

**NUCLEAR REGULATORY COMMISSION**

Title: Advisory Committee on Reactor Safeguards  
541st Meeting

Docket Number: (not applicable)

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SUNSI REVIEW COMPLETE

Location: Rockville, Maryland

Date: Friday, April 6, 2007

Work Order No.: NRC-1514

Pages 1-71

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UNITED STATES NUCLEAR REGULATORY COMMISSION'S  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

April 6, 2007

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, taken on April 6, 2007, as reported herein, is a record of the discussions recorded at the meeting held on the above date.

This transcript has not been reviewed, corrected and edited and it may contain inaccuracies.

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)  
541st MEETING

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THURSDAY, APRIL 5, 2007

VOLUME II

+ + + + +

The meeting was convened in Room T-2B3 of  
Two White Flint North, 11545 Rockville Pike,  
Rockville, Maryland, at 1:30 p.m., DR. WILLIAM J.  
SHACK, Chairman, presiding.

MEMBERS PRESENT:

- WILLIAM J. SHACK, Chairman
- SAID ABDEL-KHALIK, Member
- GEORGE E. APOSTOLAKIS, Member
- J. SAM ARMIJO, Member
- MARIO V. BONACA, Member
- MICHAEL L. CORRADINI, Member
- THOMAS S. KRESS, Member
- OTTO L. MAYNARD, Member
- DANA A. POWERS, Member
- GRAHAM B. WALLIS, Member

NRC COMMISSIONER:

GREGORY JACZKO

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<u>AGENDA ITEM</u>	<u>PAGE</u>
12) Meeting with Commissioner Jaczko	3
12.1) Remarks by the ACRS Chairman	3
12.2) Meeting with Commissioner Jaczko	3
to discuss items of mutual interest	

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

(1:31 p.m.)

12) MEETING WITH COMMISSIONER JACZKO12.1) REMARKS BY THE ACRS CHAIRMAN

CHAIRMAN SHACK: Commissioner, welcome to the ACRS.

COMMISSIONER JACZKO: Thank you.

CHAIRMAN SHACK: We are very happy to have you here, hear your views on whatever you would like to talk about today.

COMMISSIONER JACZKO: Thank you. I appreciate you giving me the opportunity to do this.

12.2) MEETING WITH COMMISSIONER JACZKOTO DISCUSS ITEMS OF MUTUAL INTEREST.

COMMISSIONER JACZKO: I think they were talking to Frank or I guess it was actually John Larkins, the original meeting I had with John Larkins. And Frank talked about doing this kind of a meeting because as commissioners, we don't often get a chance to really interact with all of you together as a group.

I mean, we have our annual meeting where we meet with usually a sampling and everyone is there but not everyone is speaking. And it's often then more about what is on the Commission's mind. So I

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1 thought it was a good idea for me to go and get a  
2 sense to hear what is on your mind because I think  
3 obviously you are all here to advise us and kind of  
4 help us.

5 So I was just going to say a couple of  
6 things and then really leave it open for you all to  
7 ask me questions or let me know things that you're  
8 thinking about and go from there. So I always find  
9 it's a little bit easier. Then I don't have to do as  
10 much work ahead of time.

11 I guess what I would say -- and a lot of  
12 this I think to some extent duplicates what I said at  
13 the ACNW when I did a similar thing there. And, of  
14 course, it's a little bit different. One of the  
15 things I said there was that it would be great to see  
16 the ACNW become more like ACRS because I think, you  
17 know, this truly is a unique body in the world of  
18 nuclear regulation.

19 And it's really a real asset that we as a  
20 Commission have to have such a collection of experts  
21 in a variety of different fields to advise us on  
22 different issues and, really, to keep sometimes, too,  
23 the focus on the technical things.

24 We get caught up a lot I think in the  
25 regulatory side of things, which is in its own sense

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1 a technical discipline in a way. And I think it's  
2 good, then, to have ACRS to kind of be there to have  
3 a voice, really, on a lot of those technical things  
4 and just, really, from a truly independent  
5 perspective. I think that's truly important.

6 So there are a variety of issues that --  
7 and perhaps you will want to talk about, but I'll just  
8 touch on a couple, I think. A really important issue  
9 I think where I think the ACRS views are extremely  
10 important is really on our efforts to risk-inform and  
11 performance-base our regulations.

12 We talk about that a lot. And we have had  
13 some achievements in that area, some areas where we  
14 have tried to do things and it has not really worked,  
15 and some areas that are kind of works in progress, the  
16 50.46 rulemaking probably being the best example of  
17 that latter case. And I know certainly the Committee  
18 has recently weighed in on that issue. And I think  
19 that's been extremely helpful for the Commission.

20 But I think that's an area that I think  
21 before I came to the Commission, I really never heard  
22 the words "risk-informed, performance-based." And  
23 beyond the words "risk-informed, performance-based,"  
24 I didn't really know what they meant.

25 And I think since I have been here, I have

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1 learned a little bit about what the goals are. And I  
2 think it is a worthy goal to have regulations where  
3 we're doing things that are managing ultimately our  
4 resources in the most efficient and effective way.

5 That is a very easy thing to say in  
6 principle. It's a very difficult thing to do in  
7 practice. And I think that's what we have found or at  
8 least what I have found since I have been here.

9 And, on the one hand, I think it's an easy  
10 thing to want to do because we have modeling  
11 capabilities now that allow us to come up with numbers  
12 very easily and allow us to put things in a very  
13 quantitative perspective or in a very quantitative  
14 format. And with that, I think there's a tendency to  
15 want to take and trust those things and use them  
16 because it's easier to say, "Well, we're doing  
17 something because this number was bigger than the  
18 number we said it needed to be."

19 It's easier to do that sometimes than to  
20 say, "Well, we think we need to do this because we  
21 have a concern in this area. But that doesn't  
22 necessarily always mean that it's the right way to go.  
23 And it depends on the validity and the reliability of  
24 those numbers.

25 And so I think just talking about that

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1 generally, the idea of risk-informed,  
2 performance-based, my sense right now is we still have  
3 a long way to go to really get to a place where those  
4 numbers -- where we have a lot of confidence and  
5 reliability in those numbers, in the numbers that  
6 we're using, in the calculations that we're doing  
7 ultimately.

8 There's a variety of areas, of course,  
9 where that comes up and where the Commission is moving  
10 forward. One area that I have tried to focus a little  
11 bit on is really in fire protection. And I think  
12 that's an area where risk-informing our regulations  
13 can be extremely helpful because in the end -- and we  
14 have done that.

15 I mean, we have a risk-informed  
16 regulation. We have yet to have anyone actually  
17 implement that. But I think that there is a  
18 tremendous benefit because our current  
19 non-risk-informed regulatory framework is so  
20 convoluted and so challenging to implement that this  
21 alternative approach could perhaps help us put that in  
22 a more transparent regulatory framework. But it  
23 depends crucially on a lot of the work we're doing to  
24 get Fire modeling right, to get all of these kinds of  
25 things.

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1                   And so I think there are clearly, I think,  
2 areas where it's important to do. I have suggested  
3 that on the emergency preparedness area, that that may  
4 be an area we want to look at, what I have not really  
5 called risk-informed but more performance-based  
6 regulations.

7                   Our current ideas on emergency  
8 preparedness really come down to a very prescriptive  
9 list of things that emergency plans have to include or  
10 things that have to be done as part of that, but  
11 there's really no clear guidance in our NRC  
12 regulations about the public health and safety goals  
13 that emergency preparedness is trying to accomplish.

14                   Well, I think that that is something that  
15 would lend itself to a performance-based kind of rule  
16 and recasting, really, that idea of reasonable  
17 assurance in more of a performance-based way. And  
18 that obviously I think would entail using some of the  
19 risk-informing tools that we have right now to do  
20 that.

21                   So I think there are areas where this  
22 really lends itself. I personally don't think that  
23 the ECCS rule is an area that really lends itself to  
24 risk-inform. I think we have a good deterministic  
25 rule there right now that has done its job adequately

1 and provided a good margin of safety.

2 But I think moving to a risk-informed  
3 rule, really what we're going to wind up seeing is we  
4 are going to recapture by analysis margin that I think  
5 will then erode away again through performance or  
6 through operational modifications. I don't think  
7 that's what our goal should be for risk-informing.

8 So that is certainly one area that I think  
9 I certainly have an interest in. And I know I think  
10 the Committee has a lot to offer in that particular  
11 area. Certainly if you have thoughts on any of those  
12 things, I would be more than happy to hear them.

13 A couple of other areas that I will just  
14 touch on. And I think certainly one of the areas that  
15 I'm very interested in is how we are preparing for new  
16 reactor licensing.

17 I think we have done a lot right now as an  
18 agency, and I think appropriately so, to focus on  
19 getting the staff, the agency staff, resources where  
20 they need to be, but I think sometimes we lose sight  
21 of the auxiliary organizations that really make this  
22 Commission an effective regulatory body, ACRS being  
23 one of them, the licensing boards being another.

24 And so in the areas of new reactors, I  
25 would really say I think I would certainly appreciate

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1 hearing from you all about where you think we are in  
2 terms of making sure that we have incorporated your  
3 role into that process appropriately, into our  
4 planning and scheduling and those kinds of things, to  
5 make sure that we will have an opportunity to get the  
6 feedback that is necessary and appropriate from ACRS  
7 as we deal with new reactor licensing.

