 (No response.)

14 CHAIRMAN BURNS: Okay, very good. I think we'll start with Mr. Bley
15 and Dennis, would you begin the Committee's presentation?

16 MEMBER BLEY: Thank you, Chairman. Are we going to have the
17 slides?

18 CHAIRMAN BURNS: That's good. There we go.

19 MEMBER BLEY: Well, since our last meeting with the Commission in
20 March of this year, we've issued 15 reports. The first four I'm going to go over we'll talk
21 about more today. In fact, Dr. Powers will lead the discussion of our review of the Non-
22 Power Production or Utilization Facility License Renewal Rulemaking, so-called NPUF.
23 Mr. Stetkar will lead us through the -- one of our last Fukushima reports, and this is the

1 one on Guidance for Flooding Hazard Reevaluation, Including Focused Evaluations and
2 Integrated Assessments.

3 Professor Corradini will talk us through our review of the risk significance
4 determination process that was proposed by NuScale in a topical report, and Professor
5 Ballinger will go over our review of the guidance and technical basis for that guidance for
6 applying the alternative pressurized thermal shock rule.

7 During this period, we looked at two COLAs. The first was Turkey Point
8 Unit 6 and 7. The second is a little unusual. It's exceptions to the AP1000 certified
9 design for the Levy plant. Levy was the lead plant for a number of exceptions that were
10 found to be needed to implement the functions of the certified design.

11 The first of those was a condensate return and passive residual heat
12 removal issue, and then there were four others, main control room operator dose, main
13 control room heat load, plant monitoring system, and hydrogen venting and containment.

14 These were all quality issues in the design cert. Two of them were
15 identified as errors in calculation. One is omissions and two of them were lost, so-called
16 losses of design control. For example, on the main control room heat load, the
17 calculations were done properly. But then over the years additional heat loads were
18 added beyond what were expected. We also looked at license renewal applications.
19 We had LaSalle County and Fermi 2.

20 Next slide. We have two more Fukushima reports, one on the Tier 3
21 recommendations for containment vents, hydrogen control, and advanced
22 instrumentation, enhanced instrumentation, and the other on the natural hazards other
23 than seismic and flooding.

1 We looked at several reports on -- that were guidance and bases, Reg.
2 Guide 1.229 on risk-informed approach for addressing the effects of debris on post-
3 accident long term core cooling. This was that regulatory guide that was kind of left over
4 from our 50.46(c) draft final rule evaluation of a few months back. Also, NUREG-1927,
5 which is the standard review plan dealing with compliance for dry storage of spent nuclear
6 fuel.

7 Next one, please. We looked at the topical report, the so-called full
8 spectrum LOCA, the Westinghouse calculations came for realistic loss of coolant accident
9 evaluations over the whole spectrum of break sizes. We looked at the Diablo Canyon
10 digital replacement of the process protection system, and in April we sent you our own
11 biannual review of the NRC's Safety Research Program.

12 Next slide. We had two visits that were important to us in this year. The
13 first is one of our annual visits to the regions under the auspices of our Plant Operations
14 and Fire Protection Subcommittee. We went to Region II, and while there we also visited
15 the Vogtle site. We looked at the old existing units, primarily looking at the FLEX
16 implementation there, and we got to see the AP1000 new site.

17 I'll tell you there's been a tremendous amount of work done since the last
18 time we were there, and it was a very useful trip for us. I also found out, just for
19 information, if you go to their website, they have movies of this modular construction
20 process, and you can see them moving these massive structures out onto the pads.

21 We also sent our Metallurgy and Reactor Fuel Subcommittee to the
22 AREVA fuel fabrication facility in Richland, Washington.

23 Next one. Moving to our future work, we have two more Fukushima-

1 related items. The first is a follow-on with respect to remaining issues dealing with
2 natural hazards other than seismic and flooding, and the second is the mitigation of
3 beyond design basis events rulemaking. For our Radiation Protection Subcommittee,
4 we have a significant meeting coming up in two weeks on the 10 C.F.R. Part 51
5 rulemaking.

6 We've had many, many meetings with the staff and stakeholders over
7 quite a few years in this area. New member Dr. Margaret Chu will be chairing that
8 meeting, her first one.

9 Next slide. We have one design certification. This is the continuing
10 work on APR1400. The schedule is very intense on that and everyone's having a bit of
11 trouble keeping up with it but it's moving forward. We have one COLA. We will have
12 one COLA. That's the North Anna ESBWR. We have the NuScale safety focused
13 review and we have to learn to understand what's meant by this, the safety-focused
14 review.

15 I thought they all were in a sense, but there's some new ideas being
16 proposed, and we haven't seen those yet. In the license renewal area Grand Gulf, we're
17 dealing with this week. We should finish that up, and we also will have South Texas.

18 Next slide. GSI-191, the sump and debris issue. We have one
19 technical report, the WCAP related to GSI-191 debris issues. We also have PWR
20 Owners Group in vessel debris test results to review, and South Texas Project's risk-
21 informed amendment request that's continuing work.

22 Next slide. In the digital I&C area, we will be reviewing a SECY paper
23 on cybersecurity for fuel cycle facilities. This is kind of a fallout of the Commission's 2008

1 SRM in this area. Also before we start our review and comment of the digital I&C action
2 plan, we're going to be briefed on how 50.59 can be used vis-a-vis digital I&C work.

3 In the reliability and PRA area, we have two continuing projects to keep
4 track of. The staff will be coming to talk with us on both Level 3 PRA and the
5 development of human reliability analysis methods.

6 Next slide, please. Our Metallurgy and Reactor Fuel Subcommittee has
7 two issues coming up. One is continuation of the consequential steam generator tube
8 rupture work and the second is the consolidation of dry cask and dry fuel storage standard
9 review plans.

10 This is kind of known as a management aging process in storage maps,
11 which is kind of like a GALL for dry storage.

12 The Thermohydraulic Subcommittee is looking at the AREVA extended
13 flow window from Monticello, and the supplement to a topical report on the BISON code,
14 which is the Westinghouse transient analysis code for BWRs. At this time, I'll turn it over
15 to Dr. Dana Powers to talk about NPUF.

16 MEMBER POWERS: I'll talk about NPUF. It's a new abbreviation.
17 The agency, of course, needs new abbreviations. It encompasses the research and test
18 reactors as well as our radionuclide facilities such as SHINE. I'm going to focus on the
19 research and test reactors. These are the reactors that feel like they're the red-headed
20 stepchildren of the licensed reactor world.

21 We have about 31 of these facilities that are licensed and operating.
22 Three of them are at government locations, three are in commercial locations, but the
23 vast majority of them are located at universities.

1 Typically they have very low radionuclide inventory, they're operated at
2 low pressure and low power, they're natural cooling, even air cooling is often sufficient for
3 these facilities.

4 On the other hand, they're located rather close to that population that we
5 would consider "the public." When I say they're low power, the next slide shows some
6 of the power spectra of these reactors. Four of them operate at less than one kilowatt,
7 some as low as a small lightbulb. Five of them are over two megawatts, the rest arrayed
8 in between most, between two and a quarter of a megawatt.

9 They have relatively low usage. Four are used only a few hours per
10 week. Sixteen of them are used a few hours per week, seven used maybe 20 hours, 40
11 hours per week. Four have high levels of usage. They age slowly.

12 That is, they're not operated at high pressures. They're not operated at
13 high powers. They don't go through massive power changes. So there are not a lot of
14 driving mechanisms for aging. Furthermore, they don't change in their design much.

15 The trick for operating these facilities safely is to keep them well-
16 maintained and to operate them within the technical specifications with trained personnel.
17 When the Atomic Energy Act was formulated, the research and test reactors carried a
18 much higher level of accord.

19 We knew at the time that we had a nifty new technology. We didn't know
20 how to optimize it. We didn't know what all that could be done for it. We did know that
21 before you could learn how to use this technology to its best, you had to have a generation
22 of people that were trained to be familiar with the technology.

