UNITED STATES

NUCLEAR REGULATORY COMMISSION

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MEETING WITH THE

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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THURSDAY,

APRIL 6, 2017

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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 10:00 a.m., Kristine L. Svinicki, Chairman, presiding.

COMMISSION MEMBERS:

KRISTINE L. SVINICKI, Chairman

JEFF BARAN, Commissioner

STEPHEN G. BURNS, Commissioner

ALSO PRESENT:

ANNETTE VIETTI-COOK, Secretary of the Commission

MARGARET DOANE, General Counsel

ACRS MEMBERS PRESENT:

RONALD BALLINGER, ACRS Member

DENNIS BLEY, ACRS Chairman

DANA POWERS, ACRS Member

PETER RICCARDELLA, ACRS Member

JOHN STETKAR, ACRS Member

P R O C E E D I N G S

10:05 a.m.

CHAIRMAN SVINICKI: Well, good morning, everyone. We meet this morning for something that's always a highlight of our year which is our meeting with the Advisory Committee on Reactor Safeguards.

This is our semiannual meeting and we meet with this independent advisory body to hear their views. We are, of course, recipients of their letter reports on various topics that they review under statute.

But today we will highlight some of their recent work and we will engage between the Commission and the members on these topics recently reviewed by the committee or I guess on our part any other topic we care to raise.

So we always look forward, again, both to the written letter reports of the committee and also to these engagements here in public session.

Before we begin I will ask my colleagues if they have any opening comments. Okay, well we can get right to it then.

I will turn the meeting over to the committee's chairman and ask you to begin. And if each of the presenters can then probably just hand off to each other as you do in your typical fashion. And after that we have a Q&A with the Commission. Thank you and good morning. Please begin.

MR. BLEY: Thank you, Chairman. Good morning. I guess I will wait for the first slide.

Since our last meeting next one please with the Commission back in October we've issued 14 reports. The first five that I go through are the ones that

will be presented this morning.

The first one will be presented by Dr. Powers and that's our report on 10 CFR Part 61, low-level waste.

The second one is our report on a series of reports related to APR1400 including various chapters of the design certification, an interim report, and two topical reports, one on the critical heat flux correlation and one on the fluidic device design that controls passively the safety injection tank flow following a LOCA.

Next, Dr. Riccardella will present our review of the regulatory guidance for evaluating the effects of light-water reactor environments in fatigue of metal components.

Finally, Mr. Stetkar will present two of our final reports on Fukushima. The first is on the draft final rule on mitigation of beyond design basis events, and the second is on recommendations related to the evaluation of natural hazards other than seismic and flooding. Also periodic confirmation of natural hazards and real time radiation monitoring.

Also, during this period we reviewed one COLA for North Anna. We had one license renewal application for Grand Gulf.

And we had a couple of guidance reports. We looked at the proposed revision to NUREG-1530 which is the dollars per person rem value guidance.

And we reviewed Reg. Guide 1.26 Revision 5 which dealt with the water, with quality group classifications and standards for water, steam and radioactive waste-containing components at nuclear power plants. Next slide please.

We also looked at the Monticello license amendment request for operation

in the extended flow domain. That's kind of like what we've talked with you before on MELLA Plus, but this one's for the AREVA design.

Also, non-LWR vision and strategy near-term implementation action plans, and the associated advanced reactor design criteria.

We also looked at our own report on the assessment of the quality of selected NRC research projects being performed by Research.

In our ongoing work next slide please we're looking at two design certifications, the APR1400 which is continuing work and NuScale which has just arrived.

We also are looking at the construction permit for another new moly-99 facility, Northwest Medical Isotopes, and there's power uprate for Browns Ferry that started a long time ago, was deferred, and now it's come back. And I guess I'd mention this time it comes in with no credit for containment accident pressure.

License renewals, we have three: South Texas Project Units 1 and 2, Seabrook, and Waterford.

Also, for AP1000 there's a WCAP related to GSI-191 sump debris issues. Next slide.

We looked at the guidance for subsequent license renewal and a review of the guidance for cost-benefit analysis. We're working on those letter reports this week.

Metallurgy and reactor fuels area, we're continuing our review of the consequential steam generator tube rupture work as well as consolidation of dry cask and dry fuel storage standard review plans.

In the digital I&C area we've got three topics we're following: fuel cycle facility cybersecurity rule, and our report on that will come out in a month or two, 10 CFR 50.59 guidance, and diversity in defense-in-depth against common cause failure. Next slide.