8 We saw I think some challenges in that  
9 area dealing with the restart at Brown's Ferry unit 1.  
10 There were some things that I think -- I don't want  
11 this to be intended as a criticism. I think  
12 eventually the communication worked out well and ACRS  
13 was involved in an appropriate way, but I think it  
14 took a little bit of scheduling and communication to  
15 get us there.

16 And I think now is the time to be looking  
17 forward towards the new reactor work and making sure  
18 that we're building in the role that ACRS needs to  
19 play in that and is required to play, I think, by  
20 statute.

21 I think, then, the last point that I will  
22 really make -- and this is one that I have probably  
23 touched on to some extent in talking about the  
24 risk-informed issues. And that really I think has to  
25 do with modeling and the role of modeling.

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1           As we, as I said, I think become more and  
2 more comfortable with computers and computing power  
3 gets more and more accessible, I guess, if you will,  
4 I think we have to be more and more vigilant as an  
5 agency to make sure that we are properly validating  
6 and verifying models that we're using.

7           In particular, as we start to have those  
8 models play more of a role in regulatory  
9 decision-making, I think one of the issues that I  
10 talked a little bit about with ACNW was the role  
11 clearly with the Yucca Mountain or with the high-level  
12 waste repository program.

13           We have gone almost exclusively to a --  
14 really, I guess that one could be called a little more  
15 of a risk-based rule to some extent. I mean, the  
16 regulatory decisions we make in that case will be  
17 based, by and large, on the outcome of a computer  
18 model.

19           And so how we approach that and how we  
20 deal with understanding that model is extremely  
21 important from a public health and safety mission.  
22 And I think clearly there are a lot of areas on the  
23 reactor side where we are doing those kinds of things.  
24 And it is extremely important.

25           And I know I have always appreciated

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1 hearing from many of you about your views on modeling  
2 and various models and where those stand. So I think  
3 that is certainly another area that is an extremely  
4 important one as we go forward.

5 The last thing that I guess I will just  
6 close with -- and, like I said, I'll hopefully leave  
7 this open for you all to determine what we will talk  
8 about.

9 I think I'm often asked, you know, the  
10 questions as a regulator. We always get the  
11 questions, you know, "What keeps you awake at night?"  
12 And I think that the simple answer, I guess, it is  
13 really those things that we still don't yet fully  
14 understand.

15 I continue to be surprised by the lack --  
16 I don't want to say -- well, not lack of understanding  
17 but of the amount of the complexity that nuclear power  
18 plant operations really involve and the degree to  
19 which there are still phenomena that have not been  
20 fully analyzed or fully predicted and fully  
21 understood, certainly countless ones, just in recent  
22 years some of the acoustic issues with power uprates  
23 that were to some extent relatively simple physical  
24 phenomena but phenomena that were not really  
25 well-understood before we did these power uprates.

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1           And so still to some extent I think it's  
2 makes this job interesting in that even though we have  
3 30 years or so or more of operational experience with  
4 a large number of nuclear power plants, there are  
5 still a lot of areas that we continue to learn and  
6 learn from. Of course, the agency is dealing with a  
7 lot of issues now, such as the issues with clogging of  
8 sump screens and recirculation.

9           Again, this is to some extent a fairly  
10 simple problem that one almost thinks somebody should  
11 have figured out earlier. But, again, there is a  
12 tremendous amount of complexity that goes into a  
13 recirculation system and all of the variables that  
14 have fed into dealing with that issue that it's really  
15 taken us some time to get to an understanding of that  
16 as an issue and what needs to be done in that.

17           And I think, certainly as I have seen from  
18 the Committee's comments, that is still an area where  
19 there is probably a lot of disagreement or at least  
20 continued uncertainty about exactly what the right  
21 approach is, exactly what phenomenologically will  
22 happen if we ever got into that kind of a scenario.

23           So I think there is still a lot to do on  
24 the technical side. And I think we have to remember  
25 that we don't have perfect knowledge right now of

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1 these reactors, especially the current fleet and then,  
2 of course, if we fold in a new fleet, which may have  
3 its own kind of performance issues and maybe a fleet  
4 from which we can't rely on a lot of operational  
5 experience because, particularly if we go to plants  
6 that rely on passive safety systems, there won't be a  
7 wealth of the same operating experience upon which to  
8 rely as we go forward and deal with those challenges.

9 I think that there are still a lot of  
10 issues to be dealt with and I think a lot of important  
11 issues and I think a lot of interesting work ahead of  
12 us.

13 So with that, as I said, I would leave it  
14 open to you all if you have questions or comments.  
15 Please?

16 MEMBER WALLIS: Your first three items,  
17 risk-informing, performance-based, what do we do about  
18 new reactors, and modeling, are all related to a topic  
19 we're going to discuss. We haven't yet decided what  
20 the Committee position is yet on this framework for  
21 new, you know, how do we license new reactors.

22 I think it is a wonderful opportunity to  
23 pull things together in a more rational way and do it  
24 right and save an awful lot of effort for the agency.  
25 I mean, the object is to be more efficient and

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1 effective and transparent and all of those things.  
2 There are all kinds of opportunities here.

3 I think we have to be careful that we  
4 don't throw it away, we don't do sort of a half-baked  
5 job or realize that or try to sort out, think it's all  
6 going to be done in a year, that you have got to do it  
7 thoroughly and do it right, but I really think there  
8 is an opportunity to do something really significant  
9 for the agency. And that opportunity should not be  
10 missed.

11 COMMISSIONER JACZKO: Well, I appreciate  
12 that. And I think one of the things that -- and you  
13 brought up the word "transparency." I think one of  
14 the challenges, in particular, as we go to more of a  
15 risk-based regulation and more where maybe we're  
16 moving towards a broader use of risk tools and these  
17 kinds of things, how we continue to maintain that  
18 transparency, I think one of the kind of very specific  
19 areas that I always think about this is with the new  
20 mitigating systems performance indicator, where we  
21 have replaced what was arguably not the most effective  
22 way to measure the performance of some of these safety  
23 systems, and replaced it with a complicated algorithm  
24 that takes into consideration a lot more risk  
25 information.

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1           The challenge there becomes, how do we  
2 communicate that to the public, not only to the  
3 public, but I remember I was visiting, I think it was,  
4 Region III or Region IV and there was a -- I think it  
5 was Region III. And one of the resident inspectors  
6 commented that they didn't fully understand the basis  
7 for the answers they got from the mitigating systems  
8 performance indicator algorithm. And, you know, it  
9 was so complex that they hadn't yet fully understood  
10 it.

11           And so, you know, it does bring up -- that  
12 is I think one of the challenges, making sure that  
13 that transparency is still there and figuring out how  
14 to make sure that we continue to incorporate that.

15           MEMBER POWERS: We are undertaking a  
16 fairly thorough reexamination, a consequence analysis.  
17 And one of the issues that inevitably comes up in that  
18 is the linear no-threshold response. I get the sense  
19 there is some widespread skepticism about the linear  
20 no-threshold response, some belief that it's maybe an  
21 empirical expediency, rather than the product of an  
22 actual biochemical model.

23           And I wondered what your thinking was on  
24 that, how to deal with this.

25           COMMISSIONER JACZKO: Well, I think there

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1 are a couple of ways. I don't know that I necessarily  
2 share the view that there is a widespread sense that  
3 it's -- I don't recall the exact phrase used, but I'll  
4 say my sense is that I think there's no -- I think  
5 there's not a high level of confidence right now that  
6 a linear no-threshold model is accurate, that it may  
7 be but that there is information that could lead us  
8 one way or another.

9 I think the way I tend to look at it a  
10 little bit better is how we're dealing with, really,  
11 collective dose because I think that is to some extent  
12 where linear no-threshold becomes more of an issue.

13 When we start talking about low doses  
14 apply to large numbers of people, you start to see  
15 effects. And I think the way you deal with the  
16 uncertainties in the linear no-threshold is really to  
17 look at the use of collective dose.

18 In the context, for instance, of the  
19 consequence analysis study or something like that, I  
20 think what I'm more comfortable with is when we talk  
21 about the results of something like that, clearly I  
22 think it's much simpler to look at high-dose  
23 consequences. For those situations where you have  
24 high doses, you can look at much clearly what the  
25 public health and safety implications will be because

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1 there is much better data about certain thresholds for  
2 immediate, prompt health effects.

3 I think when you get into the issues of  
4 the lower doses, I don't think there the appropriate  
5 way to present the results is to talk necessarily  
6 about health effects. I think the best thing to do in  
7 that case is to talk about land contamination, to talk  
8 about the kinds of physical impacts you see without  
9 necessarily extrapolating that into a health and  
10 safety consequence because then I think really what  
11 you're starting to do is you are getting into a  
12 collective dose or if you do it, you do it on an  
13 individual basis.

14 So you talked about an individual risk  
15 from the low-dose exposures, rather than a collective  
16 dose, because I think that tends to distort the  
17 uncertainties inherent in our understanding of  
18 low-dose effects.

19 I'm not sure if that answers your --

20 MEMBER WALLIS: This goes back to my  
21 point.

22 COMMISSIONER JACZKO: Yes.

23 MEMBER WALLIS: I think the Commission  
24 indicated that the QHOs should be used as a basis for  
25 licensing reactors. One of those is latent cancers.

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1 COMMISSIONER JACZKO: Yes.

2 MEMBER WALLIS: So you have to figure out  
3 what you mean by that statement.

4 COMMISSIONER JACZKO: And I think -- and  
5 this is my personal view. And, again, I don't want to  
6 say that I'm speaking for the commissioner. I think  
7 this is an area where we have challenge.

