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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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MEETING WITH THE ACRS

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FRIDAY,

MARCH 4, 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 10:04 a.m., Stephen G. Burns, Chairman, presiding.

NRC COMMISSION MEMBERS:

STEPHEN G. BURNS, Chairman

KRISTINE L. SVINICKI, Commissioner

WILLIAM C. OSTENDORFF, Commissioner

JEFF M. BARAN, Commissioner

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ACRS MEMBERS:

DENNIS BLEY, ACRS Chairman

RONALD BALLINGER

JOY REMPE

JOHN STETKAR

ALSO PRESENT:

ANNETTE L. VIETTI-COOK, Secretary of the Commission

MARGARET M. DOANE, General Counsel

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P-R-O-C-E-E-D-I-N-G-S

10:04 a.m.

CHAIRMAN BURNS: I will call ourselves to order. And I want to welcome the members of the Advisory Committee on Reactor Safeguards, who are here with us this morning to present; also the NRC staff and members of the public.

Today we hold one of our periodic meetings with the ACRS. These meetings provide the Commission an opportunity to hear directly from the Committee about their recent work in general and in more detail on particular topics that have been reviewed by the Committee. We'll have presentations from the Committee and then have a question and answer session from the Commission.

But before we begin I would like to take a moment to acknowledge Andrea Valentin's official start with the ACRS as the new Executive Director this week. She joined the NRC in 1992 as an intern in the Office of Nuclear Reactor Regulation and she's had a number of positions since that time in research and in the Office of the Chief Human Capital Officer. And she was the Deputy Division Director in the Office of New Reactors and has been Acting Assistant Operations. I've seen her a lot more lately than I had prior to that. So I want to welcome her to her position.

But I wanted to also acknowledge the transition of Ed

1 Hackett, who has served as the Executive Director of ACRS for over  
2 seven years, and he is assuming the position of Deputy Director in the  
3 Office of Nuclear Regulator Research for which he is well suited and  
4 qualified. And I want to extend my thanks to him for his service in the  
5 ACRS and to the Commission.

6 And I wish the best of luck to our two colleagues here.

7 So before we begin, do other colleagues --

8 (No audible response.)

9 CHAIRMAN BURNS: Great. Then we'll turn it over  
10 to Mr. Bley in terms of providing the Committee's presentation.

11 ACRS CHAIRMAN BLEY: Thank you, Chairman.  
12 Are we going to have the slides? I'd like to get the first one on  
13 accomplishments. One more. And one more. There. Thank you.

14 It's been since last June since our last meeting, and we  
15 had one that was, as I recall, snowed out, I think.

16 CHAIRMAN BURNS: Yes.

17 ACRS CHAIRMAN BLEY: Yes.

18 (Laughter.)

19 ACRS CHAIRMAN BLEY: And since then we've  
20 issued 17 reports. I'll give you a short summary of those. The three  
21 topics on this page are the ones for which you'll hear more from my  
22 colleagues today.

23 The first one of those is the 50.46c rulemaking on  
24 ECCS LOCA performance. Ron Ballinger will do that.

25 The next one is on the maximum extended load line

1 limit analysis plus, which has to do with BWR operational flexibility and  
2 safety. And Dr. Joy Rempe will do that one.

3 And the last one has to do with Fukushima, and it's the  
4 plans for resolving the Near-Term Task Force open Tier 2 and Tier 3  
5 items. And John Stetkar will do that one.

6 Next slide, please. Among the reports we had we had  
7 one COLA during this period, and that's for the William States Lee  
8 AP1000. We had a construction permit; and it's been some time since  
9 we had one of those, for the SHINE medical isotope facility. And we  
10 had an early site permit, which again it's been a long time since we had  
11 one of those. That's for the PSE&G site that's up in New Jersey by  
12 Salem and Hope Creek. And they looked at one, two, three, four  
13 different reactor types as they did the early site permit block.

14 The next slide, please. In the license renewal area we've had  
15 two reports. They covered three plants and actually five different units.  
16 And we looked at the draft SECY paper on recommendations and  
17 issues related to the implementation of the risk management regulatory  
18 framework.

19 Next slide, please. Having to do with Fukushima, we  
20 reviewed the draft regulatory basis for the containment protection and  
21 release reduction for Marks I and II BWRs. We did a number of  
22 reviews of guidance and bases. The first here is Interim Staff  
23 Guidance for PRAs of advanced light water reactors for the design  
24 certification and COLA stages.

25 Next slide. We also looked at Interim Staff Guidance

1 for the evaluation of acute chemical exposures and proposed  
2 quantitative standards for fuel cycle facilities. We reviewed the  
3 enhancements to the reactor oversight process, as well as the  
4 proposed cornerstones for the fuel cycle oversight process. And we  
5 preformed our annual assessment of the quality of selected NRC  
6 research projects. We looked at one on uranium sequestration and  
7 one on weld residual stress. And these turned out to be two of the best  
8 reports we've reviewed in a number of years. We really appreciated  
9 those.

10 Next slide. In the area of Fukushima, these are what  
11 we're doing in the coming year. We're looking at the NRC Near-Term  
12 Task Force Tier 2 and 3 recommendations, Groups 2 and 3. We're  
13 looking at guidance for performing integrated assessment for external  
14 flooding, and mitigation of beyond-design- basis events rulemaking, the  
15 update.

16 The next slide. We're looking at two new plants. One  
17 is a design certification and the other is a combined license application.  
18 Actually two of those. We're looking at the research and test reactor  
19 license renewal process rulemaking, and actually we expect to have a  
20 report out on that at the end of this -- well, sometime in the next couple  
21 of weeks it'll be released. We're still working on that. And our biennial  
22 review evaluation of the NRC Safety Research Program is underway  
23 and should complete within the next month or so.

24 Next slide. We're doing five license renewals and  
25 we're reviewing the subsequent license renewal process and GALL

1 that's being developed now. In the area of radiation protection Part 61  
2 rulemaking is back to us again, and we'll be looking at that soon.

3 Next slide. Digital I&C area we have four areas we're  
4 looking at. Three of these are SECY papers and one's an actual  
5 design and installation of new equipment.

6 Next slide, please. In the area of reliability and PRA  
7 we have four projects we're following. Probably the biggest is the  
8 Level 3 PRA work, which is well along at this point in time, and we're  
9 having continual Subcommittee meetings with the people doing that  
10 work.

11 We're also following the continuing HRA, human  
12 reliability analysis, develop work.

13 And we're looking at the risk-informed approach for  
14 assessment of debris accumulation in PWR sumps. And that's the  
15 GSI-191 work.

16 And NuScale has submitted a topical report on risk  
17 significance determination following a different approach than most  
18 people have used. We're in the middle of that review at this time.  
19 We've had a Subcommittee meeting and we'll be working on that  
20 probably for another month or two.

21 Next slide. In the area of metallurgy and reactor fuels  
22 we have three projects that we're following: spent fuel storage and  
23 transportation, the dry fuel storage with generic aging, and a draft  
24 regulatory basis for Part 50, Appendix H on reactor vessel material  
25 surveillance.

1                   Next slide. We have ongoing work in thermal-  
2 hydraulics. These two have been around for awhile. We hope they'll  
3 be finishing up this year. The first is the full spectrum LOCA  
4 methodology and the other is the BISON code, which has to do with  
5 BWR stability modeling.

6                   And that's an overview of what we have. I'm going to  
7 pass this on to my colleagues. And I'm going to apologize. I've got a  
8 little problem with my leg and I'm going to have to leave the table for a  
9 little bit.

10                  At this time I'd like to pass it on to Professor Ron  
11 Ballinger to talk about the 10 CFR 50.46 work.

12                  ACRS MEMBER BALLINGER: Thank you and good  
13 morning. Good morning. This presentation is on the draft final rule  
14 for -- well, it's 10 CFR 50.46c for the ECCS performance system.  
15 There should be another word in this title. It's the draft finally final rule  
16 for ECCS performance. My undergraduate thesis in 1975 was on zirc  
17 water reaction kinetics, and two of the investigators at Oak Ridge,  
18 Cathcart and Paul, which you might be familiar with, they have sons  
19 and one of them has a grandson working at Oak Ridge on this topic still.