In reliability in PRA we're continuing our review of the Level 3 PRA and the human reliability analysis methods development.

We're also looking at the Westinghouse shutdown seal for reactor coolant pumps.

And finally on the last slide from me, the thermal hydraulic phenomena, Aurora B Transient Code Suite PAD5 which is a Westinghouse performance and design model.

And two GSI-191 issues, both the PWR Owners Group debris test results and the South Texas risk-informed license amendment request.

At this time I'll turn it over to Dr. Powers to bring you up to date on the low-level waste 10 CFR Part 61. Dana.

Dr. POWERS: I'm going to discuss this proposed revision to 10 CFR Part 61.

This has been an activity underway for about a decade. And I come before you not as someone with particular expertise in low-level waste, but rather someone who has been at least in attendance throughout this process. I have the first slide please.

The current rule on low-level waste disposal was originally envisioned for relatively short-lived material. A period of institutional control of about 100 years

was envisioned.

And then there would be a period after institutional control had lapsed in which most of the radioactivity would disappear as a result of decay.

The motivation for regulatory change is the proposal to dispose in these shallow facilities depleted uranium.

The fuel enrichment process has generated about a million tons of uranium hexafluoride that they propose to reduce down into an oxide form and place into a shallow disposal facility.

Now, depleted uranium is a most unusual waste product. Its chemical toxicity in fact is about a million times its radiotoxicity.

The material, the uranium-238 isotope has a half life of about four and a half billion years. The 235 makes up about three-tenths of a percent have a half life of about seven-tenths of a billion years. So it's no longer short-lived material.

The material decays slowly and eventually becomes into a quasi-steady state with the radioactive products after about 200,000 years.

The hazard posed by the material is largely one of inhalation and ingestion because the decay is predominantly beta and alpha decay. The next slide.

The staff has come up with a rule. And I must say that their effort to accommodate all the stakeholders in this process has been truthfully heroic.

They've had lots of help. They've had certainly help from the licensees, from the agreement states. The Commission has offered its help. The ACRS has written many times on this.

They have a review that has a performance metric in it. It's a dose limit.

That dose limit is completely consistent with the Commission's latent cancer safety goal.

They've defined two time frames following the lapse of institutional control of 1,000 years.

The 1,000-year time frame is not in light of all the uncertainties very different than the 500-year evaluation period in the current rule.

Then there's a 10,000-year compliance period that's for those licensees that choose to accept into the repository very large quantities of these long-lived radioisotopes.

The 10,000-year time frame seems to have come from the requirement the Commission has placed for an intruder analysis, an inadvertent intruder who, following the lapse of institutional control might come onto this site and live there, or burrow down into the waste.

The rule does have a requirement for waste acceptance criteria. These are now site-specific rather than generic in nature.

They do require that there be a performance assessment for the repository. And they make that requirement to include preexisting waste whether or not the repository will accept these long-lived isotopes.

In fact, many of the repositories have already accepted a certain amount of depleted uranium into the site, though nowhere near the quantities that we're talking about now.

The recent ACRS letter is one of several we've written on that. Our conclusion is the revised rule will provide adequate protection of the public health

and safety.

The rule has its complexities and those complexities reflect the attempts by the staff to try to accommodate multiple views on this issue.

The ACRS certainly would have preferred for a more central role in using the quantitative output from a performance assessment.

In particular, we would like to understand well how uncertainties make it possible that many of the complexities do not augment the safety to the public health and safety in a meaningful way.

We would have preferred the preexisting waste be treated on a case-by-case basis, especially in those cases where the records are poor on the waste in place.

We certainly have not identified any reason to think those waste placed under the current rule pose any new threat to the public health and safety.

Our general conclusion, however, is that we've worked pretty long and hard on this. The rule may not be perfect in anyone's mind, but it certainly will be adequate to protect the public health and safety.

At this point I'll turn the floor over to Dr. Ballinger.

Dr. BALLINGER: Good morning. As you know were the staff is in the process of reviewing the DCD for the APR1400 certification.

And the ACRS is reviewing chapters as we get them.

And in addition, we've reviewed not only chapters, but the topical reports as Chairman Bley has mentioned.

By way of background KHNP submitted a design certification in December

2014. The application included the DCD and associated topical and technical reports. Next.

As of now we've submitted a letter where we have reviewed SERs for Chapters 2, 5, 8, 10, and 11 with open items as well as two topical reports.

I might add that we've subsequent to that been reviewing several other chapters so we're quite well along.

The staff's SER and our review of these chapters was based on Rev. 0 of the DCD along with supplemental material including KHNP responses to RAIs, requests for additional information.