8 MEMBER WALLIS: Yes. And if you're going  
9 to use it as a criterion, let's be clear how you  
10 evaluate it.

11 COMMISSIONER JACZKO: And I think that is  
12 an area that we probably should reexamine because I do  
13 think that that is the area where -- you know, the way  
14 I tend to look at it is we're not a cancer research  
15 institution. So what I think we have a responsibility  
16 to do is have a good understanding of what the doses  
17 will be.

18 The health effects I think ultimately  
19 combine a lot more work and a lot more that is beyond  
20 the expertise of this agency. But I think what we can  
21 continue to do is to try and put it in the perspective  
22 of an individual risk and what the individual risk may  
23 be, our best understanding of what the individual risk  
24 may be from certain levels of dose and look at  
25 comparative risks to do that.

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1                   But it is a challenge, I think. And I  
2 think as the draft ICRP recommendations have talked a  
3 little bit about moving away from the use of  
4 collective dose because, again, it does I think tend  
5 in a non-transparent way to give you information that  
6 isn't necessarily useful, you know, because of the  
7 idea of low doses in the large populations giving you  
8 cancers where the individual cancer risk may not  
9 necessarily be the same as that risk that you derive  
10 from that perspective.

11                   MEMBER CORRADINI: If I could just ask to  
12 clarify to follow up Dana's question, so as you're  
13 speaking about it, then, I guess I am trying to think  
14 of a potential analogy.

15                   So NCRP when I have been at their annual  
16 meetings, I get the impression that if I'm dealing in  
17 small doses, large populations, it's very much now I  
18 can turn to the medical community. Is that a model  
19 that one could look at how the medical community  
20 explains risk for small doses; for example, medical  
21 treatments?

22                   I'm curious where you're getting the way  
23 to look at it. The only peer comparison or the only  
24 analogue I can think of is small doses in medical  
25 applications.

1                   COMMISSIONER JACZKO: And, again, I'll be  
2 honest. This is largely I'm thinking on my feet here.  
3 I think that as I see this information, I guess what  
4 I look at is I think if I look at some consequence  
5 analysis, let's say, that shows that there will be  
6 low-dose contributions to a large population and out  
7 of that, you would find a number gives you 100  
8 calculated latent cancers after 60 years.

9                   That to me is not necessarily a useful  
10 number. What is useful is to look at an average  
11 individual, I think more useful, and say, "Well, what  
12 is the potential change in their cancer, in an  
13 individual's cancer, risk as a result of having  
14 received that low dose?"; which never necessarily gets  
15 you to reporting a fatality figure. So you don't from  
16 that extrapolate, then, to 100 calculated deaths,  
17 let's say, but you talk about the individual risk,  
18 which I think allows you to put it in a more useful  
19 perspective because it's not the same thing to say  
20 that we would have 100 prompt calculated fatalities  
21 from a nuclear incident as saying that we would have  
22 100 calculated latent cancers from a nuclear incident.

23                   I think it's that comparison of that  
24 number that can sometimes cause confusion and not  
25 necessarily put the latter number in the proper risk

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1 perspective, I think, compared to the first. I mean,  
2 clearly 100 prompt calculated fatalities is an  
3 accident scenario that is much worse and not to  
4 discount the 100 calculated latent cancers, but I  
5 think that there's a lot less certainty in that  
6 number, that it's not necessarily as reliable of a  
7 number. And there's a tremendous amount of  
8 uncertainty in calculating that. So where I think  
9 that perhaps a better approach is for those low doses  
10 to talk about what the potential individual risk might  
11 be for cancer later down the road or whatever other  
12 kind of latent health effects you could have. With  
13 that, then, you start to talk about, I think, then,  
14 the kinds of things that you would do on an individual  
15 basis to address those potential consequences, rather  
16 than doing it on a -- because, again, that 100  
17 calculated latent cancers -- is it really an issue  
18 that lends itself in my view immediately to some kind  
19 of regulatory action, you know, but --

20 MEMBER WALLIS: There is that debate,  
21 though. I mean, it's societal versus individual risk.  
22 You go back to the QHO debate. Among the  
23 commissioners, there was disagreement. And, I mean,  
24 if you're just looking at individual risk, you could  
25 put a reactor in the middle of Central Park.

1 Individuals are no more at risk there than somewhere  
2 else near a reactor.

3 COMMISSIONER JACZKO: Again, I think  
4 that's -- and this is why these discussions are always  
5 useful, because I certainly wouldn't think that that  
6 would be the right direction to go. But I think,  
7 again, not having been here with the discussions on  
8 the QHOs and those things, it's always useful to know  
9 that the Commission has thought about these things.

10 It's always a good reminder that I should  
11 go back and read some of those discussions. But I  
12 think that there are -- what to some extent to me it  
13 comes down to is a question of, do we have enough  
14 reliability in those low-dose numbers to make good,  
15 solid regulatory decisions based upon them?

16 And I think that there is information in  
17 there. And we have to take that information into  
18 consideration. But I think it may not always be the  
19 most reliable indicator of what we do to make  
20 regulatory decisions.

21 Now, that doesn't mean that we should  
22 ignore them. I think it means that we can go to  
23 issues like land contamination, which I think the  
24 Commission to some extent shies away from, but to some  
25 extent it may be a more useful value to determine the

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1 kinds of societal implications that you may have from  
2 a low-dose contamination because there are ways to --  
3 you know, again, you wind up with other kinds of  
4 calculations and other kinds of uncertainties, but I  
5 think that there are other metrics that you can use as  
6 well with some of the lower-dose exposures in terms of  
7 an accident analysis, an accident consequence to get  
8 an understanding of the kinds of effects that you  
9 would be doing.

10 But, I mean, my sense is that there is  
11 some uncertainty about when you're no-threshold, but,  
12 again, the differences I don't see -- what I see right  
13 now from some of the data is that there may be a  
14 threshold, but, again, that threshold is probably not  
15 a terribly large number. It may be somewhere again in  
16 the low-dose regime. So it may still be a useful  
17 regulatory tool to consider, to continue to consider  
18 linear no-threshold models.

19 But, again, I think where some of the  
20 problem comes is when we extrapolate that on a  
21 collective dose approach. But if we can continue to  
22 talk about that from an individual risk perspective,  
23 it may be more useful.

24 MEMBER KRESS: When one calculates the  
25 latent cancer QHO, they're generally truncated after

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1 50 miles. In essence, what you're saying is that is  
2 an ad hoc threshold, which is all right, but I think  
3 you are absolutely right in terms of individual risk  
4 being very important.

5 But I think the agency is not only  
6 concerned with that. That ought to be a prime  
7 concern. But they ought to be concerned with things  
8 like total deaths and, in particular, land  
9 contamination.

10 COMMISSIONER JACZKO: Yes.

11 MEMBER KRESS: But we don't have any QHO  
12 for those.

13 COMMISSIONER JACZKO: Yes.

14 MEMBER KRESS: And I think that's missing.  
15 That's one of my hobby horses. We need a QHO of sorts  
16 for land contamination and total deaths.

17 COMMISSIONER JACZKO: Yes.

18 MEMBER KRESS: That would complete the  
19 regulatory objectives.

20 COMMISSIONER JACZKO: Yes.

21 MEMBER KRESS: And you could work those  
22 into the risk objectives of the regulations.

23 MEMBER CORRADINI: Can I follow up just  
24 with that? So how much do the commissioners talk with  
25 the EPA about having consistency in such measures?

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1 So, for example, if I am worried about release of  
2 radioactivity at low amounts and, as you say and I  
3 think it is a very good way of thinking about it,  
4 looking at individual risk or effect on land, that  
5 those regulations are in some sense consistent, not  
6 equal but consistent in some manner to how I worry  
7 about groundwater and essentially the computation of  
8 the risk from essentially contaminated groundwater,  
9 whether it is RICRA waste or et cetera, has the  
10 Commission -- do you guys have continual conversations  
11 with those in EPA to, shall I say, make things such as  
12 this more consistent or at least talk about  
13 consistency? That always has intrigued me about that  
14 sort of communication.

15 COMMISSIONER JACZKO: Well, I would say I  
16 can only speak for my own conversation. So I will say  
17 that, I mean, I think in an ideal world, I think we  
18 would be able to have a risk-based regulatory scheme  
19 with perfect knowledge. We could do perfect risk  
20 calculations. And we would be able to put in relative  
21 perspective the relative risks of all the various  
22 things.

23 So in an ideal world, we would have  
24 comparable risk. A lot of behavior would have some  
25 comparable risk, whether it's an EPA-related chemical

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1 or an NRC-regulated radionuclide or whatever the case  
2 may be or even comparable obviously between EPA and  
3 NRC for radionuclides.

4 But we aren't really there yet to some  
5 extent because issues like, for instance, land  
6 contamination may be handled differently from one  
7 agency to another. And that is certainly an important  
8 issue. And we see that in certain things that we're  
9 dealing with.

10 The Commission is dealing right now with  
11 an issue with how we are going to move forward with  
12 our cleanup standards for groundwater contamination at  
13 *in situ* leach-mining facilities.

14 EPA has a statutory responsibility there  
15 to establish some regulations. There is some  
16 discussion on the Commission about what we think is  
17 appropriate in that arena. And then there may be some  
18 disconnect there.

19 So I think certainly in an ideal world, we  
20 would have common risk. And it would be across  
21 everything, every risk that anyone faces. But the  
22 challenge is ultimately as I look at risk and the use  
23 of risk, I think that we do this to again try and put  
24 some basis for our decision-making process that is  
25 more easily explainable than why we are doing one

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1 thing or not doing something, more importantly.