20                  (Laughter.)

21                  ACRS MEMBER BALLINGER: So I don't know what  
22 the message is, but think about what you want. All right?

23                  (Laughter.)

24                  ACRS MEMBER BALLINGER: Okay. Next slide,  
25 please. The goals for this rulemaking were to revise the ECCS



1 acceptance criteria to reflect extensive research findings. And tongue-  
2 in-cheek aside, it was a long process. There's been a lot of work that's  
3 been done on this and a lot of convergence between the staff and the  
4 industry. And a lot of new data has been generated as a result of that,  
5 so "extensive" is kind of an understatement in this case.

6 As a result of that, one of the other goals is to replace  
7 the prescriptive criteria with performance-based requirements now we  
8 have enough data so we can do this. And one of these is in response  
9 to a Commission directive. We'll expand the applicability to all fuel  
10 designs and cladding materials. There are new fuel designs in  
11 particularly ZIRLO and M5 that perform much better. And so this is a  
12 good addition. And in addition to that to allow an alternative risk-  
13 informed approach to evaluate effects of debris on long-term cooling.  
14 This is a GSI-191 issue.

15 Next slide. This kind of gives you a synopsis of what  
16 the results are. The figure on the upper right plots the embrittlement  
17 oxidation limit, which Appendix K now would say 17 percent versus  
18 hydrogen content, which is a surrogate for burnup. And so, it turns out  
19 that with high burnup fuel, with the absorption of hydrogen and other  
20 things, the equivalent clad oxidation limit needs to be reduced. And so  
21 that's what this shows.

22 And the second major part of this has to do with in  
23 some cases you can get what's called breakaway oxidation where you  
24 get a suddenly accelerated oxidation rate for certain times and  
25 temperatures. And under those circumstances you get a lot more

1 hydrogen that's absorbed. And so the embrittlement criteria need to  
2 be adjusted for that. The lower right hand photograph shows an  
3 extreme example of that. That's a piece of Russian fuel cladding which  
4 is no longer made, but it gives you an example of the extremeness.

5 Next slide, please. The new rule maintains peak  
6 cladding temperature and hydrogen limits. 2200 F, the one percent  
7 cladding reacted, which we're all familiar with. But it adjusts the  
8 equivalent clad that's oxidized to reflect this burnup effect on ductility  
9 on a quench, core coolability, if you will. It requires an analytical limit  
10 for peak cladding temperature and integral time at temperature to  
11 develop that to account for these effects. These kinds of calculations  
12 have always been done, but now this reflects the new data. It requires  
13 an accounting for this breakaway oxidation, which is that lower right-  
14 hand figure in the last slide. And it allows the use of risk-informed  
15 methods for long-term cooling.

16 Next slide, please. As a result of this effort, not only  
17 the rule was produced, but a number of Reg Guides, four to be exact,  
18 three related to basically ECCS performance of the cladding material.  
19 They're listed here: 1.222, 1.223 and 1.224, which provide guidance  
20 for licensees to meet the new rule. And then a fourth Reg Guide,  
21 1.229, relates to the risk-informed approach to address the effect of  
22 debris, the GSI-191 problem.

23 Next slide, please. Now, with respect to  
24 implementation, this has been a long ongoing dialogue, if you will,  
25 between industry and the staff, and while I've only been involved with it

1 for the last three years as my membership of the ACRS, it's been long  
2 before that. And I must say that the implementation scheme has  
3 evolved considerably from much more prescriptive, much more  
4 onerous, in my opinion, but to one that they have now so that the  
5 industry and the staff are largely in -- largely -- I say largely in agreement  
6 with the implementation schedule. There's still some back and forth,  
7 but nonetheless it's a reasonable implementation schedule.

8           And this shows what that is. And the licensees have  
9 to produce an implementation plan within six months after the date of  
10 the rule and then they have to be compliant with the rule and completed  
11 no later than 84 months after the implementation of the rule, which  
12 seems like a fairly long time for something which is adequate protection,  
13 but nonetheless the accident we're dealing with is a low-probability  
14 event. The ability to do the calculations and understand margins in  
15 these calculations has improved very significantly over the last, good  
16 knows, 10 years or so.

17           And so, this 84-month time scale reflects the fact that  
18 it is adequate protection. We have to get closure on this plus enough  
19 time for licensees to get compliant. By that time there will be no old  
20 cladding in service. Zircoloy 4 will be gone. And so it's all going to be  
21 M5 or ZIRLO in the case of the PWRs, which is a much better  
22 performing cladding material. So that's as a good thing. And should  
23 the licensee need more time, there's always the -- they can always  
24 request an extension. So it's a good compromise.

25           As far as the ACRS recommendations we just wrote a

1 recent letter and we suggested or recommended that the rule be issued  
2 along with three out of the four Reg Guides. At the time we wrote the  
3 letter Reg Guide 1.229 was still in draft form. We didn't have the final  
4 wording. And so what we elected to do was to delay that. And this  
5 shows you the schedule. We will be having a Subcommittee meeting  
6 in March and then we'll write a letter on that Reg Guide in April.

7 And I have actually finished early. Thank you very  
8 much.

9 CHAIRMAN BURNS: Thank you.

10 ACRS CHAIRMAN BLEY: That's good. I guess at  
11 this time we'll turn to Dr. Joy Rempe.

12 ACRS MEMBER REMPE: Thank you. Today I'd like  
13 to discuss our reviews of the license amendment requests for operation  
14 in the maximum extended load line limit analysis plus, or MELLLA+,  
15 expanded flow domain. And in this presentation I'm going to be  
16 emphasizing what MELLLA+ is, its regulatory history and why it's of  
17 interest to licensees and some special limitations that need to be  
18 included when one implements the MELLLA+ operating domain.

19 The next slide has a simplified power to flow map that  
20 I think is useful for explaining what MELLLA+ is and why its of interest  
21 to licensees. As you know, BWRs are licensed to operate for specific  
22 power and flow conditions. If a reactor were licensed to operate in the  
23 MELLLA domain, it would have an operating flow domain that would  
24 correspond to the light green region that's shown on this slide that  
25 allows it to go up to 100 percent power and 100 percent core flow.

1                   BWRs control power using two options: control rod  
2 movements and flow adjustments. Licensees tend to prefer flow  
3 adjustments because there are more complex operator actions required  
4 for control rod movements and flow adjustments allow reactivity to be  
5 distributed core-wide, which has some benefits with respect to fuel  
6 performance.

7                   In recent years several BWRs have requested  
8 extended power uprates, and if the BWR is authorized to operate in the  
9 increased core flow region along with their EPU, their operating domain  
10 would correspond to the regions that are shown in light green, orange  
11 and what should be light yellow, but it's also marked with the increased  
12 flow region. And that allows them of course to have a larger operating  
13 domain, but it actually decreases their operating core flow window.

14                   In order to regain some of the operational flexibility and  
15 safety benefits, some of the licensees have requested to go use the  
16 MELLLA+ option, which would correspond to the dark blue region  
17 shown on this view graph. If the licensee were to operate along the  
18 low-flow regions of that MELLLA+ region, which is designated by the  
19 line segment D-E, that has the potential to have the plant in a condition  
20 where it's more susceptible to power and flow oscillations. So  
21 additional measures need to be implemented to maintain the safety  
22 margin when they are in the MELLLA+ operating flow domain.

23                   With respect to the next slide, in 2007 we issued a letter  
24 that recommended that the GE-Hitachi MELLLA+ licensing topical  
25 reports be approved. These reports identify the scope and provide

1 generic analyses that are needed to meet safety and regulatory  
2 requirements.