23 Therefore, research and test reactors were accorded in the Atomic

1 Energy Commission a special status. They were accorded minimal regulations,
2 consistent with the objective to protect the public health and safety. Somewhat
3 arbitrarily, it was decided to license these facilities for 20 years. I think at the time no
4 one actually thought any of the facilities would go through relicensing.

5 At the time the Atomic Energy Act was written, new reactors were built,
6 constructed, decommissioned and redesigned on about an 18 month cycle. But that has
7 not been the case, and we have now reactors, some of which were originally licensed in
8 the 1950's, some as recently as 2010, going through relicensing and it's been difficult.

9 I think the Commission is acutely aware that there have been difficulties
10 because of staff diversion onto things such as TMI, such as Fukushima to review the
11 relicensing applications. At the same time, many of the facilities have small staffs.
12 Some of them have staffs of two people. Some, of course, have larger staff.

13 So it's been difficult for them to respond to the relicensing process with
14 the alacrity that has been accorded to the power reactors. I think the Commission is
15 aware of that and asks the staff to consider streamlining them.

16 On the next point, the staff has taken what I think is a very novel
17 approach. They have definitely thought out of the box for this one. What they propose
18 is for the research reactors that they will be licensed with a non-expiring license. They
19 will be required, however, to submit every five years an updated final safety analysis
20 report and they will be subjected to the continuing program of inspection and monitoring.

21 This is licensing under sufferance, rather than a periodic license. It's
22 rather similar to the kind of licensing that's done in some European countries. ACRS
23 examined this proposal from the staff for a non-expiring license. They concluded we

1 could identify no reason that this process would degrade safety. We could speculate
2 that perhaps it would enhance safety because it would enhance familiarity with the
3 technical specifications and the technical bases for those technical specifications, and
4 that it would match more closely the cycle of personnel, especially at the university
5 reactors.

6 We drew similar conclusions on other aspects of the staff proposal,
7 including changes in the dose criterion, the applicability of 10 C.F.R. 50.59 to
8 decommissioning and timely submittals for license renewal applications, and basically
9 concluded the staff had a good proposal and it should be approved.

10 MEMBER STETKAR: This morning I'm going to briefly provide an
11 overview of our review of the guidance for assessments performed for the reevaluated
12 flooding hazards.

13 Next slide. As a background, the staff developed guidance for these
14 evaluations in COMSECY-15-0019. Basic elements of that guidance entailed focused
15 evaluations to confirm that key safety functions are protected by existing barriers in the
16 plant, or by committed plant modifications.

17 If protection did not provide adequate margin against the reevaluated
18 flooding hazard, then a so-called integrated assessment could be performed to evaluate
19 the combined effects from plant-specific protection and flood damage mitigation
20 strategies, and COMSECY-15-0019 in particular noted that revised integrated
21 assessments of local intense precipitation would not be required.

22 Next slide. In parallel to the staff's work on development of guidance for
23 these integrated assessments, the industry itself was proceeding with the development

1 of guidance for implementation of FLEX. As part of that guidance, the industry noted
2 that licensees could consider alternatives or so-called targeted mitigation strategies to
3 compensate for possible limitations in site-specific FLEX strategies.

4 The industry also developed guidance, in particular NEI 16-05 for the
5 performance of assessments to be performed in response to the reevaluated flooding
6 hazard, and the staff developed interim staff guidance JLD-ISG-2016-01, I hope they don't
7 get any longer than that, to endorse the industry's guidance.

8 Now the guidance and the staff's endorsement entails three so-called
9 paths for these assessments, and we don't have time to go into details of the paths. But
10 the salient information is that Paths 1 through 3 are deemed to be focused evaluations.
11 Paths 4 and 5 are deemed to be integrated assessments.

12 That distinction is important because the staff will review all of the
13 integrated assessments in their Phase 2 regulatory evaluation process, to determine
14 whether any regulatory requirements are required on a site-specific basis. So there's a
15 distinction there.

16 Next slide. I did provide you a brief overview of these paths. It's useful,
17 shows the scope of each of the paths. It shows the progression from protection through
18 mitigation with increasing attention as we go from Paths 1 to 5 to site-specific risk
19 considerations.

20 Next slide. We had several recommendations and conclusions during
21 our review of this guidance. Our first conclusion was that this graded approach provides
22 an appropriate evaluation framework. The focused evaluations first emphasize
23 protection against flooding damage.

1 If that protection is not adequate, mitigation strategies are examined only
2 if protection cannot be assured, and we concluded that that type of progressive evaluation
3 appropriately considers the protection, mitigation, risk information and supports a defense
4 in depth approach to external flooding.

5 Next slide. With regard to the treatment of local intense precipitation,
6 we recommended that if the mitigation strategies are needed for flooding caused by local
7 intense precipitation, the staff should review those evaluations in the same manner as the
8 integrated assessments that are performed for any other flooding mechanism.

9 Next slide. We also had some comments and recommendations on
10 assessment of the reliability of the mitigation strategies, and in particular the strategies
11 that are developed for the so-called Path 5 assessments, and the higher frequency, I'm
12 sorry, the Path 4 assessments and the higher frequency Path 5 assessments, or in effect
13 the higher risk-significant scenarios.

14 The assessments for those scenarios should demonstrate so-called
15 effective mitigation, and by effective mitigation we mean mitigation that is both feasible
16 and reliable. We noted that the guidance for equipment reliability and availability was
17 actually quite good. However, in contrast, the guidance for evaluating personnel
18 performance was relatively more weak.

19 So we recommended that the staff should better specify expectations for
20 assurance of reliable personnel performance in those higher risk scenarios.

21 Next slide. We also had some comments and recommendations on the
22 evaluation of seismically caused floods and in this topic in particular, I want to make sure
23 that there's common understanding. We're talking here about seismic events that cause

1 damage at the site, and damage to nearby facilities that may then result in flooding.

2 So an example would be a large earthquake that causes damage on the
3 site and damage to a nearby dam. The dam failure would then cause flooding at the
4 site. The concern is that licensees who develop strategies that are targeted to only a
5 single hazard, for example targeted strategies for seismic or targeted strategies for
6 flooding, those strategies could be compromised in the event of a compound scenario.

7 So we recommended that the staff should develop guidance to ensure
8 that the site-specific evaluations for sites that might be vulnerable to these types of
9 scenarios explicitly consider them.

10 Next slide. A draft version of the staff guidance recommended that an
11 independent peer review be performed for every integrated assessment, and we
12 observed that conducting those reviews could be quite challenging, both from a resource
13 perspective and quite honestly from the ability to find available, independent technically
14 qualified reviewers.

15 In particular, probabilistic flooding hazard assessment is an evolving
16 technology and the community just isn't all that large. The staff has revised the guidance.
17 The final version of the guidance indeed has removed that requirement for independent
18 peer reviews. So we think that's an improvement.

19 Next slide. As Dr. Bley mentioned in his introduction, we are very
20 actively involved in continuing engagement on all things Fukushima. In particular with
21 regard to the flooding hazard assessments, our Fukushima Subcommittee was briefed
22 on draft guidance for the Phase 2 regulatory evaluations in an August 17th subcommittee
23 meeting.

1 The committee decided not to write a letter on that topic, excuse me, and
2 we have requested future briefings on selected site-specific evaluations, in particular any
3 Phase 3, I'm sorry, Path 3 evaluations that address mitigation of local intense
4 precipitation, selected Path 4/Path 5 evaluations and an example of any targeted
5 mitigation strategies that might compromise some of the safety functions.

6 MEMBER CORRADINI: Sorry. I had it on and I turned it off. Sorry.
7 So we'll talk about NuScale, in particular a topical report which is entitled "Risk
8 Significance Determination."

9 Next slide, please. So as you're well aware, NuScale's design
10 certification application is expected to come in approximately in December, at the end of
11 this year. In fact, as I understand it, the certification application is being reviewed now
12 for acceptance.

13 NuScale's integral pressurized water reactor is a particular design which
14 really shows a lower risk profile than current light water reactors. In fact, the estimated
15 CDF and LRF values, core damage frequency and large release frequencies, are much
16 lower than current operating nuclear power plants.