You'll be pleased to know that our reviews to date have not identified any significant issues. And that goes as well for chapters that we're not reporting on here.

We have had a few recommendations, one of them being the design certification should be explicit that it's for a single-unit plant with a base load operation that's not made clear enough we think.

The staff should confirm that the shutdown cooling pump can provide automatic containment spray flow during conditions when the suction paths to the associated containment spray pump are isolated.

That may seem like kind of a nit-pickier thing, but it's really not.

With regard to the fluidic device, that's one of the unusual features of the APR1400. It's a passive device that controls water flow during a loss of coolant accident that is actually pretty novel.

It's a safety injection tank, but a difference from current designs as I said.

The topical report describes the safety injection tank device design, its principles of operation, and important design features, as well as full-scale experiments confirming its performance. So I would stress that they did do full-scale testing of this device.

The conclusion then is that the device, the design testing and evaluation are acceptable and conform to the design and performance requirements.

Regarding the critical heat flux correlation, the KCE-1 -- K I think stands for Korea, CE stands for combustion engineering -- heat flux correlation.

We reviewed the topical report that justifies the use of this correlation for the fuel, the so-called PLUS7 fuel for the reactor.

Our conclusion here is that it gives you reasonable assurance that the use of this critical heat flux correlation is acceptable for calculating critical heat flux for the PLUS7 fuel design given -- assuming that the fuel conditions and limitations identified by the staff are met.

And that concludes my presentation. Thank you.

MR. RICCARDELLA: Hi. I'm going to be a little change of pace and talk about environmental fatigue effects, environmental effects on fatigue analysis. Can I have the first slide please. Background.

So in the late nineteen sixties, early nineteen seventies, the ASME Board on Pressure Vessel Code developed fatigue curves for design of nuclear components.

At that time there was insufficient data to address the effects of reactor coolant environments, but they did introduce substantial safety factors including a

factor of 2 unstressed or 20 on cycles, whichever is greater, to cover things like data scattering.

At one time it was thought that that would also cover environmental effects, but it's turned out not to be the case.

In about 2007 as a result NRC sponsored research a NUREG report was published that indicated that the code fatigue curve did not adequately bound fatigue life in reactor water environment and proposed an adjustment factor known as the environmental fatigue factor FEN.

At the same time a reg. guide was issued, Reg. Guide 1.207 that basically endorsed the NUREG methodology.

It was applicable to new plants only. Operating plants under license renewal were addressed via the GALL report which endorsed the NUREG.

And significantly, the staff concluded that operating plants under the original licensing period didn't need to address this issue, that there was sufficient margin.

So we have a curve that -- this is a typical way to address metal fatigue. It's called an S/N curve, or a stress or strain versus number of cycles.

A good way to visualize this curve is if you think of a paperclip. I've got a standard paperclip here and I'm sure everyone has done this once in their life, has taken it and bend it. And if you bend it really hard you can make it break in 10 cycles or so.

So what you've done is basically plotted a point on the upper left-hand corner of this curve, a very, very high strain and maybe 10 or 15 cycles to failure.

Conversely, if I took this sample and just tinged it like that, let it vibrate, believe it or not you could break it. But you'd have to do it about a million times. You'd be way out on the right-hand side of that curve. That's low strain, high cycle fatigue. So that's what we're dealing with.

ASME ran a number of tests like that including intermediate conditions and developed this dash curve which is the mean curve. Of course there's statistical scatter. That was the mean of their data.

And then they impose what I mentioned, a factor of 2 or 20 on it and came up with the design curve which is the solid curve on this chart.

Well, as a result of the NRC and other research, international research elsewhere, we found that under certain environmental conditions the curve is not conservative.

In the little box you can see what the conditions are. I mean, if we do it at relatively low temperature, at relatively low strain rates we get the blue circles which are bounded by the curve.

Even at moderate temperatures you have points that are bounded by the curve.

But if you do it at high temperature, low strain rates under the certain types of conditions you can get points that fall below the design curve.

So, how is this used? Well, in design we talk about a cumulative usage factor. And basically what that is is just -- it's the ratio of the applied number of cycles at a given stress level at a plant to the allowable number of cycles.

So you think of the 10 cycles that it took me to break this paperclip. Well,

suppose in the reactor design I had three cycles of that loading. So that would be the first ratio would be 3 over 10, would be 0.3.

And so you add that up for all the cycles and the ASME code rule is that has to be less than one.