3 Our letter now reviewed focused on analytical  
4 uncertainties and limitations that are needed to preserve the safety  
5 margins with MELLLA+ operation, and to date there's been four license  
6 amendment requests for operating in the MELLLA+ domain. And as  
7 you may have seen in our letters, we have recommended that these  
8 MELLLA+ license amendment requests be approved, but our reviews  
9 tended to focus on uncertainties and plant-specific evaluations to  
10 assess safety margin.

11 In the next slide there's a table that compares the  
12 features of the plants that were referenced in these license amendment  
13 requests. And as you can see, the plants differ in the reactor type, their  
14 containment and their power level. Even the region that they've  
15 selected for MELLLA+ operation has varied as indicated by the lowest  
16 core flow rate that has been specified in the license amendment  
17 requests. They also have identified different approved GE fuels that  
18 they use. And they have differences in power density and the peak  
19 power to flow ratio in which they'd operate. And those are all specified  
20 in the license amendment requests and the analyses indicate that these  
21 features can effect the plant operation.

22 Last, they've implemented different compensating  
23 measures that are required for MELLLA+ operation. For example,  
24 each of the license amendment requests have implemented a change  
25 in the time-critical actions and the actual number and the type of time-

1 critical actions that have varied in these license amendment requests.

2 For example, each of the licensees has identified a  
3 change in the time required for feedwater flow reduction. As you know,  
4 cold water/sub-cold water going into the reactor can affect its reactivity.  
5 And so the time that they've specified will differ based upon the power  
6 density of the reactor and other plant features such as an automated  
7 system to reduce feedwater flow.

8 Next slide, please. In the GE-Hitachi licensing reports  
9 they have identified the fact that plant response evaluations need to be  
10 performed as part of any license amendment requests that are  
11 submitted, and those plant response evaluations consider normal  
12 operation as well as off-normal events, anticipated operational  
13 occurrences, design-basis accidents, as well as special events such as  
14 anticipated transit without scram instability events.

15 Our recommendation to approve the GE-Hitachi  
16 methods was contention on limitations associated with ATWS  
17 instability events, and that's because we recognize that there are  
18 uncertainties in analytical methods for predicting couple thermal-  
19 hydraulics and reactor physics plant response especially of high-power  
20 and high-void conditions.

21 We recognized that there were differences, as I've  
22 emphasized in my presentation today, in plant design, their operation  
23 and the selected compensating measures. And finally, we actually  
24 specified that certain sensitivity studies be performed and that the  
25 licensees identify nominal values as well as the uncertainties in these

1 nominal values and that we recognize that these sensitivity results were  
2 needed to have confidence in the analysis results that are provided.

3 Last, today I'd like to close with some thoughts about  
4 what we believe are anticipated future activities in this topic area. Our  
5 interactions with the staff indicate that at least one additional license  
6 amendment request will be submitted for MELLLA+ operation. In  
7 addition we're aware that another vendor has interest in submitting  
8 licensing topic reports related to operation in the flow domain. And  
9 last, the staff has actually initiated a program to perform testing to  
10 investigate heat transfer during dryout, post-dryout and rewetting  
11 conditions and we believe that data from these tests will help reduce  
12 some of the uncertainties in the analytical models for predicting  
13 instability phenomena. Thank you.

14 ACRS CHAIRMAN BLEY: Thanks, Joy.

15 Now we turn to our illustrious past Chairman, Mr.  
16 Stetkar, for the Tier 2 and 3 work.

17 ACRS MEMBER STETKAR: I'm not sure anybody  
18 has ever used the term "illustrious" and "Stetkar" in the same sentence.  
19 Thank you.

20 (Laughter.)

21 ACRS MEMBER STETKAR: I'm going to brief you  
22 this morning on our review of the plans for resolving the Fukushima  
23 Near-Term Task Force Tier 2 and Tier 3 recommendations.

24 Next slide, please. So a little bit of background. If  
25 you recall back in October of 2011 when SECY-11-0137 was issued to



1 provide priorities of resolution of the Near-Term Task Force  
2 recommendations, that SECY divided the recommendations into three  
3 tiers: Tier 1, 2 and 3. The recommendations that were allocated to Tier  
4 2 and Tier 3 weren't necessarily allocated to those tiers because they  
5 were less important than Tier 1 recommendations.

6 As noted on this slide in many cases judgments were  
7 made because of the need for further technical evaluations of the  
8 relevant issues, in some cases resolution of the Tier 2 or Tier 3  
9 recommendations depended on, decisions that were made on a  
10 particular Tier 1 recommendation, or pragmatically the staff required  
11 individuals with specific skill sets who were working on the Tier 1 issues.  
12 So Tier 2 and Tier 3, we're finally getting around to addressing them  
13 today, but as I said they're not necessarily less important than the Tier  
14 1 issues.

15 Next slide, please. In the interim, four plus years,  
16 some of the initial Tier 2 and Tier 3 recommendations have already  
17 been subsumed into some of the Tier 1 activities, most notably the  
18 rulemaking for mitigation of beyond-design-basis events and the  
19 associated Commission orders. One of the recommendations, the  
20 need for expedited transfer of spent fuel to dry cask storage was  
21 resolved back in May of 2014. So we have a reduced list of Tier 2 and  
22 Tier 3 recommendations from the original allocation.

23 Next slide. In SECY-15-0137, which is the subject of  
24 our letter from November last year, divided the remaining Tier 2 and  
25 Tier 3 recommendations into three groups for resolution. Group 1, the

1 staff examined and concluded that the existing regulatory framework  
2 and regulatory requirements are adequate. There's no need for  
3 additional regulatory attention to resolve those recommendations and  
4 the staff concluded that those recommendations should be closed now.  
5 And I've listed the relevant recommendations. I won't bore you with  
6 naming them.

7 Next slide. The Group 2 recommendations in SECY-  
8 15-0137, as you know the staff concluded that their initial assessment  
9 was that those recommendations could also be closed and that no  
10 further regulatory action is warranted for closing those  
11 recommendations. However, the staff determined that there was a  
12 need for additional interaction with us, the ACRS, and external  
13 stakeholders before they could make their final conclusions and final  
14 assessments. The staff has committed -- they're planning, I know you  
15 are well aware of sending a paper to the Commission by the end of this  
16 month on closure of these three recommendations. And I've listed  
17 those. I'll at least name them because there are only three.

18 They're the recommendations on provision of reliable  
19 hardened vents for containments other than BWR Mark I and Mark II  
20 containments, the issue of hydrogen control and mitigation for all  
21 reactor containments, and the provision of enhanced instrumentation  
22 for beyond-design-basis accidents.

23 Next slide. Group 3 recommendations. The staff  
24 concluded in their SECY that these recommendations still require some  
25 additional technical evaluation. They're the subject of ongoing studies.

1 In some cases the studies are near completion, but the staff hasn't quite  
2 put together the full documentation of the basis for resolving the issues.  
3 And similarly to the Group 2 recommendations the staff concluded that  
4 they require additional interactions with us and public stakeholders.

5 They plan currently to close those recommendations  
6 by the end of this year. We're aware of the fact that the staff schedule  
7 for addressing the first one that I've listed here, re-evaluation of other  
8 external hazards beyond seismic and flooding issues has been  
9 accelerated. We have a Subcommittee meeting scheduled on that.  
10 We're planning to meet in April on that topic at the Subcommittee level  
11 and most likely issue a letter on it in May of this year.

12 Next slide. In our November 16th letter report we  
13 agreed with the staff's decisions to allocate these recommendations  
14 among the three groups, so we agreed with the venting process.

15 Next slide. We also agreed with the conclusions that  
16 the recommendations in Group 1 did not merit further regulatory action  
17 and that the existing regulatory framework is adequate to address those  
18 recommendations. And we of course noted that we keep following the  
19 staff progress on the remaining Group 2 and Group 3  
20 recommendations.

21 What I'd like to do is in the couple minutes I have left  
22 here is highlight some of the comments in our letters on our three  
23 specific issues that we addressed in that November letter.

24 Next slide. The first one is the issue of seismically-  
25 induced fires and floods. And I want to emphasize that the ACRS

1 agrees fully that this topic does not reach the bar for requiring further  
2 regulatory action across the industry. There is full agreement. It's  
3 documented in our letter.