17 Next slide, please. So in terms of background, a component or a system
18 is considered risk significant if its assumed failure causes a notable increase in the core
19 damage frequency. Current risk significant criteria are embodied in Regulatory Guide
20 1.200, and would overstate the importance of some structures, systems and components
21 for a plant with such a low risk.

22 I'd note that 1.200 has specific relative numerical criteria. So you look
23 at a ratio. If the ratio is greater than X, you start classifying in a certain fashion. The

1 feeling is that these traditional criteria are insensitive to global safety improvements that
2 you might see in such a design as NuScale.

3 So for NuScale, this would result in the categorizing of a majority of the
4 NuScale equipment modeled in the PRA as risk significant, and we just don't feel that's
5 appropriate.

6 Next slide, please. So NuScale's approach is a bit different. They take
7 an alternative approach to Reg Guide 1.2 for identifying their SSCs as candidates for risk
8 significance, and in fact what they do, NuScale follows a framework similar to Reg Guide
9 1.174.

10 What I mean there is they're basing it on larger increases of risk that may
11 be acceptable if the CDF is smaller. So as I have a lower and lower estimated value for
12 the CDF, I allow for more variability in the risk significance, and therefore classified in a
13 different manner.

14 NuScale's risk significance determination methodology is based on
15 criteria for the candidate SSCs on a fixed contribution for the CDF and the LRF. I won't
16 give you the numbers. I probably will get them wrong anyway, but a fixed value, and this
17 NuScale-specific numerical value is different than what you see for AP1000 ESBWRs.
18 So they're -- from a case by case basis, they're different.

19 Next slide, please. So we looked at that in a Subcommittee meeting in
20 March and then in a full Committee briefing and wrote a letter in May of '16.

21 Next slide, please. So our conclusions and recommendations are that
22 the criteria for determining risk significance in a case by case manner can lead to
23 inconsistencies in regulatory positions. If you look at what is being done for NuScale, it

1 is different than AP1000, it is different than ESBWR on a case by case basis.

2 We felt the staff should develop a consistent approach by adopting a
3 continuous scale to determine quantitative risk significant criteria, with more margin
4 allowed for plants with lower risk values. I note here that in principle, NuScale really is
5 following this general procedure because of their lower risk profile, and it's actually based
6 on some past ACRS recommendations, in particular a letter we wrote back in April 26th
7 of '12 and July 16th of '14, discussing this concept of a flexible continuous scale.

8 Next slide, please. From a case by case basis, we feel that the NuScale
9 approach is reasonable provided that the current estimates of CDF and LRF remain
10 approximately the same. And then finally we recommend that the staff is going to need
11 to address the multi-module aspects of the NuScale design. You're probably all familiar
12 with that this is a, for want of a better word, a six pack or a 12 pack idea, right.

13 So therefore the way it's designed with a common pool, which has both
14 radiological protection and ultimate heat sink abilities, there's going to be some
15 interactions that have to be considered on a multi-module effect, and that could alter the
16 CDF and LRF risk estimates and associated SSC classifications.

17 Next slide, please. So we got back the staff's response to that, and I'll
18 go over that briefly. The staff agrees that generic numerical criteria for determining risk
19 significance would be advantageous rather than a case by case basis. Currently now as
20 I had mentioned, they use a, what is called a risk achievement worth.

21 For example, it's a rationing, and every one of those that I mentioned on
22 the case by case basis are different. So the staff intends to pursue revisions of the
23 quantitative risk significance criteria to make them consistent with a broad spectrum of

1 design and absolute levels of overall plant risk. In fact, the staff in its response noted
2 that they will consider our suggestions from those two past letters I mentioned as a
3 potential model to consider.

4 Next slide, please. They also noted that numerical criteria will be
5 scalable based on applicable base risk metrics, so that they'd be scaled based on whether
6 those are for CDF, LRF or large early release frequencies, and numerical criteria will be
7 anchored to thresholds for risk significance that conform with the acceptable risk increase
8 guidelines that I mentioned in Reg Guide 1.174.

9 They would also complement the existing criteria from Reg Guide 1.2,
10 which would be in use for current operating plants.

11 Next slide, please. So the staff actually noted that they will draft a single
12 guidance document for using the PRA to rank these SSCs in their response. I'd also
13 note that they said they'd begun this activity, which I'm quite happy with and we're looking
14 forward to looking at it, and the staff will be revising these existing guidance documents
15 as resources permit.

16 Next slide. Finally, the staff agrees with the ACRS on the
17 recommendation on multi-module aspects of the NuScale design. They're currently
18 considering the impact of multi-module aspects of this design on the CDF and the LRF,
19 and on the categorization of the SSCs, and that they will consider this as part of its review
20 of the NuScale design certification, particularly through Section 17.4, Reliability
21 Assurance Program. So with that, thank you, and you'll see more of NuScale.

22 MEMBER BALLINGER: Good morning.

23 CHAIRMAN BURNS: Good morning.

1 MEMBER BALLINGER: Over the past several years, we have been
2 reviewing the guidance on the alternative pressurized thermal shock rule, which is 10
3 C.F.R. 50.61(a). By way of background, the original rule, which was as near as I can
4 recall promulgated in the 70's, along with an associated Reg Guide 1.99 that dealt with
5 requirements to maintain sufficient ductility in the pressure vessel for a LOCA event, and
6 the rules were very prescriptive because the database was limited, and so there was a
7 lot of conservative built into it.

8 The alternative rule, 61(a), was issued in 2010. So it's been an ongoing
9 process and provides alternative limits that are based on much more sophisticated better
10 analysis, fracture mechanics, probabilistic fracture mechanics analysis, which limits the
11 vessel, frequency of vessel failure to 10^{-6} . So it's a new approach.

12 NUREG-2163, which is the background document, and Reg Guide 1.230
13 provide the guidance on use of the alternative rule. As I said, 61(a) is less restrictive on
14 the reference temperature for embrittlement screening, and it should enable longer
15 operations. That's particularly important for license renewal, license extension and
16 things like that. But it comes at a cost to the licensee of responsibility to be sure that
17 their vessel meets certain criteria.

18 Those criteria primarily related to ensuring that the embrittlement
19 behavior of their vessel is consistent with the database upon which the probabilistic
20 fracture mechanics analysis was performed.

21 So we want to make sure it's in the universe, and that means that there's
22 an evaluation of plant-specific surveillance data that's required, and an evaluation of in-
23 service inspection data. The two are different.

1 The motivation again was that the original screening criteria resulted in
2 an unnecessary burden without an improvement in overall safety. There was again a
3 conservative bias on toughness that resulted in an artificial impediment to license
4 renewal. Plant-specific analysis was an option if you couldn't meet the rule, but the --
5 nobody exercised that option because it was very onerous to do and it was found to be
6 impractical.

7 But there have been improvements in technical understanding. There's
8 a few more of these, but these are the major ones, and that is the recognition that there's
9 a spatial variation in fluence not so much through the wall, as we always recognize that,
10 but around the vessel and through the welds and things like that.

11 Most of the flaws in the vessel are now recognized as being subsurface
12 not -- they're embedded rather than on the surface, and the previous rule had to assume
13 that the vessels were surface-connected, which is where things would fail. That resulted
14 in -- the spatial variation in fluence resulted in spatially dependent embrittlement
15 properties.

16 Next slide, please. So this is a short table which gives you the
17 differences between the two with respect to this reference temperature screening criteria.
18 The 61 was more restrictive. The 61(a) is voluntary by the way. The licensee can still
19 use 61 if they desire to do that.

20 You need -- they're better informed and less restrictive. The plant-
21 specific surveillance data required, we don't need to go through the required tests. But
22 there are more tests that have to be passed in order for assurance that the vessel is within
23 the database that was used for the new rule. So in the plant-specific flaw inspection the

1 same way.

2 None was required before, before 61 that is, but for 61(a) you need to
3 understand the flaw distribution in the vessel, again to make sure that that flaw distribution
4 matches up with the flaw distribution that was used for the probabilistic fracture
5 mechanics analysis.