So, the NUREG and the reg. guide proposed this environmental fatigue factor which -- it's the ratio of the number of cycles to fail in air divided by the number of cycles in water which you know is greater than one if the water curve is lower.

But it was kind of clever in that they imposed this on each of the component cycles. So if you have different temperatures and different strain rates for different operating conditions you could have a different FEN for each of those conditions and take into account appropriately. And then you get an environmental cumulative fatigue usage factor.

Okay, so fast forward to 2017. A Rev. 1 to that NUREG was published, includes more recent fatigue test data since the original report.

It also incorporates some updates to the FEN equations to address some technical issues that were found with the original equations.

And significantly, they validated the methodology through some tests -- comparison to tests that better simulated actual plant conditions, different strain rates, different loading conditions, and actually even a test on a pipe that was subject to thermal stress loading. So they simulated actual operating conditions and demonstrated -- compared the methodology to that.

Simultaneously the staff is proposing to issue Reg. Guide 1.207 Rev. 1 revising the FEN equations to correct the issues with those.

Also it was decided to make the reg. guide applicable to both new plants and operating plants under license renewal within the reg. guide itself.

And also, the original reg. guide and NUREG were applicable to pressure boundary components. The new reg. guide makes it clear that it's applicable to all metal components that have a cumulative fatigue usage factor as part of their licensing basis.

There was an extensive public comment period. The drafts of these documents were issued for public comment in 2014.

Comments were received from a wide variety of knowledgeable subject matter experts, both domestic as well as international experts.

And the staff addressed each comment and incorporated a number of changes to the documents to address those comments.

We reviewed this matter at our last meeting and issued a letter. Our recommendations were that Rev. 1 of the reg. guide and the NUREG should be issued, but that the staff should continue to participate in the ASME code committee efforts that will incorporate these environmental effects in the ASME code.

CHAIRMAN SVINICKI: Thank you. I believe, Dr. Stetkar, you have the last two comments. Would you please proceed?

DR. STETKAR: I do, thank you. The first one is a review of 10 CFR 50.155, the mitigation of beyond design basis events rulemaking and associated regulatory guidance. Eventually we'll see this.

The ACRS has been engaged very heavily in this activity. We've held seven subcommittee meetings on the topic from November '14 through November

of last year.

We've written three letters on the topic. I'm going to focus primarily on our December letter from last year which was on the draft final rule and the regulatory guidance in its format at that time. Next slide.

In our December letter from last year we had several recommendations.

Our first was that draft final rule should be issued after consideration of the recommendation that we've listed here.

And that was that the equipment capability requirements and communications requirements should apply for all mitigation strategy, including those intended to cope with the loss of a large area of the plant due to explosions or fire. And I'll elaborate on that in a few slides here.

Next, our recommendations were the draft final Regulatory Guide 1.227 regarding spent fuel pool instrumentation, and Reg. Guide 1.228 for the integrated response capabilities should be issued.

We recommended that the staff should review the mitigating strategies in FLEX support guidelines to ensure that they contain contingency actions for loss of dc power supplies, instrumentation, and associated equipment operating practices.

I'll remind you, as I'm sure you're well aware, that the nominal conditions used for design of the FLEX mitigation strategies specify a loss of all ac power supplies and a loss of access to the ultimate heat sink. Next slide.

We recommended that the risk-informed assessment process endorsed in Reg. Guide 1.226 should be revised to omit an overall seismic risk screening criteria recommended in Revision 3 of NEI 1206 which is endorsed by Reg. Guide 1.226.

And I'll elaborate on that also in a couple of slides. Next slide.

We noted that Regulatory Guide 1.226 and interim staff guidance JLD-ISG-2012-01 Rev. 2 should contain guidance that it's functionally equivalent and applied consistently for all licensees.

That's important because the interim staff guidance applies to submittals that are currently coming in in response to the order.

The reg. guide will apply for all future applications of the rule. And it's important that licensees have consistent guidance and the staff has consistent review guidance for those applications so that we don't have discrepancies.

So therefore we've recommended that the draft final version of Regulatory Guide 1.226 should not be issued until it's reconciled with the final version of the guidance in that interim staff guidance for the current submittals. Next slide.

With regard to this issue about the equipment capability and communications requirements, we noted that 10 CFR 50.54(hh)(2) which is the rule that applies to loss of large areas due to explosions and fires will be sunset as part of the rulemaking for 10 CFR 50.155. It's going to be basically subsumed by the current proposed rulemaking.

We were informed that the equipment capability and communications attributes under 10 CFR 50.54(hh)(2) are addressed in guidance for that rule, not in the rule itself.