4 As we reviewed the staff's discussion of this topic in the  
5 SECY paper we had some questions about the rationale that they used  
6 to draw their conclusions, the technical rationale. And in particular we  
7 raised the issue of scenarios that involve -- I'll call it an intermediate  
8 seismic hazard which occurs at an intermediate frequency.

9 So I'm not talking about a very, very bad earthquake at  
10 a very, very low probability. I'm talking about something that's not quite  
11 that bad but may occur more frequently which may initiate a fire and  
12 also disable fire detection and suppression systems within the plant  
13 which are typically not designed for seismic qualification. We don't  
14 know what the risk from those events are because people have not  
15 looked at them.

16 In our letter report we noted that we would follow that  
17 issue under our Reliability and PRA Subcommittee because we know  
18 that Brookhaven had been working; finished it in December, on a  
19 feasibility study methods for that particular issue and we're going to  
20 follow it in terms of risk assessment methodology under our PRA  
21 Subcommittee.

22 Next slide. We also made some comments on  
23 mitigation of hydrogen releases. In particular we noted that as part of  
24 their final examination of this Group 2 issue now the staff should  
25 examine other pathways for hydrogen releases into reactor buildings,

1 for even Mark I and Mark II containments, that there may be conditions  
2 where a sufficient release of hydrogen into the reactor building could  
3 occur while pressures in the containment are still below the thresholds  
4 where the operators are instructed to open the vents.

5 It depends on the pathway, depends on the material,  
6 depends on the pressure in the drywell, temperatures and so forth, but  
7 we highlighted that as a particular other release pathway for that  
8 particular type of reactor.

9 And we urged the staff to examine what is going on  
10 internationally in terms of other countries' decisions for ability to mitigate  
11 or control hydrogen and at least inform of us how they've considered  
12 that experience in their final justification.

13 Next slide. And the final topic that we commented on  
14 was the issue of enhanced instrumentation for severe accidents. We  
15 know that the staff plans to continue to participate in research on the  
16 capability of instrumentation to withstand severe accident conditions.

17 We also indicated that we would like to better  
18 understand how operators would determine the reliability of what  
19 instrumentation they have available under severe accident conditions  
20 and how supplemental calculation aids would be used to aid their  
21 decision process when they're in the space of severe accident  
22 management.

23 And we wanted to examine the ongoing efforts to  
24 identify key instrumentation that may be needed both before, during and  
25 after the onset of core damage during a severe accident. And that's it.

1 Thank you.

2 CHAIRMAN BURNS: Well, thank you all for your  
3 presentations across a variety of topics. And I know the Commission  
4 appreciates the work of the ACRS in terms of the -- both in the licensing  
5 area as well as looking at the topical areas particularly as we work  
6 through the Fukushima, post-Fukushima consideration of potential  
7 safety enhancements and lessons learned. So again, appreciate the  
8 work of the Committee on that.

9 I have a few questions. One thing for Dr. Bley. You  
10 mentioned the Committee's review of Duke Energy's COL for the Lee  
11 site, and we have ongoing reviews of the Levy and Turkey Point COLs.  
12 And I think it's stated that the COL -- in the Committee's letter on the  
13 review of the Lee application they state the COL should be approved  
14 following approval of generic changes which are pending submittal and  
15 which would affect the standard content of the AP1000.

16 ACRS CHAIRMAN BLEY: That's right.

17 CHAIRMAN BURNS: Can you describe what  
18 involvement the ACRS will have in resolution of some of these generic  
19 changes in the AP1000?

20 ACRS CHAIRMAN BLEY: Sure. Actually, they are  
21 currently being addressed for Levy. And the COLA I showed for Levy  
22 is really going after those issues. And our best judgment would -- we  
23 haven't written this -- would be that the other plants would probably  
24 follow whatever happens there.

25 We have a Subcommittee set up to look up, and I don't

1 remember the exact date of that, but it's within the next few months.

2 PARTICIPANT: (Off microphone.)

3 ACRS CHAIRMAN BLEY: Thank you. April, yes.

4 CHAIRMAN BURNS: Okay. Great. Thanks.

5 Professor Ballinger, in terms of talking about the  
6 50.46c rulemaking, I think the Committee's recommendation is that the  
7 Reg Guide; I think it's 1.229, not be issued until the Committee  
8 completes its review. I'm not quite sure where the Reg Guide is in  
9 terms of being close to issuance or not, but essentially would you  
10 recommend that the Commission hold off on the final rule itself pending  
11 outcome of the Reg Guide review?

12 ACRS MEMBER BALLINGER: Boy, that's a good  
13 question. The letter we wrote recommended issuing the rule and the  
14 Reg Guides, and so that's our opinion. The rule contains a lot of  
15 language related to the risk-informed long-term cooling issue, and we're  
16 satisfied with that.

17 I think the Reg Guide, the reason that we wanted to  
18 hold off on that was that we didn't have a final document with all the  
19 right words correct and everything. And so we got to a point where we  
20 said we need to move forward on this. This is not my personal opinion:  
21 I don't think there's any issue with Reg Guide 1.229 that we're going to  
22 come up with. So I guess my answer would be yes. I wouldn't wait.  
23 And that's a personal opinion.

24 ACRS CHAIRMAN BLEY: I could add a little to that.

25 CHAIRMAN BURNS: Sure.

1                   ACRS CHAIRMAN BLEY: I think we said this in the  
2 letter. The letter dealing with the rule was the rule said what needs to  
3 be done, and we found no problem with that.

4                   CHAIRMAN BURNS: Okay.

5                   ACRS CHAIRMAN BLEY: It was the how that needed  
6 some refinement. And staff's coming back to us with that refinement  
7 so we can see what it looks like.

8                   CHAIRMAN BURNS: Okay. Good, good. You  
9 talked a little about the implementation strategy, and essentially as I  
10 understand it, the ACRS is satisfied with the approach that the staff had  
11 for implementation. This is the six-month implementation plan and the  
12 further work on implementation. I haven't really had a chance to digest  
13 it. I think that we got a late-breaking letter from NEI within the last week  
14 or so that talks about a further type of approach. But the sense again  
15 I had from the Committee is that they felt that the staff's approach  
16 toward implementation was a satisfactory one from what you were  
17 saying.

18                   ACRS MEMBER BALLINGER: Yes, and that actually  
19 represents a lot of dialogue back and forth between the industry and  
20 the staff. And 84 months is -- in some cases people were saying that's  
21 a long time.

22                   CHAIRMAN BURNS: Yes.

23                   ACRS MEMBER BALLINGER: And the NEI folks  
24 would say it's not long enough. In fact, it should be infinity.

25                   But as a practical matter, I think 84 months is a very



1 good compromise, because if you think about it, the evolution of fuel  
2 designs has changed over the years, and that's mitigating, but if you go  
3 and look at the couple of documents that were produced by the owners  
4 groups -- I didn't want to put them on the slides because there's a couple  
5 of tables in there. In the case of the PWR side they broke the plants  
6 into, I think, seven groups and then they asked the question where are  
7 these plants with respect to the limits? And at some point they had to  
8 start doing very sophisticated calculations to meet the rule.

9 So but those calculations are being done and they  
10 reflect a better understanding of what's going on. So this is  
11 compromise between we need to get this, we need to recognize the fact  
12 that we have real science that shows this burnup effect, but at the same  
13 time we've got the evolution of fuel designs with respect to oxidation  
14 performance and the like. And breakaway oxidation will in effect  
15 basically go away by this time. And so, you can see the back and forth.  
16 But the 84 months is a good compromise. And licensees always have  
17 the option of requesting an extension.

18 CHAIRMAN BURNS: Yes.

19 ACRS MEMBER BALLINGER: So I think it's a good  
20 compromise.

21 CHAIRMAN BURNS: Okay. Thanks.

22 And, Dr. Rempe, a couple of questions on the review  
23 on the MELLLA+ implementation. I think it's on slide 25 you talk about  
24 implementation, and it included represented compensatory measures  
25 that could be taken.