6 If there's a deviation from that, there's a path to account for that. But it's
7 a little bit more -- requires more information. Again, so the plant-specific -- excuse me,
8 next slide.

9 The plant-specific surveillance checks ensures again that the plant
10 surveillance data that's being assessed is well represented. With respect to the flaw
11 inspections, the inspections again assure that we have the right distribution and they're
12 consistent with ASME pressure boiler and pressure vessel code Section 11, and they
13 have -- there has to be verification that the flaws of the clad metal interface do not open
14 to the pressure vessel inside surface. So that's the surface-connected flaw issue.

15 There's a requirement to assess NDE uncertainty, and again the flaws
16 that are closer to the idea, which -- excuse me, ID, idea where the damage is the highest
17 and therefore the susceptibility the highest, are assessed more stringently.

18 And the recommendation that we made after review was that the guide
19 and the NUREG should be issued. Thank you very much.

20 MEMBER BLEY: That's it.

21 CHAIRMAN BURNS: All right, that's it now. Thank you for the
22 presentation and we'll begin the questions this morning with Commissioner Svinicki.

23 COMMISSIONER SVINICKI: Chairman, is it Bley? Have I been saying

1 your name wrong for years and years?

2 MEMBER BLEY: It is, thank you.

3 COMMISSIONER SVINICKI: I thought I visited Pitcairn Island in
4 January so Bley --

5 (Simultaneous speaking.)

6 MEMBER BLEY: It's spelled a little differently.

7 COMMISSIONER SVINICKI: It is spelled differently, but that's what I
8 think of. Are you unrelated at all to Captain Bligh?

9 MEMBER BLEY: That's B-L-I-G-H. I almost was a captain.

10 COMMISSIONER SVINICKI: Well I know it is, but my name is spelled
11 nothing like it was back in the Slovak region of Austro-Hungary.

12 MEMBER BLEY: That's probably true.

13 COMMISSIONER SVINICKI: Now we've seen some church records
14 that had a Z and a Y and not as many I's. But in any event, it used to be that at Ellis
15 Island they were able to take significant liberties. I think that my parents arrived and my
16 father arrived, well his father, at a time of a wave of Polish immigration.

17 So the name was made much more Polish. I've traveled to Poland and
18 they say oh, you're Polish. I agree because I'll just affiliate with anyone who will have
19 me. So if they think I'm Polish that's fine, but it's actually Slovak.

20 MEMBER BLEY: It's German and Dutch maybe in it too.

21 COMMISSIONER SVINICKI: Okay, but it is Bley. Okay, thank you. I
22 just thought you were too nice to correct me for years and years and I wanted to get the
23 record straight. So welcome to all members of the Committee, and a special welcome

1 to the new members. Always appreciate. I know we regret when members don't renew
2 with the Committee, but it's also very, very valuable to have new expertise and
3 backgrounds represented. So I welcome the new members today.

4 The Committee has been very prolific since our last meeting, so I did
5 review -- I have the greatest intentions upon receiving the letter reports one by one, that
6 I want to read them all so they go on a reading pile that many of us have. The preparation
7 for this meeting always forces me.

8 Now if we have a voting matter, of course, I pull that one out of the pile
9 because I want, I give in all seriousness, although I'm not always in perfect alignment with
10 the Committee's views, I give heavy, heavy weight to the Committee's input on any matter
11 on which I'm voting. So I really have a respect for the work that you do.

12 So you've teed up a number of issues, and I'm also going to close with
13 some observations I make. When you read a body of a committee's work in one sitting,
14 you get some discernible maybe trends for things. I'm always thinking about your
15 engagement with the agency staff, your input to the Commission and how the general
16 flow of all of those things appears to be working.

17 So this meeting is also an opportunity for you to hear the Commission's
18 feedback. So I want to provide that as well. I will interrupt Dr. Powers from the
19 equations on which he's working right now and begin --

20 (Laughter.)

21 MEMBER POWERS: He is not. He is recording your words as you're
22 speaking.

23 (Simultaneous speaking.)

1 COMMISSIONER SVINICKI: Well, I was going to say and will still say
2 that I'm beginning with Dr. Powers first of all as just evidence of my high regard for his
3 work, and secondarily because he has introduced such a pleasing new acronym into
4 today's discussion. It's just, it sounds like there's clouds and rainbows and unicorns
5 around NPUF.

6 So not all new acronyms are so melodious and pleasing to the ear, so I
7 really do thank you for addressing this topic.

8 MEMBER POWERS: And it is reflective of what it speaks to, rainbows
9 and wonderful reactors.

10 COMMISSIONER SVINICKI: No, I'm not certain. I'll have to do more -
11 - I'll have to do more thinking about that. But I was going to ask you about how the ACRS
12 might have deliberated on the periodicity of five years for the updates. Now you went on
13 to say in your oral remarks today what wasn't on the viewgraphs, that you feel it aligns
14 with the turnover of maybe students, graduate students and personnel.

15 But I guess what I was looking for is I know there's no perfect sweet spot,
16 but did you talk about maybe it should be three years, maybe it should be seven years,
17 you know. You were made comfortable with five? Is that, was that the high science of
18 kind of round numbers or things you can divide ten by or --

19 MEMBER POWERS: I don't think you can divide five by ten evenly and
20 not come up fractionally. But that's subject to analysis. You are correct. There is not
21 going to be an engineering way to come up and say here is the optimal periodicity on this.
22 We are aware that in the European system that they do typically five or ten years for a
23 complete review of a power reactor, and that system --

1 COMMISSIONER SVINICKI: But I would also note though your Slide
2 18 notes that there are very few design changes at these facilities. So how did you weigh
3 that fact?

4 MEMBER POWERS: The fact that the design changes are relatively
5 rare was viewed more as an assurance that you're not going to have wholesale changes
6 here, that the reports are going to look similar and the focus is going to be more on the
7 technical specifications for the operation of the reactor as it is.

8 And I was I think explicit in saying that it is with operation within the
9 technical specifications that is a key to operating these reactors safely. Now the
10 weighting that we would put, we had a general recognition that many of the people
11 operating these reactors have like a four or five year tenure on this facility.

12 You'll never be able to align it completely with their tenure, nor would you
13 want to, I would think. You would want to have one experienced person moving out of
14 the system but with an overlap sufficient to train the guy that was coming in as his
15 replacement.

16 To balance all of that and come up with some sort of an optimum was
17 never undertaken by either the ACRS or the staff.

18 COMMISSIONER SVINICKI: Was it more just that five years on
19 balance seemed reasonable?

20 MEMBER POWERS: It seemed reasonable. Ten years --

21 (Simultaneous speaking.)

22 MEMBER POWERS: Twenty years was clearly too long, and a great
23 deal of difficulty was encountered in reconstituting the licensing bases for these reactors

1 for the license renewal. On the other hand, three years strikes us as that's all you would
2 be doing because the staff -- many of these reactors are relatively small. As soon as
3 you got one done, you would just be immediately starting on another one.

4 So we wanted to some period, and that's about the level of thought on
5 these things.

6 COMMISSIONER SVINICKI: Okay, that's helpful. Was there also an
7 element of that deliberation that looked at the way these reviews, as they're done now,
8 tend to -- well, this isn't a scientific term -- tend to clump? You mentioned that the staff
9 has -- some of these reviews have been prolonged because there have been intervening
10 events like Fukushima or Three Mile Island.

11 In a cursory look of mine, I felt like many of them had started operations
12 around the same kind of Atoms for Peace in that time period. So they come up, their 20
13 years not surprisingly then all tends to clump in a certain number of years, and every time
14 the wave comes in NRC is a bit overwhelmed in adding that many wave of reviews to its
15 current body of work because it's just kind of a surge.

16 So was there any discussion or I don't know if the staff is looking at.
17 Could they begin somehow to phase this in and then space them out so that they're not
18 clumped?