2 And we have a long way to go, I think, to  
3 be able to communicate that effectively. And I think  
4 to some extent, we can't discount often the need to  
5 make regulatory decisions because, if you will,  
6 sometimes there is an inappropriate sense of concern  
7 on the part of the public. I think we have to  
8 accommodate that and we have to be aware of that  
9 sometimes because I think as an agency, sometimes we  
10 have to, nonetheless, take action to reassure the  
11 public, even if that, the concern that the public is  
12 expressing, may not be based on solid risk  
13 information. And I think that is a challenge.

14 The most obvious challenge with that I  
15 think recently was the situation we had with tritium  
16 contamination. I mean, there I think the agency -- I  
17 mean, from a risk standpoint and from probably an  
18 individual risk standpoint if you want to look at it  
19 that way, I would say that the tritium contamination  
20 was not a tremendous concern to public health and  
21 safety, but it was a tremendous concern, I think, in  
22 a lot of communities to the public. I mean, it was a  
23 concern because there was a lack of trust that the  
24 agency was aware of what was happening in some of  
25 these reactor sites.

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1                   And, regardless of whether it turned out  
2                   that the levels of tritium contamination were really  
3                   in almost all cases below EPA limits, there was not a  
4                   sense that the NRC was aware of that. And that is  
5                   what the concern was. And that was a case where I  
6                   think the agency could have done more and been more  
7                   proactive in addressing that. And the industry came  
8                   out with a groundwater-monitoring program.

9                   I don't think it would have been an  
10                  appropriate response for the agency to have done that  
11                  and to have required a groundwater monitoring program,  
12                  again not because the health and safety risk was there  
13                  but because there was an overall concern among certain  
14                  segments of the public that we were not fully  
15                  monitoring this program and that the concern I think  
16                  wasn't the actual levels of contamination but it was  
17                  the, what about the next spill that you don't know  
18                  about for which those contamination levels do get  
19                  large enough that there is a public health and safety  
20                  concern.

21                  So, you know, the risk is a tool. And  
22                  it's there, but it's not a perfect tool. We don't  
23                  have perfect information. We don't have, you know --  
24                  and just a comment on the idea of the QHOs. And I am  
25                  not familiar enough with the QHOs, really, to comment

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1 on them, but I will say that certainly from what I  
2 have just heard in this discussion, I mean, I am more  
3 along the lines of believing. I mean, obviously we  
4 should have something that is a fatality measure as  
5 well. I mean, it sounds terribly morbid to talk about  
6 these things, but that is, I think, an appropriate  
7 thing to deal with.

8 And I do think land contamination is  
9 something that I think is also a good metric.

10 MEMBER KRESS: Well, there are certainly  
11 regulatory --

12 MEMBER WALLIS: The staff is assuming that  
13 the QHO is a costing granite because that was the  
14 thinking at that time. That's the way they've got to  
15 evaluate the future.

16 COMMISSIONER JACZKO: Well, I think that's  
17 the one thing about it. The Commission is always  
18 changing. Probably the biggest challenge, I think,  
19 for the staff is to know when the Commission has  
20 changed its mind. And sometimes as individual  
21 commissioners, we have different views.

22 MEMBER WALLIS: Maybe it's up to them to  
23 tell you when you ought to change your mind.

24 COMMISSIONER JACZKO: Well, I think  
25 sometimes I think they wish that they could just do

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1 that. But I think the QHOs and I think right now my  
2 sense of certainly where I think I am with going  
3 forward with a new regulatory framework, I think the  
4 Commission, that's one of those long-term goals that  
5 I think the Commission probably right now isn't  
6 focused on.

7 And right now, I mean, certainly as we  
8 look at the new technologies that are really on the  
9 horizon for potential new or that would need a  
10 potentially new licensing framework, namely  
11 high-temperature gas reactors or liquid metal  
12 reactors, my view and as I voted, I think, on some of  
13 these things is that we probably need a Part 50(x)  
14 that would cover those specific technologies.

15 I am not yet comfortable enough that we  
16 are there technically or have enough time to really  
17 develop the right framework that would be more along  
18 the lines of a risk-informed and that we may wind up  
19 with a deterministic set of regulations that applied  
20 it specifically to those reactor technologies.

21 But I think, you know, again, I think all  
22 of these things are important things for us to  
23 consider to continue to think about and really to get  
24 right, but I think the hardest thing with so much of  
25 this is communicating this to the public and getting

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1 the public to be comfortable that this isn't a way to  
2 simply relax regulatory standards or to do these kinds  
3 of things because I think that is often -- you know,  
4 there is a sense, I think, that that is to some extent  
5 why the Commission has looked at some of these  
6 risk-informed approaches, is a way to reduce  
7 regulatory burden or to do things like that.

8 And I think that's really not -- in my  
9 view, that's not necessarily the most effective reason  
10 to be doing this. I think we should be doing it  
11 because it provides a more transparent and a more  
12 clear definition of what we mean by protecting the  
13 public. And it takes advantage of the modern tools  
14 that we have and our evolving understanding of reactor  
15 physics and these kinds of things.

16 MEMBER KRESS: With respect to licensing  
17 new reactors, I've tried to put forth the principle  
18 that I'm not sure the Committee has bought in on yet.  
19 I think --

20 COMMISSIONER JACZKO: I do many of those  
21 things. I know how you feel.

22 MEMBER KRESS: Basically it goes something  
23 like this. You should have a way to separate design  
24 safety from site suitability. QHOs in my opinion are  
25 site suitability things, and they should pay very

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1 little, if only an ancillary role in terms of design  
2 safety. And, therefore, we need two sets of criteria:  
3 one for design safety and another one for site  
4 suitability.

5 Now, I don't know if you have thought  
6 about that or not, but do you think that is a good  
7 principle?

8 COMMISSIONER JACZKO: Well, I certainly  
9 think it is an interesting idea. I would certainly be  
10 interested to hear what the rest of the Committee  
11 thinks about it, too. But I think --

12 MEMBER CORRADINI: You will need a few  
13 hours.

14 COMMISSIONER JACZKO: I think the  
15 interesting issue with site suitability is what do we  
16 do with site suitability long term. And I think that  
17 is really one of the challenges that the Commission is  
18 faced with. And it to some extent I think cropped up  
19 in license renewal. There are sites right now where  
20 the population density around the sites is not what it  
21 was when those plants were originally sited.

22 And if you have site suitability criteria,  
23 what do you do long term with those criteria if issues  
24 that are beyond the control of this agency change  
25 those criteria? I think in that case, you have to

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1 rely on the design safety features to compensate or to  
2 really ensure that the site suitability is --

3 MEMBER KRESS: Yes. I don't think you  
4 could separate the two.

5 COMMISSIONER JACZKO: Yes. I mean, I had  
6 an interesting discussion when I went to visit a plant  
7 in a relatively high population area. As we were  
8 driving around -- this was within the ten-mile EPZ and  
9 a brand new housing development going up. And I was  
10 with the county manager at the time.

11 And I asked him. I said, "Well, you guys,  
12 are you comfortable, you know, with this new housing  
13 development and new population, how this will affect  
14 your evacuation plan and all these things?"

15 And they said, "Well, you know, it creates  
16 a challenge." And they said, "But we have no role  
17 whatsoever in that land use decision. It was the  
18 local zoning board or whoever made the decision to  
19 allow the development to take place." And it just  
20 brings up the challenges that you have in this idea of  
21 site suitability.

22 You know, we make those kinds of  
23 considerations at licensing, but beyond that, it is a  
24 difficult issue to really control. I mean, the  
25 Commission can't say you can't -- I mean, at least I

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1 don't think we really have the statutory authority  
2 right not to say, "You cannot build in this area  
3 because of that."

4 Now, we would have probably the authority  
5 to say, "If the site suitability parameters change so  
6 that the licensing basis is no longer valid, we could  
7 restrict the license or we could do something to" --

8 MEMBER KRESS: Or not allow another plant  
9 to be built.

10 COMMISSIONER JACZKO: Or not allow another  
11 plant to be built, but that would be a separate  
12 decision that would again be evaluated, that initial  
13 licensing in which you would take into those  
14 considerations.

15 But, you know, again, it calls into some  
16 the question of, well, the site is suitable for an  
17 existing plant. What makes it unsuitable for a new  
18 one? And that's the challenge, I think, with that  
19 kind of a metric or parameter.

20 MEMBER POWERS: In your opening comments,  
21 you mentioned an interest in fire safety. It's, of  
22 course, one of the more publicly visible issues.  
23 People understand fire as a threat.

24 And, yet, when we look at our fleet of  
25 plants, we have Appendix R plants. We have branch

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1 technical position plants. And now we're having NFPA  
2 805 plants. Plus, each one of those has a myriad of  
3 exemptions. I mean, I think there are like 3,000  
4 exemptions altogether.

5 What is your thinking about this and how  
6 the public responds to this kind of approach to fire  
7 safety, adding to it the fact that we don't require  
8 single failure criteria of fire equipment?

9 COMMISSIONER JACZKO: Well, I think it's  
10 an area where we have real challenges with  
11 communicating what we are doing. I mean, that's why  
12 I think I mentioned that I think this is an area where  
13 I think risk-informing could help because I think we  
14 can at least have, I think, a more transparent basis  
15 for why we're taking the actions we're taking when it  
16 comes to fire safety.