1 ACRS MEMBER REMPE: Yes.

2 CHAIRMAN BURNS: And for each of the plants listed  
3 one of the compensatory measures was time-critical actions. Can you  
4 help me on what time-critical actions would be in that context?

5 ACRS MEMBER REMPE: Okay. Sure. I tried to  
6 mention it, but perhaps I wasn't clear enough. But one of the examples  
7 that's in each of the LARs was he need to reduce feedwater flow.

8 CHAIRMAN BURNS: Okay.

9 ACRS MEMBER REMPE: And of course that does  
10 result in an injection of cold/sub-cold water, which is reactivity insertion.  
11 And based on the plant's design the actual time that they allocated for  
12 the operator to implement this feedwater flow reduction varied, and  
13 that's because of the power density of the plant, it's because of other  
14 systems. And I mentioned the fact that one of the plants actually had  
15 an automated feedwater flow reduction system. And so, the plants  
16 would -- the licensees would pick different times in their submittals.  
17 And so, that's one example of a time-critical action.

18 CHAIRMAN BURNS: Okay. Good. Thanks.

19 ACRS MEMBER REMPE: Yes.

20 CHAIRMAN BURNS: One of the other things, I think  
21 you talked about future activities related to the review and staff testing  
22 to reduce uncertainties. Do you have a sense of what that is going to  
23 entail?

24 ACRS MEMBER REMPE: Yes. Well, one of the  
25 issues and why we spend the time we spend reviewing these submittals

1 is because there is uncertainty in the heat transfer that's implemented  
2 in the licensee's code versus what the NRC has in their TRACE code  
3 for predicting the heat transfer during dryout and post-dryout and  
4 rewetting. And so, there is a lot of sensitivities done, there's a lot of  
5 -- I'd like to just say expert opinion involved, because there's not  
6 sufficient data. And so, they are actually going to run tests to try and  
7 better quantify that heat transfer and reduce the uncertainty.

8 And so, I think that many of us on the Subcommittee  
9 were very pleased to see that the staff has submitted that user need  
10 and they are moving forward with that testing program, because I think  
11 that will make these reviews a lot simpler, especially when we're going  
12 to another vendor who's requesting operation in the expanded flow  
13 domain.

14 CHAIRMAN BURNS: Okay. Good. Thanks.

15 And, Mr. Stetkar, I think my last question goes to one  
16 of the issues on the slides; and I probably lost it here.

17 ACRS MEMBER STETKAR: That's okay. I've  
18 forgotten it also.

19 (Laughter.)

20 CHAIRMAN BURNS: Yes, all right. Are my glasses  
21 good? No. Yes, they are. It's actually slide 37. You talked about  
22 comments with respect to staff work on mitigation of hydrogen releases,  
23 and the last bullet there: findings derived from staff reviews of  
24 international activities. What do you expect in that regard that the staff  
25 would do? Is this the approaches that others internationally have

1 taken toward the venting issue, which I know is -- you can get a lot of  
2 people in a room --

3 ACRS MEMBER STETKAR: Yes, and I have to be  
4 careful here because as you know we're in the midst of our deliberations  
5 --

6 CHAIRMAN BURNS: okay. Yes.

7 ACRS MEMBER STETKAR: -- of a white paper.

8 CHAIRMAN BURNS: Yes.

9 ACRS MEMBER STETKAR: But I can tell you that  
10 during the discussions that we had we asked the staff to go out and  
11 examine the bases for why different countries were adapting different  
12 methods --

13 CHAIRMAN BURNS: Okay.

14 ACRS MEMBER STETKAR: -- for controlling  
15 hydrogen and provide us some insights when they came back to us on  
16 that information, because we felt they hadn't necessarily looked very  
17 carefully in that area for support of the initial 15-0137 justification.  
18 That's all I want to say about it right now --

19 CHAIRMAN BURNS: Yes, that's fine.

20 ACRS MEMBER STETKAR: -- because they have in  
21 fact come back to us.

22 CHAIRMAN BURNS: Okay. All right. Good. That  
23 helps me.

24 Again, thanks for your presentations. I'll turn to  
25 Commissioner Svinicki.

1                   COMMISSIONER SVINICKI: Good morning and  
2 thank you for your presentations. I could go in any order here, but  
3 since the Chairman asked about 50.46c, maybe I'll start there with  
4 Member Ballinger.

5                   I want to return to your good compromise. I think that  
6 was the term you used on implementation. You talked about 84  
7 months. You responded to a question on that.

8                   I have studied carefully the transcript from your  
9 meeting on this topic and some of the back and forth you had with the  
10 NRC staff regarding the proposal perhaps to have a kind of triggered  
11 compliance that you might write the rule to have if the plant had certain  
12 -- well, there's different ways you could structure a trigger, but if different  
13 things happened, then they would have to comply, but otherwise, if they  
14 kept to themselves in their regime where this wouldn't be deeply  
15 relevant, they wouldn't have to.

16                  And so, you asked the staff for their reaction to that  
17 suggestion that instead of having 84 months and everyone come into  
18 compliance that you could structure the compliance some other way.  
19 And the staff's answer is long and I don't want to take a lot of time  
20 reading two pages of this transcript, but the staff responded, "One  
21 problem with this defining a trigger, one of the triggers would be a plant  
22 mod would be -- it would discourage plants from moving from old ZIRLO  
23 to optimized ZIRLO." There's more discussion there, but it's says, "it  
24 would be detrimental to improvements to the plants. That's one  
25 thought."

1                   And Member Riccardella then questions, "So  
2 therefore, you'll force everybody to incur that expense?" And the staff  
3 has another answer about it, about different triggers and things like that.  
4 But then Member Ballinger, finding that I think not responsive, says,  
5 "The counter-argument for that would be, at least in one sense, you're  
6 saying that improvement for improvement's sake is an absolute good  
7 regardless of what the current level of safety is. Is that what you're  
8 saying?" And she says, "Well, no, but they wouldn't move to better  
9 performing alloys if they don't have to comply." And then Member  
10 Ballinger asks, "But if their peak clad temperature was 1,700  
11 Fahrenheit, or some ridiculously low number, you're saying that they  
12 should change anyway, where industry would argue we're at 1,700 with  
13 the current fuel that we have. Why should we change?"

14                   And I sense that there's not really a satisfactory answer  
15 to that from the staff. And having read your letter report, you pull away  
16 from that. Can you help me understand why in the deliberation it  
17 seems an oddly meek posture for the ACRS I know to kind of have  
18 taken that and moved off and said, well, this is a good compromise?  
19 Can you help me understand from that transcript Q&A to saying it's now  
20 this is a great idea and it's a good compromise? I don't see really that  
21 the staff provided you with a satisfactory answer on that point.

22                   ACRS MEMBER BALLINGER: My goodness.

23                   (Laughter.)

24                   ACRS MEMBER BALLINGER: Okay. I think I do  
25 remember that conversation, at least most of it. And I think what I was

1 trying to get at was that the industry folks were saying, okay, why should  
2 we -- we have been complying all this time with Appendix K and nothing  
3 -- we're okay. Why should we move to a different regime, if you will, to  
4 look at the effect of burnup and include that? And they were -- I guess,  
5 let's see -- I'm trying to recall what that was. I don't -- I think it was a  
6 compromise or -- the two things are going back and forth there.

7 It's an adequate protection issue. We have real  
8 science that says we need to take account of what we know which we  
9 didn't know before. The plants have been operating obviously safely  
10 for all this time, although we haven't had a loss of cooling accident, so  
11 we don't really know. Maybe I'm not giving you a satisfactory answer.  
12 But I don't think it's a pulling back. I think it's a realization that 84  
13 months is a long time.

14 COMMISSIONER SVINICKI: Well, and maybe again  
15 we react to things based on other issues that we're working on. I had  
16 a very productive briefing with the NRC staff yesterday on the open  
17 phase condition. I don't know if the Committee's been involved in that  
18 and I'm not asking you about it. But at the end of the day I think that  
19 the response to my question ended up being, well, Commissioner, we  
20 always meant to require that, but we just didn't say so and we haven't  
21 said so for three decades, but it was always intended.