19 MEMBER POWERS: I think that's actually happening in here.

20 COMMISSIONER SVINICKI: Okay.

21 MEMBER POWERS: I think they're getting rid of the clumpiness of
22 things.

23 COMMISSIONER SVINICKI: Okay.

1 MEMBER POWERS: And I'd just comment that you have a staff that's
2 extremely familiar with these facilities and what not. So they kind of know all, they know
3 where the skeletons are buried.

4 COMMISSIONER SVINICKI: And although I'm sure that we do have
5 employees with continuity on it, we also do rotate a lot of our technical staff around. So
6 between the waves when the clump comes in, it does tend to be different people. We
7 also, I think, like many government agencies, are perhaps facing another little mini-wave
8 of retirements.

9 So we might lose some of that continuity of knowledge. Well that's very
10 thorough. Thank you again for your input on that. On the general topic of the flooding
11 hazard reevaluation, there's discussion here about, you know, mitigation strategies are
12 examined only if protection cannot be assured.

13 Did the Committee engage the staff or deliberate amongst itself on its
14 view of the staff's handling of saying, you know, what is the level of assurance that's
15 necessary? I know this is a little bit of the soft science of the regulatory craft, as the
16 Chairman calls it. But was there engagement on the staff's threshold determinations of
17 what is the level of assurance that we're looking for?

18 MEMBER STETKAR: I'm going to try to understand the question a little
19 better. In terms of --

20 COMMISSIONER SVINICKI: Well, I mean, the events we're looking at
21 as a body are generally, by definition, extremely low frequency.

22 MEMBER STETKAR: Right.

23 COMMISSIONER SVINICKI: So you've got to marry those two

1 concepts. So, saying, you know, we're only going to do a certain type of examination or
2 analysis that protection is assured, what does that mean? Because we can't divorce that
3 from probability space.

4 MEMBER STETKAR: Okay, good. I think that the approach -- and one
5 of the reasons that we sort of requested seeing some examples of these evaluations --
6 is, I hate to be trite, but the devil is in the details, often. I think that the approach that's
7 been taken is that the -- initially, the evaluation of the hazard itself is done -- the first
8 evaluation is done very conservatively. So they assume -- a dam disappears. The
9 wave of water comes down the valley or, you know, the cloud stays over you and dumps
10 all of its water or whatever.

11 They evaluate, first, what is the maximum flood depth from that extreme
12 event? Without any consideration of its frequency or its probability. If the plant is
13 adequately situated up on top of a hill, if they have adequate barriers, if they have
14 adequate drainage to handle that event, that's it. That's the notion of protection. Might
15 be too much in terms of frequency? That isn't addressed. So, the plants that look at
16 protection in that sense, flooding protection, are, I believe, taking that approach, if they
17 cannot demonstrate adequate margins.

18 In other words, the maximum flood depth comes up to be a few
19 centimeters below the top of their wall, if you will. They're then starting to invoke now
20 more progressive evaluations of frequency, probability, consequences, more of a risk-
21 informed approach.

22 So as you go into those Path 4 and Path 5 assessments, those are by
23 design intended to evaluate both the frequency and the consequences on a site-specific

1 basis and bring in more of those notions.

2 COMMISSIONER SVINICKI: Well, I think that answer demonstrates the
3 complexity of, first of all, the staff has had to confront in looking at these issues, but also
4 then in the Committee's deliberations.

5 I'm over my time, but I just wanted to offer a couple of observations on
6 the NuScale topic. I just want to note that I'm in alignment with the Committee and that
7 I think the staff's, you know, case-by-case approach ventures near to a kind of, you know,
8 a relative risk notion. And I think that the Committee, I interpret, was a little bit disfavoring
9 the fact that could lead to a bit of an ad hoc decision-making.

10 Another outgrowth of that is it obscures the Commission's ability to have
11 policy oversight into overall tolerance of risk and level of risk, which, you know, the
12 Commission kind of disfavors taking an ad hoc approach to that, as is evidenced by
13 having things like safety goals and other things that the Commission has wanted to have
14 as a coherency to our overall approach to licensing things.

15 I would say that the categorization of the SSCs, the issue that was
16 explored by the Committee, feeds into some of the criticism that NRC gets that our
17 processes are fundamentally not going to be amenable to new types of reactors. So I
18 think by working with the staff to address something like this, it's a powerful demonstration
19 of the fact that we can bring the expertise either through an advisory committee such as
20 yours or the staff itself. There are mechanisms within this framework to make these
21 kinds of adjustments if we just buckle down and do the work.

22 The other thing that I appreciate -- and I know has been a challenge for
23 the staff, for the Committee -- as we're in looking at some of the Tier 2 and Tier 3 things

1 on Fukushima, the difficulty is that a lot of the paths and decisions have been made in
2 the years since that accident through a number of different Commission SRMs.

3 When I read the back and forth of the staff's response to some of the
4 areas that the Committee would identify, the staff would say, "Listen, you know. We got
5 a vote to close that out. We won't be doing further work in that area. And while we are
6 always open to new learning, there does need to be, maybe even in a Project Aim
7 environment, a mindset that says we have to have a basis for, you know, adding more
8 decimal places to that analysis or fundamentally reopening something."

9 We are, I think, getting to a point where there's a certain stability in the
10 post-Fukushima regulatory approach and response. We're at some of the tail ends,
11 through guidance and other things being developed, of really giving some sort of
12 predictability and scrutability to that framework.

13 So I do appreciate the Committee bringing its expertise to bear. The
14 staff is now way down into the details where the devil resides. So I do appreciate that
15 you're kind of engaged in a back and forth with them on that.

16 And I'm way, way over my time. But I would just say, on the review that
17 you do of the research program -- I've been meaning to give this feedback, I think, for a
18 couple of years. It's intensely valuable what you do, but it is evident that it is intensely
19 labor intensive for the Committee to do, and it results in a thick work product. I'm going
20 to admit that, even as committed as I am, I read the staff's response because then I can
21 kind of know what were the areas to be highlighted, and I always need to know what the
22 agency staff is thinking since I'm a member of the Commission.

23 So I, as an individual member of this Commission, would be open to

1 hearing if there are ways to make that work product, you know, less of a kind of maybe
2 the writing of it or the -- I don't know. Is the benefit in the engagement with the staff?
3 And the staff sincerely values the input.

4 I will say also that, in my nine-plus years here, the budget is the one time
5 of year that I really look at the elements of the research program. In that venue, those
6 research projects are competing with the entirety of the agency budget for my attention.
7 So if you were to guess that they get kind of a superficial look, you'd be right.

8 That's why I think your review is an all the more important thing. But that
9 being said, I would be open. I think we've gotten a report in the same kind of format for
10 a long time and it's extensive, it exceeded 80 pages this year. That's a real significant
11 effort for the Committee. So I'm just open to things that would allow you to bring all the
12 insights and maybe have some relief from the burden, it looks like.

13 Is it Professor Corradini? I mean, you were introduced as Professor
14 Corradini. Is that -- they've told me you're no longer teaching.

15 MEMBER CORRADINI: They got rid of me.

16 COMMISSIONER SVINICKI: Is the professor an honorific or is that --
17 because you're Dr. Corradini.

18 MEMBER CORRADINI: They use the term "emeritus" when you're old
19 and useless.

20 COMMISSIONER SVINICKI: Okay. But you're still considered a
21 professor. I know you're a doctor, but you're a professor even if you don't teach?

22 MEMBER CORRADINI: Yes.

23 COMMISSIONER SVINICKI: Okay. All right. Professor Corradini. I

1 don't know. The Chairman's going to cut my mic off here in a second because I'm way
2 over.

3 CHAIRMAN BURNS: I'm a doctor, but only in Germany, is the law.

4 MEMBER CORRADINI: Anyway, I will answer one -- I don't know what
5 -- if I'm supposed to answer anything. But we have a new person in charge of the
6 research report, and Dr. Rempe will solve the problem.

7 COMMISSIONER SVINICKI: Oh, okay. Well, I'm not sure it's a
8 problem because it's a very valuable report. But I think I'm doing, I guess, a mini Project
9 Aim on you. If there's some way to make it a better use of the Committee's resources,
10 I'll listen to it. I'm not speaking for anybody else.