17 I don't think it's an effective regulatory  
18 framework to have as many exemptions as we have and to  
19 have the variety of manual actions and other  
20 exemptions that we have for many plants.

21 I think, similarly, having a third  
22 alternative is also unfortunate. I think it would be  
23 better ultimately to have one answer. If we think  
24 NFPA 805 is the right way to go, I think, in  
25 hindsight, it probably would have been better to

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1 require that, that everyone move to NFPA 805 and go  
2 that direction, I think.

3 And I know George had raised one of the --  
4 and I'm not sure who else did -- the issue of moving  
5 forward with new plants and are we going to have a  
6 dual track approach going forward. And I think that  
7 was good insight and something I had never thought  
8 about, but I think we need to have one approach going  
9 forward. Either it's the Appendix R-type requirements  
10 or it's an NFPA 805-type requirement going forward and  
11 that if it's going to be the risk-informed, that we  
12 get the infrastructure in place to do that.

13 So I think this is an area where we  
14 continue to be challenged and I think where we will  
15 continue to have trouble communicating effectively to  
16 the public that we are taking the appropriate steps  
17 because of the large number of exemptions that we  
18 have. And it's not I think an ideal way to regulate.

19 MEMBER POWERS: We've struggled, it seems  
20 to me. Moving to risk bases is not a move in a  
21 direction toward making it easier to explain to the  
22 public what is going on.

23 COMMISSIONER JACZKO: Yes.

24 MEMBER POWERS: One of the things that  
25 bedevils us occasionally -- and this is a very

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1 risk-favorable group in general -- is, how do you  
2 communicate risk analyses to the public affected by a  
3 plant? I mean, they can't get the PRA and look at it.  
4 And even if they could, it's not clear that they would  
5 know what cuts that and things like that.

6 COMMISSIONER JACZKO: Yes.

7 MEMBER POWERS: How do you do that?

8 COMMISSIONER JACZKO: Well, I think that's  
9 the biggest challenge, I think, with risk-informing  
10 our regulations. And I think it's a challenge we have  
11 in fire protection.

12 I think there is probably not a good sense  
13 that the public sees that as us doing anything other  
14 than making it easier to not ensure adequate  
15 protection. I don't think that's what we're doing,  
16 but I think there is that sense.

17 I think, you know, the way you do it is I  
18 think you just are persistent. And I think it's about  
19 more than communicating. I think it's about -- I try  
20 and think of it not so much as communication but as  
21 conversation.

22 But there has to be a back and forth. And  
23 there has to be more of a proactive effort, where  
24 we're listening to the concerns that we're getting  
25 from the public. I don't think we do that as an

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1 agency as well as we could. And I think that's where  
2 we can start to work through that.

3 There will be questions. And I think it  
4 is answering those questions. We can't always get to  
5 the right answer or to get to a satisfactory  
6 understanding that we have done the right thing. But  
7 I think it involves a lot more communication than we  
8 do now and, unfortunately, probably than we have the  
9 resources to do now.

10 I think that is how you get there. And  
11 I'm perhaps naively optimistic that that it is --

12 MEMBER APOSTOLAKIS: I hope it is not a  
13 crisis of some sort.

14 (Laughter.)

15 COMMISSIONER JACZKO: I think it's  
16 something that we have to continue to focus on.

17 MEMBER APOSTOLAKIS: There are two  
18 thoughts that come to my mind when we talk about these  
19 things; first of all, communicating to the public the  
20 risk approach. I mean, if you look at it in an  
21 absolute sense, you are right. I mean, how do you  
22 communicate it?

23 But I think, though, that it is easier to  
24 communicate a regulation that is based on risk than a  
25 regulation that is deterministic. That is my personal

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1 view.

2 The second point I would like to make is  
3 that we keep talking about the public. Well, let's  
4 not forget this is kind of an amorphous entity. Who  
5 is the public? I mean, usually when a proposed rule  
6 or some other regulatory document goes out for public  
7 comment, I mean, it says, "Public Comment."

8 And we ask the staff, you know, "Who were  
9 the public that responded?" It's typically NEI.  
10 Sometimes you get other people, but most of the time,  
11 the overwhelming number of comments comes from NEI.  
12 Is that the public? Of course, they are part of the  
13 public, but that is not the public.

14 So I don't know. I mean, people have been  
15 talking about these things now for 30 years or 25  
16 years without answers. So it's not an issue that is  
17 unique to us, it seems to me.

18 And one of the best statements I heard  
19 from a senior NRC manager years ago when somebody  
20 asked at a meeting -- he was describing to us a  
21 meeting. So one of us asked, "Was the public there?"

22 And he said, "Yes, we were."

23 (Laughter.)

24 MEMBER APOSTOLAKIS: I think we are the  
25 real public interest group. You are.

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1 COMMISSIONER JACZKO: Well, it's  
2 interesting. And I've given some talks on this  
3 recently, this idea of who the public is. And I think  
4 it is a lot broader, obviously, than the industry and  
5 I think than NEI or even, then, our staff. And I  
6 think the challenge is to recognize that and to  
7 recognize that sometimes we have to be more proactive  
8 in engaging the public and finding people within  
9 communities.

10 In most of our reactor sites, we have a  
11 good sense of who are people that can communicate to  
12 a broader audience and who are important people to  
13 communicate with. And I think that is an important  
14 thing to do.

15 You know, the way I looked at this  
16 recently because I have been thinking about this is I  
17 even looked at the issue of licensing. And I think  
18 the initial sense is that we issue a license for an  
19 applicant or a potential future licensee for them to  
20 do something. And I looked at that a little bit. And  
21 I thought about some cases where we have issued  
22 licenses and nothing has happened, PFS being a good  
23 example.

24 We issued a license to Private Fuel  
25 Storage. And today they are not building an

1 independent spent fuel storage installation at Skull  
2 Valley. Yet, we have issued a license. We have said  
3 it is safe to do that. And, yet, the governor is not  
4 convinced. A lot of state and federal elected  
5 officials are not convinced.

6 So I looked at that. And I thought, well,  
7 you know, I think we have to broaden our sense of who  
8 -- we're issuing licenses for the public. We're not  
9 issuing licenses for applicants. We're issuing  
10 licenses for the public because ultimately the public  
11 has to buy in and accept our decisions.

12 And if they don't -- and, you know, again,  
13 defined fairly amorphously, the public has the ability  
14 to stop those licensing actions. And I think that  
15 that was a very telling example to me. You know,  
16 there are obviously other examples on the power  
17 reactor side. So I think a lot of it really comes  
18 more towards being proactive in engaging those people  
19 earlier on.

20 You know, if we do a rulemaking, it's not  
21 sufficient to send it out in the Federal Register  
22 notice. We can go out and engage people and tell  
23 people we want their comments and we would like them  
24 to comment and tell us what they think.

25 You know, I think an example of a way that

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1 I think you can change this in a very concrete way are  
2 the annual assessment meetings we do. We do annual  
3 assessment meetings, and we do what we call public  
4 meetings, which is a meeting that we have with the  
5 licensee that the public watches. And the public  
6 usually at the ends gets an opportunity to ask  
7 questions or say things.

8 But when I look at this and think, well,  
9 what the public wants and the public being people in  
10 that community, local elected officials, local  
11 interested citizens, what they want, they want a  
12 meeting with the NRC.

13 I mean, when was the last time that the  
14 NRC went out during an annual assessment meeting and  
15 had a meeting without the licensee there but invited  
16 just the members of the public to come in and talk to  
17 them and tell them what is on their mind, what they're  
18 interested in, what they are worried about, what they  
19 think has been going well, what they like? That is a  
20 public meeting. That is not a meeting with a licensee  
21 in public.

22 And I think that those kinds of  
23 differences can go a long way towards more members of  
24 that public in a broader sense realizing that we are  
25 there as a resource for them as well as the licensee.

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1           And then, I mean, I think a lot of this  
2           came in the context of communicating risk. And I  
3           think to some extent it is easier to communicate a  
4           risk-informed regulation if you have the trust and  
5           confidence of the public in the technical  
6           underpinnings of that, that regulation, and that  
7           that's where the -- I don't think we fully have that  
8           with all segments of the public right now. And that  
9           is the difficult thing to communicate, the model that  
10          this is based on, and that the calculations are  
11          well-verified and the models are validated.

12                 What we can do right now is we can say  
13           that. If you don't have the confidence and full trust  
14           and confidence in the public, then you can't get to  
15           that next level of communicating it to them.

16                 But if you have that, then I think to some  
17           extent you are right. It is easier to describe and  
18           say what this regulation is doing if you can put it in  
19           a risk-informed way.

20                 MEMBER APOSTOLAKIS: I can give you  
21           another example, actually two or three. We do go out  
22           of our way, by the way, sometimes to communicate and  
23           get in contact with the public, like we had the  
24           subcommittee meeting on Vermont Yankee on site so the  
25           public could participate.

1 COMMISSIONER JACZKO: Yes.

2 MEMBER APOSTOLAKIS: But my colleague,  
3 Graham Wallis, likes to refer to the informed public.  
4 Sometimes we make a decision on a model or a method  
5 that we say for regulatory purposes is good enough,  
6 which I think makes perfect sense for us who  
7 understand the regulatory system.

8 But then this model, for whatever reason,  
9 can be reviewed or seen by experts in that particular  
10 field from a technical society who have nothing to do  
11 with nuclear regulation. And these guys might say,  
12 "Well, gee, you know, this is really pretty crude. My  
13 God, is that how you regulate nuclear reactors?" You  
14 are losing the confidence now of a well-informed  
15 member of the public. On the other hand, should we go  
16 and use the latest state-of-the-art models to  
17 regulate? That's also infeasible.