22 So maybe I have a broader question for you. As you  
23 look at things like subsequent license renewal do you take the policy of  
24 the regulatory framework as stipulated and you're basically looking at  
25 technical issues within that, or do you revisit the policy approach to

1 some of these issues in making your recommendations?

2 Well, maybe I should have the Chairman answer this.

3 ACRS CHAIRMAN BLEY: I'll even come back to  
4 where Dr. Ballinger was. I think the thing that led us to the final position  
5 we took in the 50.46 letter was -- as he says, the science was there and  
6 the staff had found that those older plants, even though we had never  
7 had a problem, he said we'd never had the LOCA that challenges it  
8 either, and they aren't up to the current science. So if they find it  
9 adequate protection, then the 84 months seemed quite a long time.  
10 And if there are peculiar circumstances for a particular plant, maybe  
11 they would come in and request a change. It seemed given the  
12 science and that position it was a reasonable spot.

13 Your next question --

14 COMMISSIONER SVINICKI: Well, my question  
15 would be if it's adequate protection, 84 months seems outrageous then.  
16 I'm not sure it's adequate protection is what I'm saying. I'm not sure  
17 how we ended up at terming it a good compromise. I think that the  
18 staff's struggle is indicative of this elemental foundational question  
19 about what is the safety significance and the current risk related to this  
20 new science that we now understand?

21 And I think the staff is struggling with this on a number  
22 of fronts. I don't want to introduce topics that aren't the subject of  
23 today's meeting, but they're struggling with it on service life, they're  
24 struggling with it on open phase, they're struggling with it here. And  
25 often when we get down to these determinations of calibrating adequate



1 protection, frequently that involves the Commission because it is a very,  
2 very complicated issue.

3 So we will receive this rule and we will deliberate on it  
4 and we will act on it, but I'm not convinced that this particular issue we're  
5 talking about right now is dispositioned. I'm not sure that it is. I think  
6 it has policy implications and I'm not sure -- I think that the technical  
7 issue is well studied, but I think there is an issue here with the  
8 application of a requirement based on this science of where it's  
9 applicable and where it's safety-significant. And that's a judgment that  
10 the Commission will make.

11 I was trying to get some insights into your deliberation  
12 of how it is that you adjudicated this. And so, I think you decided that  
13 the staff's approach was reasonable and didn't decide to fly-speck it  
14 much beyond that.

15 ACRS CHAIRMAN BLEY: I think that's it, and that  
16 that position was reached through a lot of negotiation with the industry.  
17 There were a handful of -- our understanding was there were a handful  
18 of plants that really thought they would never be challenging this and  
19 they wouldn't be operating that long. And that seems a very special  
20 case.

21 On your other issue of policy in general, it's a difficult  
22 one to give a simple answer to because what one calls policy -- some  
23 policies are pretty easy as policies, what a life is worth, that sort of thing  
24 --

25 COMMISSIONER SVINICKI: Can I ask, if you review

1 the --

2 ACRS CHAIRMAN BLEY: -- but some related to  
3 safety --

4 COMMISSIONER SVINICKI: As you review the  
5 guidance; let's narrow it to subsequent license renewal, as you renew  
6 that guidance knowing that the Commission's recent deliberation was  
7 to affirm the general regulatory framework for license renewal as being  
8 adequate for subsequent license renewal, will you review the draft  
9 guidance within that framework or would you look at that guidance and  
10 offer suggestions for how the regulations themselves should be  
11 changed?

12 ACRS CHAIRMAN BLEY: Well, we already took that  
13 position in a letter a year ago agreeing with where you came out. I  
14 think we wouldn't limit ourselves if we saw a safety issue. We have not  
15 yet found a safety issue in the subsequent license renewal that would  
16 take us out of the realm of what's been done up to the current time, and  
17 we've looked very hard for that. If we found it, I think a policy that said  
18 it's okay to do the same thing --

19 COMMISSIONER SVINICKI: But in the  
20 absence --

21 ACRS CHAIRMAN BLEY: -- we would comment that,  
22 no, here's a safety issue that says that's not true.

23 COMMISSIONER SVINICKI: In the absence of that  
24 deficiency, though, it sounds like you would consider the policy to be  
25 settled if you don't unearth anything.

1                   So in that spirit maybe I'll just close with your slide on  
2                   seismically-induced fires and floods you indicated that; I tried to take a  
3                   careful note here as quickly as I could, this topic does not reach the bar  
4                   for further regulatory action and there's Full Committee agreement on  
5                   that.

6                   So in light of that, what ultimately is the scope of your  
7                   looking at that? If it doesn't result in regulatory action; you're an  
8                   advisory group to a regulator, what is it that -- is it further perfection on  
9                   our knowledge or -- help me understand scope of your review.

10                  ACRS CHAIRMAN BLEY: It was John's slide, so I  
11                  think I'll give this one to him.

12                  COMMISSIONER SVINICKI: Okay.

13                  (Laughter.)

14                  ACRS MEMBER STETKAR: Thank you. We do  
15                  several things, as you know. One of the things that we've traditionally  
16                  done is look at the use of risk information to support the regulatory  
17                  process. The use of that information in my opinion requires risk  
18                  assessments that assess the entire risk of a plant. So it's not just the  
19                  risk that somebody thinks is important today because of an accident  
20                  that has happened. It's the entire source of the risk.

21                  And in that sense seismically-induced fires or  
22                  seismically-induced floods are a contributor to the risk of the plant.  
23                  How much of a contributor we honestly don't know because they've not  
24                  been addressed in current full-scope risk assessments. And that's the  
25                  sense that we're trying to pursue this from a scientific basis or from a

1 completeness of the availability of risk assessments to then inform  
2 Commission decisions or staff decisions about particular issues that  
3 come up, whether it's a risk-informed initiative or a licensing issue that  
4 comes before the Commission.

5 COMMISSIONER SVINICKI: Okay. Well, I'm over  
6 my time. Thank you.

7 CHAIRMAN BURNS: Commissioner Ostendorff?

8 COMMISSIONER OSTENDORFF: Thank you all for  
9 your briefs. Though I'm not leaving the Commission until June 30th,  
10 this is my last chance I think to have a meeting with the ACRS, so I'm  
11 going to take a few minutes and make some comments about the body  
12 and so forth, and then I'm going to comment in part 2 on some of the  
13 specific areas of work that you're involved in now or in the future.

14 I think we just have been so fortunate to have the  
15 Advisory Committee on Reactor Safeguards professionals here  
16 advising the Commission, period. We are so blessed and lucky. I  
17 asked Margie to kind of pull out -- and I appreciate General Counsel's  
18 help to look at the implementing legislation, Section 29 of the Atomic  
19 Energy Act of 1954.

20 Thanks, Margie.

21 But the people writing that just had great foresight and  
22 I can't tell you how much I as a Commissioner and I know my other  
23 colleagues have benefitted from your thoughtful review of numerous  
24 issues and the independent technical professionalism you bring to the  
25 table I think is unparalleled.

1 I've had experience in my time with the Department of  
2 Energy, with the Secretary of Energy Advisory Board, my time at  
3 Department of Defense, with the Defense Policy Board and the Defense  
4 Science Board, so I have some other experience before coming here.  
5 And I would just tell you that I think -- I'm not saying anything negative  
6 about those other boards, but I'm saying that when I -- looking at the  
7 entire horizon of the boards and committees which I've had experience,  
8 you're the very top. And that's your professionalism, your commitment  
9 to work is just really admirable.

10 I know that many of you don't live in this area, and so  
11 you have a demanding schedule that requires you to be away from  
12 home. I've had positions in my past where I've spent many months  
13 away from home at sea or doing other things. And so, I'm also mindful  
14 of the sacrifice that you have made to contribute to the Commission and  
15 by your time away from your families.