11 MEMBER BLEY: I would say, though, that Chapter 2 is a summary of
12 everything. It's not very long. And we do divvy this thing up and each of us then --

13 COMMISSIONER SVINICKI: Oh, okay. I thought the lead, really --
14 because Dr. Apostolakis did have the lead for a while? Boy, did he complain about
15 having to do that.

16 (Simultaneous speaking.)

17 MEMBER CORRADINI: Dr. Rempe, do you want to answer?

18 MEMBER REMPE: I do, as Professor Emeritus Corradini said, I have
19 just started doing this, and he finished the one that was issued last year. So I appreciate
20 your comments, and I think it's a good topic that the Committee should discuss and find
21 a way to, you know -- maybe it is time for a change. So thank you.

22 COMMISSIONER SVINICKI: Thank you. Okay, I'm sorry, Mr.
23 Chairman, and I should be.

1 CHAIRMAN BURNS: Take whatever time you want, Commissioner.

2 (Laughter.)

3 COMMISSIONER SVINICKI: Wow.

4 CHAIRMAN BURNS: I mean. one of the things with three members is
5 that, in some ways, you don't -- I mean, you know, just sort of the -- I apologize, but the
6 structure is --

7 COMMISSIONER SVINICKI: We're going to have to get so much more
8 disciplined.

9 CHAIRMAN BURNS: I will be more disciplined.

10 COMMISSIONER SVINICKI: That's what happens. This happens on
11 three-person commissions, and then it's a rude awakening when you get five again.

12 CHAIRMAN BURNS: Yeah, exactly. So anyway, Commissioner
13 Baran.

14 COMMISSIONER BARAN: Great. Well, maybe the safest thing to do
15 is use first names at this point rather than titles. But, well, thank you all for your work
16 and for that of your colleagues. We really appreciate it.

17 I wanted to follow up on the questions about the NPUF draft proposed
18 rule, and there are a couple of -- well, there are several key elements.

19 But, you know, a couple of the key elements that I think interact, it sounds like, in the
20 analysis the Committee did of this, are the new requirement to have updated FSARs
21 submitted every five years. And that's kind of paired, in a way, with unlimited terms for
22 renewed licenses.

23 So you explored that a little bit with Commissioner Svinicki on one side

1 of it, which is what's the right periodicity on the submission of the FSARs? Let me ask
2 about the term, or lack thereof, of a renewed license.

3 Can you talk about -- you talked about several of the factors that affected
4 the Committee's thinking on that. Can you talk a little bit more about why you think that
5 strikes the right balance? Because if we're at 20 years now, it is novel to go all the way to
6 unlimited. Did you look at is 30 years better, is 40 years better? You know, talk a little
7 bit about --

8 MEMBER POWERS: Ordinarily we would not.

9 COMMISSIONER BARAN: Okay.

10 MEMBER POWERS: Our focus is going to be on the safety, and does
11 this degrade the safety? We're not going to argue over the term. It's whether you have
12 terms or unlimited licenses. And what we knew is that, certainly power reactors in this
13 world, are licensed under sufferance. So it's not an unlimited license; it's a license that
14 as long as you keep the reactor in good repair, operate within the technical specifications,
15 then you can continue to operate.

16 And that was the step that was being made here, and it struck us, that is
17 not radical. It will work. It is coupled with a continuing inspection and monitoring
18 program. What mechanism is there for degradation of safety here? None revealed
19 itself.

20 Will it reveal itself as time goes on? Perhaps. But we have an
21 inspection and monitoring program to alert us if that happens. So that's the Committee's
22 thinking. And the regulatory mechanics is not really our purview, and we're not going to
23 tread into that. We're going to ask the question, does this degrade safety or not?

1 COMMISSIONER BARAN: And so if there is a new requirement to
2 submit the FSARs every five years, and therefore the licensee and the staff is focused on
3 the licensing basis in a kind of updated way, is the Committee's view that there isn't -- if
4 you have that, there isn't any additional safety benefit to going through a license renewal
5 process?

6 MEMBER POWERS: It was not really identifiable that there was one,
7 that the FSAR and the familiarity with where your technical bases come about, why you
8 do them, why are there limits on these reactors?

9 I understand these are used for experiments, and so they're not
10 necessarily repetitive operations of an identical nature going here -- some there are, but
11 not necessarily. And so you have to know the technical specifications on your reactors
12 not as rote, but rather what's the basis for it? And we saw that as much more important
13 than any prescribed period of time.

14 COMMISSIONER BARAN: Okay. Let me ask about another element
15 of the draft proposed rule, and that relates to accident dose criteria for the research
16 reactors. And so the proposal is to increase that from .1 rem to 1 rem. 1 rem lines up
17 with EPA's protective action guidelines. But, you know, .1 rem lines up with the dose
18 limits for individual members of the public, which is where the criterion is now.

19 And as I read the draft Federal Register notice, I didn't come away really
20 with a firm understanding of what the practical implications would be for a licensee of this
21 change. Can you walk us through that? What effect is this going to have?

22 MEMBER POWERS: I think it's going to be enormously small for the
23 licensee. The inventories on typical facilities are sufficiently low they'd probably get .1

1 for most of their accidents, but they have to look at their limiting accident. That may give
2 them a little bit of relief there. For the typical one, probably not a lot.

3 COMMISSIONER BARAN: Okay, because my understanding is the .1
4 has been around, I guess, since '94. So that's a couple of decades.

5 MEMBER POWERS: Yeah.

6 COMMISSIONER BARAN: Has the staff talked about it? Are you
7 aware of, have there been problems with the current .1 rem level? Is this in response to
8 --

9 MEMBER POWERS: I think we did not pursue that in great depth.
10 What we saw was that was consistent with the EPA protective action guidelines. We
11 suffered from not having quantitative metrics on the incident frequency here. So, trying
12 to align that with quantitative metrics on the consequences was kind of a pointless
13 exercise.

14 What attracted me in particular was, okay, you're getting alignment
15 between the protective action guidelines and your accident analysis. That's a rare
16 example of consistency in the regulatory process. Let's go with it.

17 COMMISSIONER BARAN: Okay. Well, and so for the -- it sounds like
18 relatively few research reactors for which this would really have an effect. What do you
19 see as the likely effect in those cases? When it's time for license renewal, it's easier for
20 them to perform the calculations, the accident scenario calculations?

21 MEMBER POWERS: I don't think they're going to be impacted a lot
22 anyway.

23 COMMISSIONER BARAN: Okay.

1 MEMBER POWERS: It gives them a number to compare against and
2 say, "Yeah, I'm below the PAG here." It's consistent. The Health Physics Society tells
3 us not to try to quantify consequences for less than 1 rem. Like I say, a rare example of
4 consistency sounded very attractive.

5 COMMISSIONER BARAN: And not to belabor this, so in terms of the
6 consistency, it sounds like that's the main thing going for this proposal. So why, in your
7 view, is it more important to be consistent with the EPA PAG than the Part 20 dose limit?
8 It's consistent with the Part 20 dose limit now.

9 MEMBER POWERS: Yes, but that's a public dose limit. You're talking
10 about a rare event accident, limiting accident. The two shouldn't be the same if you're
11 going to have a risk-informed regulation, even if it's qualitative risk.

12 COMMISSIONER BARAN: Okay. John, let me ask about one of the
13 Fukushima issues, which is the assessment of flooding hazard reevaluations. And as
14 you talked about, ACRS recommended that an analysis similar to an integrated
15 assessment be performed at the sites where mitigation strategies -- basically, the FLEX
16 equipment -- are needed to compensate for the effects of local intense precipitation
17 flooding.

18 And in their response, the staff basically said -- this is a little bit of what
19 Commissioner Svinicki was talking about -- "Well, the Commission already approved this.
20 Thanks." And so which, you know, I guess is a fair response. When we voted on this,
21 on the paper, you know, we didn't have the benefit of the ACRS' review at that time.