18 So there are these conflicts sometimes.  
19 And we have to be, you know, current, in some sense  
20 but not too current. And, in other words, this points  
21 again to the difficulty of communicating with the  
22 public who the public are.

23 And then we had the lady here, just to  
24 finish the example, I remember a few years ago.  
25 That's a terrible thing to say, but I was here. And

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1 she complained we were using language she couldn't  
2 understand.

3 And we had to point out to her finally  
4 that, look, these are technical matters. I mean, you  
5 have to use this language. We cannot simplify  
6 everything so that everybody can understand what we  
7 are talking about.

8 Maybe in a meeting with the public like  
9 you mentioned one should try or would try to avoid  
10 using these technical terms, but when the public is  
11 here and we are discussing a power uprate or a license  
12 extension, you must use this language.

13 So it's a very difficult subject. It's  
14 not just that it's our fault as an agency. I mean,  
15 it's very difficult to communicate to people and which  
16 people are you addressing.

17 COMMISSIONER JACZKO: No. Absolutely.  
18 And I certainly don't want to characterize this at all  
19 as that this is something. I think that this agency  
20 strives --

21 MEMBER APOSTOLAKIS: I know.

22 COMMISSIONER JACZKO: -- to do it. And it  
23 is a challenge.

24 MEMBER APOSTOLAKIS: Yes.

25 COMMISSIONER JACZKO: I do have to say I

1 think that ACRS, for instance, and ACNW, too, you have  
2 much more of your discussions in public probably than  
3 a lot of other agency actions. And I always point to  
4 this in the sense that it is doable. I think we can  
5 do more to do that because I think people appreciate  
6 that and they see that.

7 And I think that a lot of the members of  
8 the public do understand, you know, the reason we're  
9 all paid to do this is because we have a certain  
10 expertise that they don't have and that they're not  
11 expected to have and that that is why we are here.  
12 But it really relies on that trust and confidence.  
13 Making sure that they have that allows us to then do  
14 those things and have the technical discussions when  
15 they need to have it.

16 But I think that's, for instance, why ACRS  
17 is such a crucial entity, because it does provide, I  
18 think, an independent view. And I think that a lot of  
19 members of the public view that, view ACRS as really  
20 an independent look at the agency and the actions that  
21 we are taking; in particular, from the technical side.

22 MEMBER APOSTOLAKIS: Some people actually  
23 read our transcripts.

24 COMMISSIONER JACZKO: Yes, yes.

25 MEMBER MAYNARD: Well, I agree that

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1 communications is the real key.

2 COMMISSIONER JACZKO: Yes.

3 MEMBER MAYNARD: But you can't wait until  
4 you have an issue to deal with. It really has to be  
5 built up over time and has to be kind of an education  
6 process and a feedback process to develop confidence  
7 and to get the input and stuff from the people.

8 So I agree. And I think that it's  
9 something that both the industry and the NRC can do a  
10 better job of over time in those communications.

11 I am not sure we will ever get to the  
12 point where we will always have full concurrence on  
13 everything before we can do it because ultimately we  
14 have to regulate the safety aspects.

15 That doesn't mean that we regulate whether  
16 it actually ever gets done or not. There are other  
17 processes to deal with public opinion and everything.  
18 But I think that we certainly need to communicate  
19 enough to know that we have any safety concerns  
20 addressed and dealt with there.

21 COMMISSIONER JACZKO: Yes. I think you  
22 make an excellent point. And, again, a lot of it is  
23 resource limitations. We go out to the public when we  
24 have to. And I think that we can do a lot more to go  
25 out when we don't have to because that's when you can

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1 have discussions and you can build that confidence and  
2 build up the trust because people have an opportunity  
3 to talk to you when there isn't necessarily a conflict  
4 in place.

5 I mean, so many of our processes where we  
6 interact with the public are inherently  
7 confrontational. Our licensing proceedings are  
8 inherently confrontational, which I think is some  
9 extent unfortunate.

10 Even our rulemakings sometimes can be  
11 somewhat of a confrontational process where we have a  
12 proposal. We want to know what everybody thinks of  
13 it. It's still a little bit of a -- you know, there  
14 is something that people are kind of either supporting  
15 or opposing.

16 And, you know, I think it is important  
17 that we go out earlier and establish those  
18 relationships, establish those communications when we  
19 don't necessarily have an issue to address because  
20 that can tend to I think reinforce the support you  
21 need when the larger issues do come up.

22 MEMBER BONACA: It's interesting. You  
23 know, a comment was made to me regarding risk-informed  
24 regulation. And I have defended it. Clearly the  
25 comment was made by somebody who was not very

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1 sympathetic to nuclear energy was that "Yes, but all  
2 licensing actions you are supporting are to relax the  
3 current regulations."

4 And it's very hard to communicate that.  
5 That may be very well because deterministic process  
6 has provided quite a bit of margin to these plants.  
7 And you can relax some of them without undue risk, in  
8 fact.

9 But it is a very hard message to give  
10 because the results of that are true. I mean, there  
11 is that tendency there.

12 COMMISSIONER JACZKO: Well, I think part  
13 of what I say -- and I brought up, I think, 50.46. I  
14 think that that is a lot of what was going on with  
15 50.46. I mean, I think there was an attempt -- there  
16 is a lot of margin with the existing rule. We have  
17 better analysis techniques now that we can better  
18 quantify what that margin is. And it may show that  
19 there is a lot of margin.

20 But I look at that from the perspective,  
21 then, of, what problem are we trying to solve there.  
22 As a regulatory agency, I don't know that there is any  
23 need to erode that margin. And that is why I look at  
24 that role and I say, "I don't think there is something  
25 there that we need to move forward with."

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1           In contrast here, I think the fire  
2 protection risk-informed regulation, where we have a  
3 rule right now where it's unclear what our margin is,  
4 quite frankly, I think with that, so by going to a  
5 risk-informed regulation, I think we have ability to  
6 better quantify the margin we have.

7           And so I look at those two things. And I  
8 think in that case, in the latter case, there is a  
9 reason to move forward. In the first case, I'm not  
10 necessarily convinced that there is a reason to move  
11 forward.

12           And so I think that some of those concerns  
13 can be legitimate. And I think, again, there may be  
14 sufficient margin, even if we relax some of the  
15 standards. But, again, I think that gets into a  
16 question of what is the regulatory reason we are doing  
17 that.

18           And that is where I think you do sometimes  
19 generate this concern that the motivation is to help  
20 the industry or something like that when that may  
21 certainly be why they are asking because I have seen  
22 a business incentive to be able to produce more power,  
23 whatever the case may be, which are legitimate, again,  
24 from the perspective of an industry.

25           I don't know those necessarily should be

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1 a reason to make a regulatory decision in that case  
2 with something that I think, for instance, is such a  
3 fundamental piece of our regulatory infrastructure

4 You know, I always look at it, you know,  
5 we have such margin there. Well, we should have  
6 margin there because basic safety systems of our  
7 plants have been designed to have margin there. And  
8 that's why it's a minimal contributor to core damage  
9 frequency and all those kinds of things.

10 I think, again, a lot of those issues come  
11 back to communication and come back to the agency  
12 making tough decisions sometimes. And we often make  
13 tough decisions. We often make decisions that go the  
14 other direction, that don't necessarily go towards  
15 facilitating a licensee action. And I don't think we  
16 do a good enough job sometimes of communicating those  
17 and of letting the public know when we're doing those  
18 things, which, again, helps to demonstrate that we are  
19 looking at it in an objective manner.

20 But I think a lot of you have said these  
21 are very challenging issues and one that with this  
22 particular technology seems to have developed a set of  
23 very interested followers. And it's a technology that  
24 has been controversial.

25 But I tend to think that the way you deal

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1 with that controversy is you have to meet it head-on  
2 and really work and listen and understand what the  
3 concerns are.

4           You know, somebody asked me something  
5 about this recently. I said, you know, nobody is ever  
6 born anti-nuclear or pro-nuclear. They haven't found  
7 the anti-nuclear or pro-nuclear gene yet. And, you  
8 know, I think a lot of it is education and  
9 communication. You know, I think sometimes we often  
10 look at people who are critical of this agency, with  
11 the exception probably of ACRS. And we think that  
12 inherently I think we want to say that people who are  
13 critical of this agency are doing it because they're  
14 anti-nuclear.

15           And I think that if we do that, I think  
16 that that is an unfortunate assumption to make because  
17 I think there is a lot of value that critics can add  
18 to any discussion. And I think to some extent, they  
19 are the people who are sometimes the most fruitful to  
20 listen to.

21           It doesn't mean we have to respond and  
22 always do what our critics say, but it often gives you  
23 good insights about where you are failing and if we  
24 are getting things back from the public and even if  
25 it's a segment of the public that I think has an

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1 agenda that may be anti-nuclear.

2 I think I always have to ask myself,  
3 "Well, is that message resonating?" And if it is  
4 resonating among people who may not have a particular  
5 agenda, that shows us that we have more work to do to  
6 communicate, that our work is not getting properly  
7 communicated, that the things that we are doing and  
8 the decisions that we are making, you know, assuming  
9 that they were correct are not being successfully  
10 communicated to a lot of segments of the public. And  
11 I think that is something we have to continue to work  
12 on.