16 This is one of the few bodies I think -- I look at Vic and  
17 I look at Mike Johnson there and Bill Dean's category, but this is the  
18 one body that I can talk to that has the most opportunity for me to share  
19 Rickover stories.

20 (Laughter.)

21 COMMISSIONER OSTENDORFF: You didn't see the  
22 secret handshake there that Charlie and I have.

23 But on a personal note, I've enjoyed being part of your  
24 holiday gatherings. I think aside from your technical professionalism  
25 you're just a great group of people to be around. There's true sense of

1 community.

2           And on a more serious note, but an important one, I've  
3 seen you personally take care of your own when you've had a member  
4 that has been undergoing some of life's challenges and I've seen the  
5 support offered that individual, and you're all very decent people to have  
6 provided that community spirit for somebody who needed it.

7           Ed, thank you for your role there. I've always enjoyed  
8 working with you and I think you and your supporting staff at the ACRS  
9 have done a great job in supporting the Committee members. And so,  
10 that's not insignificant at all to make that comment.

11           So let me go onto some specific comments of your  
12 bodies of work, and I don't know that I have any questions here, but I  
13 do have maybe four or five points that I wanted to make.

14           One of them, I think your review of the Office of  
15 Research projects is really important. You have the academic  
16 research credentials to provide an independent look at how we're doing  
17 business, and I think especially in the time of Project AIM we're looking  
18 at the value of research for the user need- based approach we have.  
19 You're in a unique position to provide us valuable commentary. So  
20 thank you for doing that.

21           And I appreciated the comments that these were some  
22 of the most -- the last two projects you reviewed were perhaps among  
23 some of the best you've seen. I hope that trend continues. But I think  
24 if it doesn't continue, you need to tell us and you need to call it like you  
25 see it, as I know you do.

1           It caught my attention that you're looking at the  
2           research test reactor license renewal rulemaking, and I think that that  
3           is really important. I know you have a couple of members that are  
4           associated with institutions that have research reactors. I've been to a  
5           couple of those: Wisconsin and MIT. And I think as you look at that, I  
6           know you'll take a good technical look, but also a pragmatic look on the  
7           user end from the MIT, Wisconsin and in other perspectives. How do  
8           our regulations and how does your rule square up with what's  
9           reasonable and executable, because each individual research reactor  
10          kind of has unique circumstances.

11           You're looking at the NuScale report for the risk  
12          significance determination, and I think that your work in that area is  
13          really important for the Commission and for the NRC staff. I know that  
14          Jennifer Uhle, Mike Mayfield, others in NRO are taking a really hard  
15          look at these approaches, but any time there's something new that  
16          comes up, it's helpful to have a set of expert eyes looking at it that might  
17          bring your own experience to bear to help our staff as you look at  
18          various topical reports submitted for the NuScale application.

19           I'd make the same comment extrapolating that to  
20          advance reactor technology in the non-light-water reactor area if we  
21          receive applications going forward. We don't have any yet, but we  
22          might. There's been a lot of interest in this area. We've had some  
23          discussions, the Commission with Congress, just last week on this topic  
24          when we were before the Senate Appropriations Subcommittee for  
25          Energy and Water. And I know that there's a lot of different

1 perspectives out there in the vendor, reactor design, laboratory,  
2 industry area, and unlike the existing reactors there's not a consensus  
3 on what our regulatory structure should look like for advanced reactor  
4 license applications. And I think you can help provide your own  
5 perspectives from your -- whether it be your research lab or your  
6 national lab or your academic institution perspectives to help our staff.

7 Last comment I'll make is -- this is my personal view.  
8 I'm clearly not speaking for the Commission in any of this, but some  
9 Commissioners may agree or disagree. But I did want to highlight one  
10 area that I think is really in need of improvement for the agency and the  
11 industry, and that is how to look at existing nuclear power plants and  
12 their ability to implement digital I&C upgrades. As I'll leave the  
13 Commission here in a few months, that is the single technical area that  
14 I think requires the greatest amount of work. And it's not just work for  
15 the NRC, but it's also for industry.

16 And I know that Charlie and I have had a lot of  
17 discussions in this area and I know you're looking at a paper on diversity  
18 and defense-in-depth. I'm talking primarily -- my frame of reference is  
19 the existing reactors, because I visit a lot of plants, other colleagues do.  
20 I see that our existing plants are safe, but the parts obsolescence for  
21 digital I&C -- excuse me, for analog components is real. And I think  
22 we've seen in a previous Commission meeting back in December of last  
23 year where there was significant safety improvements articulated by  
24 Exelon for their fleet based on certain digital upgrades that have been  
25 incorporated for turbine control systems, feedwater control systems,



1 etcetera.

2 And that the recent Commission SRM and the IEEE-  
3 603 rulemaking with some direction to the staff is a very important body  
4 of work as our staff moves forward, and I think you'll have very important  
5 perspectives to help our staff in that area.

6 I've covered my list. I repeat my thank you and I really  
7 appreciate your service to the country.

8 CHAIRMAN BURNS: Thank you, Commissioner.

9 Commissioner Baran?

10 COMMISSIONER BARAN: Thanks. Well, thank you  
11 for your presentations and all the work you do.

12 I completely agree with Commissioner Ostendorff. That's just really  
13 vital work and we really appreciate it.

14 John, I want to ask some questions about the post-  
15 Fukushima Tier 2 and Tier 3 items. I realize you all at the Full  
16 Committee were just discussing this yesterday; you're working on your  
17 letter, but I'm not going to let that stop me. I want to hear your --

18 (Laughter.)

19 COMMISSIONER BARAN: -- thoughts on some of  
20 these specific items. And I wanted to start with reliable hardened vents  
21 for containment designs other than Mark Is and Mark IIs.

22 When NRC initially issued the vent order for Mark I and  
23 Mark II designs, the Commission found that it was necessary to ensure  
24 adequate protection to public health and safety. And for the Tier 3 item  
25 for the staff they were supposed to look at other containment designs

1 to see if they needed vents.

2 I want to get your sense; and it can be your personal  
3 sense or more broadly, whatever you feel comfortable with, of whether  
4 the staff's analysis in this area was as thorough as it should have been.  
5 For example, did the staff assess whether there are comparable risks  
6 related to containment pressure in other designs or whether hardened  
7 vents would provide comparable safety benefits for other designs?  
8 How much of a comparison was there between the Mark I and Mark II?

9 ACRS MEMBER STETKAR: Yes, I understand.  
10 Yes. And I have to be really careful here. As you noted, we had a  
11 briefing as a Committee yesterday afternoon on this topic. We are in  
12 the midst of deliberating on the topic to prepare a letter. We had a first  
13 initial read through that letter yesterday afternoon. I can tell you that  
14 the Committee members are actively, very actively engaged on this  
15 letter. And I have to be really careful about not presenting anything  
16 preliminary from those deliberations that could be misinterpreted in  
17 terms of a Committee position. And quite honestly, I have to be careful  
18 as an individual because we haven't reached consensus yet.

19 I can tell you we have in the white paper that we have  
20 seen, both at the Subcommittee level and discussed more detailed  
21 yesterday, and in supplemental information that we received yesterday  
22 during our oral briefings, we've addressed those issues. And we are  
23 looking at them on a design-by-design basis. We aren't restricting  
24 ourselves to extrapolating from the Mark I/Mark II examples and treating  
25 those as a base case, if you will, for the other designs. And that's about

1 all I can tell you right now, unfortunately.

2 COMMISSIONER BARAN: Okay. Well, let me ask  
3 this, which is a little bit more of a process-type question. So the staff  
4 sent up the SECY paper, which in this area didn't, at least from my point  
5 of view, have a huge amount of technical analysis about the different  
6 containment designs. And that, frankly, was what had me concerned.  
7 It wasn't that I had reached a conclusion that we should require  
8 hardened vents in other cases, but that I wanted to make sure the staff  
9 had thoroughly evaluated it to make sure that's the right answer one  
10 way or the other.