22 And so I guess I should ask you a pretty frank question, which is: do you
23 think we got this wrong? Is this something we should revisit?

1 MEMBER STETKAR: I'm not going to answer that in a yes or no. I
2 think that it's unfortunate that we didn't have an opportunity to give you feedback on the
3 SECY paper in a timely manner. It just -- it didn't come before us. I wish we had. The
4 staff's response does cite the SECY paper and the SRM on that SECY paper.

5 However, the staff also said that they acknowledge our concerns and that
6 they plan to use -- and I wrote this down so I wouldn't get it wrong -- engineering and
7 operational judgment, in particular, when they look at those mitigating strategies for local
8 intense precipitation.

9 And in fact, it's one of the reasons we wrote a follow-up letter to the staff,
10 just in our last meeting, and haven't heard back from them yet, but requesting that we see
11 a few examples of how they're treating that.

12 So they are sensitive to it, clearly. And we agreed with them in our letter
13 that trying to revise the interim staff guidance at this point, introducing new discussions
14 with the industry, new delays while people are under a pretty doggone tight time clock to
15 produce these assessments, or worse, running the risk that people who are already in
16 line to submit their assessments might use different principles than some of the later
17 submittals, I think that this is a reasonable compromise.

18 COMMISSIONER BARAN: Okay. Well, I think that answers my
19 question. And sorry if I phrased it in a way that made you timid about answering it.

20 MEMBER STETKAR: You get a chance to do that.

21 COMMISSIONER BARAN: You know, I mean, obviously, it's optimal if,
22 you know, you're able to review it in a timeframe when we're doing our decision-making.
23 Sometimes that doesn't happen. If the Committee has real concerns about what was

1 decided, I, at least, want to hear that. You know, and we should be thinking about
2 whether in any of these cases we need to go back.

3 It sounds like, in this case, the view is there are a lot of complexities to
4 going back and the staff is looking at this still, and you all are still looking at it, so it's not
5 really necessary here to go back. But, you know, from my point of view, at least, if there
6 are times where you felt we should, I think we at least want to hear that.

7 MEMBER BLEY: Thank you, and I think we do. Any time that we think
8 there's really something that is a significant safety issue that somehow slips through, we
9 do come back and raise it again.

10 COMMISSIONER BARAN: I appreciate that. I'm a little bit over, but let
11 me ask about one more topic since I have license to do unlimited questioning, I guess.

12 (Laughter.)

13 (Simultaneous speaking.)

14 COMMISSIONER BARAN: I know, unlimited duration licenses,
15 unlimited questioning.

16 Let me ask Dennis about, in May, the Committee issued a letter on the
17 staff's post-Fukushima evaluation of natural hazards other than seismic and flooding.
18 And there were two items that the Committee identified that you all thought warranted
19 additional staff attention.

20 One was hazards that could impact the ultimate heat sink, specifically
21 the effect of debris or the material on intake screens and heat exchangers.

22 The other was hazards that could adversely affect air quality at a site for
23 a prolonged period of time, a period that would go beyond Phase 1 of FLEX.

1 Can you talk a little bit more about the Committee's concerns?

2 MEMBER BLEY: Yeah. I think on this one, I'll pass it back to John, if
3 that's okay, because he did most of the work on this. But yeah, I think we were worried
4 about cases where assumptions of how things would work could get challenged by these
5 situations.

6 MEMBER STETKAR: And I think you've characterized it correctly,
7 Dennis, also. We currently have a subcommittee meeting scheduled for the 19th of this
8 month on the topic of the other external hazards. And it's going to be a busy
9 subcommittee meeting. One item in that subcommittee meeting is to address the
10 closeout of the high winds, snow and ice loading, which were passed on from the so-
11 called Task 2 evaluations to Task 3.

12 However, we are going to go back and revisit those items that we raised
13 in our letter with the staff. One of the items is quality of the ultimate heat sink water.
14 One is air quality. And we mentioned a couple of others in our letter, in particular
15 treatment of downstream dam failures and low water due to other conditions, such as a
16 seiche.

17 So we are continuing to follow up on those, and we will -- in the
18 subcommittee meeting, I don't know whether the Committee will write a letter on that topic.
19 If we do, it would be in our December meeting.

20 COMMISSIONER BARAN: Okay. Well, if you end up writing the letter,
21 if you have reactions to the revisions the staff has made to their assessment, I look
22 forward to hearing it. Thank you.

23 CHAIRMAN BURNS: Thank you. I'm going to throw a curveball here

1 and ask the general counsel a question. This happened to me once when I was sitting
2 there during an ACRS meeting. It was the most active meeting I had been in for some
3 time. And I said, "Why? I'm coming to hear these guys talk technical issues."

4 But my question is, just to refresh my recollection, the reason why we
5 can look at, as the term goes, licenses at sufferance, for this set of reactors, because
6 they're Section 104 licenses. And unlike 103, there is no term. 103 has the 40 years
7 term, correct? Am I correct?

8 MS. DOANE: Sorry, I'm not used to talking.

9 CHAIRMAN BURNS: During this meeting. At this meeting.

10 (Laughter.)

11 MS. DOANE: At this meeting, right. Fair enough, right. So, that is
12 right, and then also I think there was some look at whether the 40 year term was -- there
13 was a technical basis for that 40 year term. That's another issue. And it wasn't. So
14 there wasn't --

15 CHAIRMAN BURNS: No, no, because even in the 103 license, it's not
16 a -- it's become a way of organizing the safety review, but it really had to do with antitrust
17 and economic amortization, depreciation-type issues.

18 MS. DOANE: Right. So those issues really didn't transcend either.

19 CHAIRMAN BURNS: Yeah, and we won't go into -- like we still actually
20 have commercial operating reactors that have 104 licenses, but we'll leave that one aside
21 for today.

22 The one thing, I think, you know, it's interesting that in the -- and I've got
23 to read this, quite frankly, the staff's paper. My colleagues have spent a lot of time on

1 this.

2 I guess the one difference, perhaps, is between some of the models and
3 I see in -- I think the Swiss is the one that comes to mind, is you have this license of
4 sufferance, which I think is an interesting term, but you do have a periodic safety review.
5 Now, I suppose that -- and I think maybe Dr. Powers, where the Committee's coming
6 from, in effect the submission or the discipline of the five year review or the FSAR update
7 in a sense gives that opportunity. It puts the burden on the staff, which probably is where
8 it ought to be. But is that the comparison?

9 MEMBER POWERS: That's right. We looked at the periodic safety
10 review, and the submission of the FSAR is essentially identical requirements. The one
11 differential you have between, say, the Swiss model is they require the power reactors to
12 make changes to accommodate new understanding. We're probably not going to do that
13 for these reactors, but that's the only difference.

14 CHAIRMAN BURNS: Yeah, okay.

15 MEMBER POWERS: So it seemed like it was a parallel kind of thing,
16 maybe not identical but certainly parallel, and that gives you comfort that you're not going
17 to degrade safety.

18 CHAIRMAN BURNS: Yeah. I think the analogy is valuable, and you
19 know, I think it helps in understanding. I think what it does, and I think that's one of the
20 things I think looking at during your deliberation on the paper, on the proposal, is I do --
21 in some ways I can see that the burden on the staff -- and, again, I'm not saying that that's
22 inappropriate -- but the burden on the staff in looking at perhaps at 50.59 changes or the
23 FSAR updates is perhaps a little more exacting. But as you also commented, the relative

1 change is, or changes, are relatively small, I think, for --

2 MEMBER POWERS: And they're going to be highlighted.

3 CHAIRMAN BURNS: Yeah.

4 MEMBER POWERS: They're going to stand out. They're not going to
5 have to look for them and they're not going to, probably, not be radical.

6 CHAIRMAN BURNS: Yeah, okay. All right. Let me turn to John here.
7 One of the -- as you say, one of the recommendations from the review of the flooding
8 hazard evaluation is not to do a peer review for each and every submission that came in,
9 but there might be some focus.