13 CHAIRMAN SHACK: I am interested in how  
14 you measure acceptability of a risk-informed change  
15 that may lead to burden reduction. You're skeptical  
16 about 50.46 because you think it is basically largely  
17 a burden reduction.

18 And, you know, when we come to PTS, that  
19 will be largely a burden reduction. You know, nobody  
20 is going to argue the pressure vessels are going to  
21 get better as they get more irradiated.

22 COMMISSIONER JACZKO: Yes, yes.

23 CHAIRMAN SHACK: That's a burden --

24 COMMISSIONER JACZKO: PTS, on that one, I  
25 was not particularly supportive of the approach we

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1 were taking for that reason, because I think --

2 CHAIRMAN SHACK: So you are consistent on  
3 that point of view that burden reduction is not a  
4 sufficient argument in your --

5 COMMISSIONER JACZKO: Well, I think -- and  
6 I don't know if I want to --

7 CHAIRMAN SHACK: Even if you can  
8 demonstrate you have the acceptable risk.

9 COMMISSIONER JACZKO: And I think that  
10 comes down, I think, to some extent to a broader sense  
11 of what burden reduction means. I'm sorry. If you  
12 wanted to say something else, I didn't want to cut you  
13 off there.

14 But I think on both of those cases, what  
15 I looked at, it's not so much that there's burden  
16 reduction coming out. What I see is in the end, you  
17 wind up with about the same perceived margin, I guess,  
18 if you will.

19 In things like 50.46(a), we have a sense  
20 of what our margin is right now. Improved analysis  
21 would tell us that that margin is probably bigger than  
22 we thought.

23 CHAIRMAN SHACK: Well, I mean, you have a  
24 sense of what your margin is now because your PRA  
25 tells you what your risk is from LOCAs.

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1 COMMISSIONER JACZKO: Yes.

2 CHAIRMAN SHACK: And, yet, you are willing  
3 to believe your PRA to tell you that you have achieved  
4 something, but you are skeptical about the ability of  
5 your PRA to say, "Well, if I did it" --

6 COMMISSIONER JACZKO: You know, I guess  
7 that we have --

8 CHAIRMAN SHACK: We can say that 50.46 in  
9 the deterministic sense is successful and that we have  
10 low LOCA frequencies, but if you look at different  
11 plants, all of which meet the deterministic rule, they  
12 have LOCA risks that go up and -- you know, it's not  
13 a totally successful thing. And, you know, do we  
14 really focus on risk or do we focus on the  
15 deterministic rule?

16 COMMISSIONER JACZKO: Well, I think, I  
17 guess maybe what I would say is that I think our sense  
18 of the margin that we had, say, with 50.46, let's say,  
19 before we got into PRA, we had a sense of margin. We  
20 have taken the PRA. And it has given us a more  
21 refined sense of what that margin is.

22 And it is that more refined margin that  
23 we're working on, but in the end, I think to some  
24 extent, we would make an argument that our actual risk  
25 has really been the same in both cases, that what we

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1 thought we were doing was safe before. If we were to  
2 accept 50.46, we're saying it's still the same level  
3 of safety, really, that we had before. We just have  
4 a better understanding of quantifying that so we can  
5 make other performance changes.

6 But in the end, most utilities want  
7 50.46(a) because they want to put margin in that,  
8 through power uprates or other operational changes,  
9 they will be able to eat back.

10 So the net outcome in that case is really  
11 going to to some extent be the same level of safety  
12 that we had before or in a perceived sense of the  
13 safety. So we're giving margin to take back.

14 And that makes me a little bit  
15 uncomfortable, not because, again, I have some  
16 skepticism of the calculations of the margin from the  
17 PRA that I don't know that that is a number that is  
18 reliable enough for me to say, "I am willing to take  
19 it away to give it back."

20 Now, if what we were doing with 50.46(a)  
21 was saying, "Based on my analysis, I find that I have  
22 greater margin from ECCS because of PRA. And there  
23 are other chains that we need do.

24 For instance, there is another safety  
25 issue that comes up and says, "But we have determined

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1 that there is a risk from some other element of plant  
2 operation. And we think there is improvement to  
3 safety that could be made to that area of plant  
4 operation or performance, but it would require some  
5 modifications to ECCS that would eat away at some of  
6 that margin."

7 Then I'm more comfortable with the change  
8 in the ECCS sense that we erode some of that margin,  
9 but we're doing it because we are gaining margin  
10 somewhere else or we are improving safety elsewhere.  
11 And I think that's where I tend to look at some of  
12 those things if that makes sense in how we do it.

13 I mean, it is a complicated issue. I  
14 mean, one of the things I think the Commission is  
15 dealing with right now is taking a look on  
16 recirculation where we have always operated under the  
17 principle of automatic containment spray actuation on  
18 a LOCA, medium or large LOCA.

19 Well, that is an assumption that is part  
20 of our ECCS rule. That is not a specific requirement  
21 in the rule, but it's part of the operational  
22 procedures that we have had in place, which has turned  
23 out now that has contributions to the uncertainties we  
24 have in the potential for sump clogging.

25 So we have utilities now that are coming

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1 in to pilot modifying their containment spray  
2 actuation because it may wind up that it gives us  
3 better performance in long-term recirculation if we  
4 don't automatically actuate containment sprays.

5 You know, there is where I think we take  
6 a look at some of those. And then we rely on some of  
7 those risk tools, you know, to tell us what we need to  
8 do from an overall safety perspective and see, you  
9 know, is there a reason there to make a change.

10 You know, are we better off not going  
11 through our water inventory simply to actuate  
12 containment sprays to solve a problem that may not be  
13 there when all it does is dump more water into  
14 containment, release more debris that may wind up  
15 clogging a recirculation that you have to go to  
16 earlier?

17 So there is where you start to get into  
18 situations where it may make sense to make some  
19 changes to our ECCS practices. And that is one of the  
20 -- you know, diesel start times was really one of the  
21 other outcomes that we would have gotten from an ECCS  
22 rule, is relaxing diesel start times.

23 You know, again, that may be something  
24 that can be looked at without a modification to the  
25 large break, to the size of the large break. And so

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1 there may be safety issues in there where there is the  
2 opportunity to get improvements in safety or a better  
3 overall safety net, I think, as it works together.

4 But no. It is certainly a challenge, I  
5 think, nonetheless, with how we deal with a lot of  
6 this risk information, how we work through it. But on  
7 PTS, I was somewhat consistent, I think.

8 MEMBER MAYNARD: Well, I think you have to  
9 look at each one of these individually, but I do think  
10 that many of the burden reduction ones, it really  
11 allows focusing resources and time on other issues  
12 that we have less margin.

13 So I think that ultimately it ends up in  
14 an improvement, a balancing of the margins there.  
15 Again, it has to be looked at on a case-by-case basis  
16 because there are exceptions to that, too.

17 But usually those types of benefits we  
18 don't always highlight or communicate very well when  
19 we are actually trading margin, where we have more  
20 than we need here, less than what we would like to  
21 have here and we can trade that out.

22 MEMBER BONACA: Part of the concern with  
23 margin, I mean, speaking just for myself, is tied to  
24 the fact that if you do not cash it is for a power  
25 uprate, you just simply relax certain parameters, et

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1 cetera, then I am very comfortable with it.

2 When I cash in a 20 percent power uprate  
3 with the margin that I see from the LOCA, I am making  
4 a statement that I understand the margin so well I can  
5 cash in this piece here and be sure that I still have  
6 the same margin.

7 COMMISSIONER JACZKO: Right.

8 MEMBER BONACA: I don't have their  
9 certainty. And that is why I personally have been  
10 troubled by the concept of this change.

11 COMMISSIONER JACZKO: Yes.

12 MEMBER WALLIS: And there's also how you  
13 use new information. We learn more about what we're  
14 doing all the time. It may well be that a number x  
15 that's a criterion for something because of a lot of  
16 new information, new designs is no longer appropriate.  
17 You need number y. That's not really burden reduction  
18 or giving away margin.

19 COMMISSIONER JACZKO: Right.

20 MEMBER WALLIS: It is simply using better  
21 information.

22 MEMBER APOSTOLAKIS: And if we can come  
23 back to the issue of communication and trust -- and  
24 let's not forget one of the most important  
25 stakeholders we have is the industry itself. If they

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1 feel that the regulations are arbitrary, that's not  
2 good.

3 COMMISSIONER JACZKO: Right.

4 MEMBER APOSTOLAKIS: If we start building  
5 the image that our regulations are rational, then I  
6 think everybody benefits from that. So it's a much  
7 more complicated figure.

8 COMMISSIONER JACZKO: Yes. You know, I  
9 certainly --

10 MEMBER APOSTOLAKIS: Can I change the  
11 subject?

12 COMMISSIONER JACZKO: Sure, absolutely.

13 MEMBER POWERS: Let me ask you a question.

14 (Laughter.)

15 MEMBER APOSTOLAKIS: I wanted to change  
16 the subject really quick. Go ahead.

17 MEMBER POWERS: I wanted to ask you a  
18 question. One of our obligations is to write to the  
19 Commission about the NRC's research program. Give us  
20 an idea of what you would like to see in that report.

21 MEMBER APOSTOLAKIS: Good idea. good  
22 question.

23 COMMISSIONER JACZKO: Well, I think one  
24 thing that I would like to see is a sense of  
25 capabilities, our capabilities domestically versus

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1 internationally, what kinds of things we have the  
2 ability to do in this country and what kinds of  
3 things, more importantly, we don't from a research  
4 standpoint. I think that's an important thing to  
5 understand from our research program.