11 And broadly speaking do you think this white paper  
12 kind of beefed up the analysis from the staff on a containment-design-  
13 by-containment-design level?

14 ACRS MEMBER STETKAR: Yes.

15 COMMISSIONER BARAN: Okay. Well, I appreciate  
16 that you all are looking at it and I look forward to your findings on it,  
17 because really I think -- and having you involved in the process, I think  
18 it's just so crucial for just this regard, because on a lot of these Tier 2  
19 and Tier 3 items, as you mentioned, it wasn't that they warned  
20 important. It was other factors primarily that led to them being put on  
21 a slower track.

22 And a lot of times in several cases the recommendation  
23 by the Near-Term Task Force or the staff or ACRS that led to the  
24 development of a specific item as an action item was to do the analysis  
25 to make sure, well, we haven't really looked at this question this way.

1 Let's do a thorough look at it and make sure we don't need to do  
2 something more here. And doing a thorough analysis doesn't mean  
3 it's going to result in additional regulatory requirements, but it's always  
4 possible, I suppose. But you need analysis there, so next week or 5  
5 years from now or 10 years from now someone could look back and  
6 say, well, how did they resolve that? There was the recommendation  
7 to look at this. Did they really take a look at it and figure it out?

8 Let me ask -- I'm going to have you dodge for a little  
9 while longer.

10 (Laughter.)

11 ACRS MEMBER STETKAR: That's what they pay me  
12 to do.

13 (Laughter.)

14 COMMISSIONER BARAN: Is that it? Really is that  
15 --

16 (Laughter.)

17 ACRS MEMBER STETKAR: They don't pay me a lot.

18 (Laughter.)

19 ACRS MEMBER STETKAR: So I'm not very good at  
20 it.

21 COMMISSIONER BARAN: On page 38, or slide 38  
22 you talk there about enhanced instrumentation for severe accidents,  
23 and you mentioned that ACRS' November letter stated that the staff  
24 should really include a detailed demonstration of how the Severe  
25 Accident Management Guidelines, or SAMGs, and the calculation aids

1 are capable of leading the operators to take the correct actions even if  
2 minimal instrumentation is available.

3 Can you talk a little bit about how the staff's most recent  
4 analysis addressed this suggestion?

5 ACRS MEMBER STETKAR: I don't want to talk about  
6 the staff's analysis because that gets a little bit into what we're  
7 deliberating --

8 COMMISSIONER BARAN: Okay.

9 ACRS MEMBER STETKAR: -- over now. I can tell  
10 you that our Fukushima Subcommittee had a meeting on February  
11 18th, I think. Memory is poor, but I think it was the 18th. It was a  
12 closed session. We did have a briefing from the industry that for a  
13 particular BWR walked us through that integration of the EOPs and the  
14 SAMGs for a particular type of scenario that went all the way out to core  
15 damage to show us a better information about how -- not only from a  
16 procedure perspective, from an organizational perspective, how the  
17 emergency response organization, how the people in the control room  
18 interact with one another and how they would address issues of  
19 availability and reliability of instrumentation.

20 I can't talk about the details. It was a closed session.  
21 It was for a BWR. It was proprietary information, so there's no  
22 transcript available. But we have learned a lot between the time that  
23 we wrote our November 2015 letter and today when we're finally  
24 deliberating on the staff's white paper on the issue.

25 COMMISSIONER BARAN: Good. That's good to

1 hear.

2 And you also mentioned the staff's continuing to work  
3 on the action item related to the evaluation of natural hazards other than  
4 seismic and flooding. And I think you mentioned the April/May time  
5 frame. That's when you all --

6 ACRS MEMBER STETKAR: Yes, we have a  
7 Subcommittee meeting scheduled on April 21st on that particular issue  
8 right now.

9 COMMISSIONER BARAN: Okay. And broadly at  
10 this stage realizing you're not in April/May yet, is it your sense that the  
11 staff is including within the scope of its review all the plausible natural  
12 hazards that should be looked at?

13 ACRS MEMBER STETKAR: I don't know, because  
14 we haven't seen anything yet.

15 COMMISSIONER BARAN: Okay.

16 ACRS MEMBER STETKAR: We've seen nothing.

17 COMMISSIONER BARAN: All right. So stay tuned  
18 on that one, I guess?

19 ACRS MEMBER STETKAR: Stay tuned.

20 COMMISSIONER BARAN: Okay. And let me just  
21 ask one other question related to following up on slide 36 on  
22 seismically-induced fires and floods.

23 And I was trying to put myself in the position of  
24 someone who's watching this Commission meeting online. I don't  
25 know how many of those people there are, but there are probably some.

1 And one of the things -- I heard two things, at least a couple things in  
2 this discussion. One, that ACRS was in full agreement that this wasn't  
3 an area where we needed new regulatory requirements. But in the  
4 context of discussing the probabilistic risk assessment -- and there was  
5 also this statement made, I think, if I heard it correctly, that, well, we  
6 don't actually know what the risks are.

7 Talk to us a little bit about that. I mean, tie those  
8 things together for us. If someone was watching saying, well, if they  
9 don't know what the risks are, how do they know we don't need to do  
10 something more? What's the explanation?

11 ACRS MEMBER STETKAR: No, that's a really good  
12 question. I think that the -- we looked at each of these issues very  
13 carefully, first of all, from the perspective of our review and our letters.  
14 We looked at them very carefully, first of all and foremost, as they've  
15 been presented to us in the context of do we feel that the safety issue  
16 would meet the criteria that the staff has to meet to go forward with  
17 regulations?

18 COMMISSIONER BARAN: Yes.

19 ACRS MEMBER STETKAR: And that's a very distinct  
20 criterion. It's well documented that the staff follows it very, very well.  
21 And that's literally the context that we're writing our letters in and making  
22 our determinations.

23 When I say we don't know what the risk is on a plant-  
24 by-plant basis from seismically-induced fires and floods, that's true.  
25 We don't. We do have a lot of experience though in the spectrum of

1 risk assessments. We have some indications of how big it might be,  
2 or more likely how small it isn't. And within those broad ranges we can  
3 make some determinations about across the industry we don't feel that  
4 it rises to that bar.

5 On a plant-by-plant basis, when you're talking about;  
6 again, addressing Commissioner Svinicki's question, the completeness  
7 of the risk assessment and the risk profile, if you will, for a particular  
8 plant how important it is on a plant-to-plant basis, we just don't now that  
9 because we don't have the tool.

10 COMMISSIONER BARAN: Yes.

11 ACRS MEMBER STETKAR: We haven't built those  
12 models. And that's the sense that we're expressing we'd like to look  
13 into this more from the perspective of our Risk Assessment  
14 Subcommittee.

15 COMMISSIONER BARAN: And I'm a little bit over  
16 and it's a complicated topic, but let me just ask, I was a little bit struck  
17 when I read the letter back -- I guess it was the November letter. There  
18 was some colorful language on this that ACRS is confounded that the  
19 staff wasn't able to come up with a feasible approach for a PRA. Can  
20 you just briefly talk a little bit about that?

21 ACRS MEMBER STETKAR: Thanks. We put those  
22 words in there to make sure people read them.

23 Yes, that's what we were told orally. Again, we have  
24 not had the opportunity to read the report that was prepared by  
25 Brookhaven on the feasibility of just addressing these issues in the



1 context of a PRA. I think some of us from the words that we heard  
2 orally were a bit taken aback by people saying, well, nobody knows how  
3 to do it. And that's the confounding notion of what we heard orally.  
4 We haven't seen what's written though.

5 COMMISSIONER BARAN: Okay. Great. Well,  
6 thank you. Appreciate it.

7 CHAIRMAN BURNS: Anything else from colleagues?

8 (No audible response.)

9 CHAIRMAN BURNS: Well, again thanks for the  
10 presentations this morning and the continued work. As Commissioner  
11 Ostendorff noted, the importance of the Committee in terms of helping  
12 the agency and as it deliberates on various technical policy issues that  
13 come before us.

14 With that, we are adjourned.

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

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