10 Had you all thought in terms of what criteria or considerations might go
11 into whether determine whether to do, indeed, a peer review might be appropriate for a
12 smaller subset or a particular evaluation that might trigger such an effort?

13 MEMBER STETKAR: No. Quite honestly, we haven't. We reacted to
14 the notion that was presented in the draft guidance that simply said that the staff wanted
15 an independent peer review performed for any of the integrated assessments, which, if
16 you're familiar with the difficulties that have transpired in having truly independent, truly
17 peer reviews performed, for example the fire risk assessments to support a transition to
18 NFPA 805, quite honestly, to have a similar pedigree of peer review for a probabilistic
19 flooding hazard assessment, not necessarily the in-plant consequences but the flooding
20 hazard assessment itself, it's not clear whether we could do one, because there just isn't
21 that level of expertise in the industry.

22 And that then leads to an awful lot of questions. There's then a learning
23 curve. There's a learning curve by the staff, there's a learning curve by who would be

1 the peer reviewers, who's qualified to perform the peer review, how much time does it
2 take to perform the peer review? So our reaction initially was from that perspective.

3 Now, I know the staff has not completely backed away from the notion of
4 peer reviews in total. I believe their response to us said, well, we're not going -- they
5 removed the appendix for peer reviews that was in the draft document.

6 CHAIRMAN BURNS: Generic.

7 MEMBER STETKAR: They were just generic. They told us that they
8 may ask for peer reviews of selected elements of an analysis. I don't know what those
9 would be. Again, that's part of our continuing dialogue with the staff on these topics.

10 CHAIRMAN BURNS: Okay. And as they say, I think one of the things,
11 I think -- and you touched on it, I think -- I learned during reviewing the various post-
12 Fukushima -- or the various requirements or various aspects of looking at natural hazards
13 or external hazards is -- and I think you touch on it -- the sort of the state of the art
14 knowledge. I think, for example, maybe I'll draw an analogy. It says we know in terms
15 of seismology that so much work has been done in that area. So our understanding
16 since when I walked in here in 1978, in terms of our understanding of a seismic review or
17 our ability to do a seismic analysis, is much better than in the flooding area. And we're
18 starting to get there, working on it. But I think part of what I understand is that's some of
19 the issue.

20 MEMBER STETKAR: That's exactly, I know, my own personal concern.
21 I would feel much more comfortable with the notion of an independent peer review of the
22 risk-informed seismic assessment, because people have been doing that. We have a
23 body of experience. That being said, we've also developed a body of experience with

1 evaluating fires, and we know the difficulties that the industry and the staff has faced with
2 trying to get peer reviews of those assessments, despite the fact that we have, in principle,
3 a current knowledge base on that technology.

4 We do not have that knowledge base on probabilistic flooding analysis,
5 and all elements of it. I don't care whether it's dam failure frequencies or probabilistic
6 modeling of hydrology, or whether it's rainfall rates or any of the elements.

7 We just don't have those. It's being developed, but it's slow. It's being
8 developed. Also it's not being developed necessarily within the NRC. It's been
9 developed in other agencies, and they're starting to be a lot more cooperation and
10 understanding, but it's slow.

11 And as Commissioner Svinicki said, if we want to bring closure to the
12 Fukushima issues, we don't want to drag those -- we don't want to hold that closure
13 subject to research-type reviews.

14 CHAIRMAN BURNS: Okay, good. I'm going to touch on the PTS rule.
15 Again, my understanding, I think what you said, Professor Ballinger, is that what we have
16 is we have a rule from the late 70's or early 80's, and that this 50.61(a) is an alternative.

17 Maybe just to help my understanding, how would you pick the
18 alternative? What is it that the alternative does in terms of how do you pick which
19 analyses you want to go with, or can you switch back and forth?

20 I think part of it is, what you said is that the original rule, sort of like what
21 we were just talking about, was based on a limited data set in terms of the ability to
22 analyze PTS or the phenomenon. But I'm trying to understand a little bit better what the
23 --

1 MEMBER BALLINGER: So your question is why would you choose one
2 or the other?

3 CHAIRMAN BURNS: Yeah.

4 MEMBER BALLINGER: Well, first, any new reactor would never have
5 to use -- would never have an issue with embrittlement because welding technology and
6 things like that are -- so we won't even get close to the screening criteria over the life of
7 those plants. So it's really for plants that are built now. And so why would you choose?

8 If you have a plant for which you're about to exceed the screening criteria
9 for 61, which would be 270 degrees Fahrenheit for a weld and 300 degrees for non-welds.
10 And so if you were projecting ahead, say I wanted to go from 40 to 60 years or even
11 further, if you project that you're going to exceed the screening criteria on 50.61, then
12 assuming you're going to operate the reactor, then you would have no choice.

13 CHAIRMAN BURNS: Yeah, you're really directed to.

14 MEMBER BALLINGER: You'd have to do that, because when you do
15 that analysis, I mean, because there's no guarantee that the analysis will come out better.
16 But it mostly likely will, and so the screening criteria can get relaxed in some of these
17 plants that are the older plants.

18 When you look at how close they are to those screening limits, they're
19 pretty close when you project, because you have to do the projection, and then you have
20 to take action.

21 If you get close to that screening criteria, you have to -- you can't wait
22 until you get to the screening criteria. You have to do something now, and that likely
23 includes some method to reduce the flux, the fluence to the vessel wall, which involves

1 shuffling fuel and things around. And that's a huge economic issue.

2 So it's not a wait until then and decide kind of thing. So that's how you
3 would choose.

4 CHAIRMAN BURNS: Okay, good. Actually, the one thing that reminds
5 me, I wonder if we were back in 1990, '92, what this would have meant for Yankee Atomic,
6 which was meant to be the first one in the license renewal. I don't know. It may be
7 speculation, but kind of interesting.

8 MEMBER BALLINGER: Member Bley knows a lot about that, I think.

9 (Laughter.)

10 CHAIRMAN BURNS: And I'm not -- I just speculate. But I just thought,
11 because you know I was working on some of the rules following renewal, and, you know,
12 Yankee Atomic was going to be the lead case, and as I recall, that was the issue.

13 MEMBER BALLINGER: I might add that there's a table in, I forget
14 which, I think the NUREG, or in several of the presentations, which identifies plants that
15 are likely to have to use this.

16 CHAIRMAN BURNS: Okay, okay. I haven't seen that.

17 MEMBER BALLINGER: And that number is pretty small, pretty small.
18 There's one that's already -- at least one, Palisades, which is using it. But the number is
19 pretty, it's pretty small.

20 CHAIRMAN BURNS: Pretty small, okay.

21 MEMBER BLEY: What I can say about it is, at the time, Yankee had
22 developed a plan for doing some testing and something akin to what's ended up in this
23 rule to analyze in a probabilistic approach, but other things got in the way.

1 CHAIRMAN BURNS: Yeah, yeah, okay, good. I'll close out. I think
2 you answered a question -- or Commissioner Svinicki posed a question in terms of some
3 what I think is potentially the longer term value of some of the work on the NuScale in
4 terms of making more generic considerations.

5 And it sounds like, to the extent that that approach can be translated into
6 potential other, either Gen-IV type or thinking as we get to Gen-IV type reviews or other
7 type reviews, it sounds like I think that's -- you all are looking sort of down that path, it
8 sounded like to me. If so, I think that's a good idea.

9 MEMBER CORRADINI: I think that's the case. I would emphasize one
10 thing, though, that it's important to know enough about the design characteristics that one
11 can make intelligent judgments about it.

12 CHAIRMAN BURNS: Yeah, absolutely. Okay, thanks.

13 Well, thank you all. Unless I've got any closing remarks from my
14 colleagues, I want to again thank you for being here. Welcome to our new members,
15 again. And again I think we all appreciate the work that the Committee does in its long
16 tradition, both, as I said, of looking at sort of the bigger picture issues as well as focusing
17 on particular applications and designs as we ask you to do and is expected under the
18 statute.

19 So thank you again for the presentations today, and we are adjourned.

20 (Whereupon, the above-entitled matter went off the record.)

21

22

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