6 Now, probably the biggest challenge to  
7 some extent in this area is that the NRC's research  
8 program is really a very small research program. And  
9 it really to some extent isn't a research program in  
10 the sense of certainly a national lab or something  
11 like that. We don't do a lot of basic or even really  
12 true applied research. A lot of it is user need.

13 And I think the Commission right now,  
14 several commissioners I think are reexamining if  
15 that's the appropriate focus or whether we should try  
16 and develop a research program that is more  
17 forward-looking and more focused on, really, to some  
18 extent more, I guess, if I could call it basic applied  
19 research and really just looking at applied research,  
20 looking at reactor physics and these kinds of things  
21 and identifying potential problems, identifying areas  
22 where our understanding can be improved.

23 You know, our research really tends to be  
24 focused very much on solving, on assisting regulatory  
25 decision-making. And, again, with resource

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1 limitations, that's obviously I think the first thing.  
2 But I think then there is some sense of whether or not  
3 we should be looking beyond that and whether we should  
4 be looking to get resources to do a little bit more of  
5 the kind of the outside the box research and thinking.

6 But certainly from a practical standpoint,  
7 I continue to wonder, you know, are we doing research  
8 in the right areas, are we doing confirmatory research  
9 to support our modeling, to support our technical  
10 basis? Are we doing that? And do we have that, the  
11 expertise and the infrastructure in this country to do  
12 that or do we need to be more involved with  
13 international collaborations to get access to that?  
14 And those are some of the things that I would be  
15 interested in seeing.

16 MEMBER ARMIJO: I just came back from  
17 Japan a couple of weeks ago. And I had a chance to  
18 attend a regulatory conference there. And I was  
19 impressed with the planning on the issue of plant  
20 aging. Their planning encompasses the academic world,  
21 the government, and industry. And they are much  
22 better tied together.

23 Their planning is integrated. Yet, they  
24 can still be regulatory. And it seems that if they do  
25 it right, they can make their research dollar go a lot

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1 further.

2 And I see in the United States -- and we  
3 have always been that way -- we sort of get together.  
4 We sort of fill the blanks with industry doing things  
5 and the agency doing other things. But I just don't  
6 think we do it as well as we could. And I don't know  
7 if it's because of our philosophy that, well, they're  
8 the licensees, we're the regulators, and we have to  
9 stay at arm's length.

10 We violate that because we do have joint  
11 programs here and there and everywhere, but we don't  
12 seem to have a policy that says, "Hey, it's okay. We  
13 should encourage this cooperation so we really get the  
14 most from our research dollar."

15 And I was wondering what your thoughts  
16 were on that subject, stick with a strictly  
17 confirmatory research role or kind of broaden it so we  
18 can get ahead of some of these problems, rather than  
19 just reacting to them.

20 COMMISSIONER JACZKO: I think there are  
21 two issues here. I do think given our system, we have  
22 to have a lot of that separation, I think, in terms of  
23 collaborative research with licensees or with specific  
24 industries if it's on a problem, a regulatory problem,  
25 that we may be trying to resolve. I think there has

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1 to be a separation there.

2 But I think where the issues are is more  
3 -- I think DOE has moved away from research in this  
4 area. And I think DOE really has more of the  
5 responsibility to fulfill that role where they do the  
6 collaborative work, where that is an appropriate thing  
7 to do. I think that is really more of a DOE mission.

8 But I think that, you know, they don't  
9 have a regulatory role. So we see I think the  
10 consequences of some of that research not happening  
11 when we're faced with trying to answer questions that  
12 we don't have a research basis to support.

13 So I think part of it is perhaps better  
14 coordination between our agency and DOE to make sure  
15 that DOE is fulfilling that role of doing more of that  
16 research.

17 MEMBER ARMIJO: That research that -- DOE,  
18 of course, is more focused on the new generation or  
19 advanced reactors and new processing and not the  
20 near-term or old problems that the water reactors,  
21 lightwater reactors, are working on. So, in fact, I  
22 don't know hardly any DOE programs in that area. So  
23 that's kind of a blank.

24 COMMISSIONER JACZKO: Yes. And I went to  
25 a university that has a nuclear engineering program.

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1 And I was talking to some professors there. And they  
2 said, "You know, you, as the NRC, you need to start  
3 doing more research in all of these exotic and  
4 advanced reactor things so that we will get students  
5 to be interested in nuclear engineering."

6 And I said, "Well, there are a lot of  
7 interesting issues with the operating fleet that we  
8 need people to focus on." But I think that there is  
9 a broader sense right now that you have to stimulate  
10 the academic programs, to stimulate the students that  
11 the research needs to be on the advanced things, that  
12 that is where the interest will lie.

13 I think that is unfortunate because I  
14 think there is plenty of interest in exciting -- I  
15 mean, I just look at the sump issues we have been  
16 dealing with. I mean, I am not a chemist. I am not  
17 really a scientist. But there is basic chemistry in  
18 there. I don't think it was -- you know, there was  
19 some basic chemistry involved that you could do  
20 probably in undergraduate labs, quite frankly. And  
21 nobody was doing it.

22 But, yet, it had profound -- I mean, there  
23 were really fascinating results. I mean, the things  
24 that we saw from that research, very interesting and  
25 exciting research that people could have done, I

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1 think, not to diminish any of the work that went on at  
2 Argonne.

3 (Laughter.)

4 COMMISSIONER JACZKO: I am not trying to  
5 say that your --

6 CHAIRMAN SHACK: Mixing calcium and  
7 phosphate together to get a precipitate is not high  
8 tech chemistry.

9 COMMISSIONER JACZKO: Exactly.

10 CHAIRMAN SHACK: I would like to know if  
11 Oak Ridge couldn't get it done.

12 COMMISSIONER JACZKO: Those are the kinds  
13 of things that an undergraduate could work on and have  
14 an immediate impact, you know, have published or even  
15 be involved in working toward regulatory  
16 decision-making. So I think it's unfortunate that  
17 people don't see the opportunities for research with  
18 existing plants or even just all the modeling areas.

19 I mean, the work that we have gone on on  
20 fire modeling and the confirmatory research that  
21 they're doing now with the CAROLFIRE study, they're  
22 pulling University of Maryland students to do that.  
23 And that is very I think really cutting-edge fire  
24 modeling work. But it's really dealing with the  
25 existing plants. I think there are a lot of

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1 interesting things that can be done in that area. So  
2 yes.

3 Anything else?

4 MEMBER APOSTOLAKIS: Well, let me ask my  
5 question. You don't have to answer it. It is the  
6 nature of this Committee to critique other people's  
7 work. And most of the time it is the staff's work --

8 COMMISSIONER JACZKO: Yes.

9 MEMBER APOSTOLAKIS: -- but sometimes the  
10 industry's, too, which, of course, you know, having  
11 been criticized myself, I don't particularly like  
12 having other people telling me what to do.

13 I'm wondering since you are the  
14 decision-makers what you hear from other people about  
15 us. Can you tell us?

16 (Laughter.)

17 MEMBER CORRADINI: You can redact it,  
18 summarize it, integrate it.

19 COMMISSIONER JACZKO: I will tell you  
20 this. I have been in the elevator at times where I  
21 hear --

22 (Laughter.)

23 COMMISSIONER JACZKO: -- staff talking  
24 about the -- I think it's considered a rite of passage  
25 among the staff the first time that they have to sit

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1 probably I guess in this seat and go through the  
2 question and answer period with the committees. But  
3 I think, I mean, my sense is that the staff  
4 appreciates the feedback and the input.

5 And I think, you know, this is viewed as  
6 -- as I said, I think it's good to have people  
7 critiqueing what we do. It's good to have people who  
8 are looking to figure out where the problems are so  
9 that we know and we can address them.

10 And I think that I look -- every time I  
11 see a letter come in it's rare that I see a staff  
12 response that doesn't, by and large, accommodate all  
13 suggestions of ACRS. And I think that's a recognition  
14 on the part of the staff that it is valuable to have  
15 the interaction and the discourse. I think it --

16 MEMBER POWERS: Or they don't want to come  
17 back.

18 (Laughter.)

19 COMMISSIONER JACZKO: That could be, too.  
20 But I certainly think it is valuable. And I think the  
21 Commission uses often the work that comes from here.

22 And I think it provides a useful input.  
23 And I have some ideas of some things where I think it  
24 would be good to get ACRS to weigh in on and a couple  
25 of things that I think would be useful.

1                   So I think it's certainly valuable. And  
2 I think it's a good body. Yes.

3                   MEMBER APOSTOLAKIS: Thank you.

4                   COMMISSIONER JACZKO: Sure.

5                   CHAIRMAN SHACK: Well, thank you very much  
6 for coming down and for giving us the opportunity to  
7 have a less formal discussion than we do at our  
8 six-month interactions.

9                   COMMISSIONER JACZKO: Sure, absolutely.  
10 Well, I appreciate it. And I appreciate you taking  
11 the time to share your thoughts with me. I think it's  
12 been very informative. Thank you.

13                   CHAIRMAN SHACK: Thank you.

14                   (Whereupon, the foregoing matter was  
15 concluded at 2:56 p.m.)

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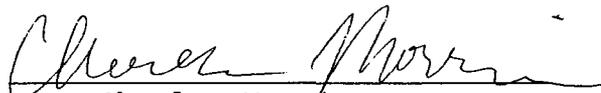
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541<sup>st</sup> Meeting

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