We were also informed that all currently operating reactors follow that guidance. Next slide.

Here's where it starts to get a little bit interesting. All new reactor

licensees will need to comply with paragraphs (b)(1) and (b)(3) of the proposed rule.

And if you're not familiar with all of the nomenclature, (b)(1) are the FLEX strategies for beyond design basis events, and (b)(3) is where the 10 CFR 50.54(hh)(2) requirements are subsumed into this rule. So a new reactor will have to comply with the FLEX requirements and the loss of large area requirements.

We feel that to provide regulatory clarity and ensure consistent integration of the mitigation strategies that will be developed by future licensees to comply with both of those parts of the rule the requirements for capability and communication should apply to all strategies required by the rule. Next slide n.

Regarding our recommendation on the seismic risk screening criteria, in exchanges between us and the staff, both in oral and written exchanges, the staff noted that they will examine the seismic capacities of FLEX equipment and structures during their reviews of the seismic risk assessments that are currently being submitted in response to NTTF Recommendation 2.1 separately from any requirements under this rulemaking.

We acknowledge that and we requested that for us to better understand those site-specific evaluations now that we be briefed by the staff on their reviews of those current risk assessments as they come in for two or three representative sites.

Just to let you know we've received a response from the staff regarding those requests. We'll be considering that response tomorrow morning in our meeting. It's not necessarily appropriate to comment on them until the full committee has had the chance to review them.

Next topic. This one doesn't get any easier. This is closure of Near-Term Task Force Tier 2 and Tier 3 recommendations.

There are three remaining relevant issues under Tier 2 and Tier 3 and those are the treatment of natural hazards other than seismic and flooding, the periodic reconfirmation of natural hazards, and a recommendation for real time radiation monitoring onsite in any emergency planning zone.

I'm going to talk about the other natural hazards first because it's the more complex of the three. I won't dwell on this.

In SECY-15-0137 the staff proposed a sequential four-task approach to examine other natural hazards. And this slide just provides you background information on what those tasks are.

Our first letter on this topic was written back in May of last year, and that letter covered the staff evaluations that had been performed through Task 2 of that process.

We concurred with the staff conclusions, the screening evaluations in Task 1 and the Task 2 evaluations that had been performed at that time for most hazards.

We also agreed with the staff at that time. The staff concluded that further evaluations were needed for high winds and in particular wind-driven missiles at selected sites, and snow loads at selected sites. They couldn't dispose of those issues at a few sites with their Task 2 evaluations. And we concurred that those additional evaluations were needed.

We also indicated last May that we would review the analyses that supported the Task 2 screening of selected hazards, in particular the effects from

downstream dam failures and the effects from low-intake water conditions due to seiche. Next slide.

We also noted that we felt that a couple of additional issues merited further staff attention in their Task 2 evaluations.

And those were issues related to the quality of the intake water supplies and the quality of ventilation and combustion air.

And finally, in our May letter we recommended that the staff should continue their involvement with ongoing multi-agency assessments of the effects from severe geomagnetic storms as they would impact nuclear power plants. Next slide.

Now, in our December letter from last year we reviewed the staff's enhanced support for their Task 2 conclusions and their completion of the Task 3 evaluations from the high winds and snow loads.

We concluded that additional regulatory actions cannot be justified for high winds and wind-driven missiles, for snow and ice loads, for failures of downstream dams, for low-intake water conditions, and for degraded intake water quality, or degraded intake air quality if you want to characterize that way.

It's important to note that our conclusions are based on the fact that regulatory actions cannot be justified considering current guidance for regulatory decision-making. Next slide.

In our December letter we recommended that the staff should ensure that the FLEX strategies contain guidance to trip-affected equipment and reduce major plant heat loads if the plant experiences a loss of all cooling water with continued

availability of ac power, again recalling that the nominal FLEX strategies are designed for conditions where you have no ac power and no access to the ultimate heat sink.

At sites that are particularly vulnerable to adverse intake water quality we also recommended that the staff should ensure strategies provide alternative sources of clean water or adequate filtration capabilities for the available water supplies. Next slide.

At sites that are vulnerable to extended periods of adverse air quality we recommended that the staff should ensure that the FLEX strategies provide needed building ventilation, and that the emergency generators have adequate filtration capabilities for that air. Next slide.

Now, with regard to NTTF Recommendation 2.2 regarding the periodic reconfirmation of hazards we recommended that the staff's proposed resolution for that recommendation should be modified such that the scope of hazards assessed by the new external hazards center of expertise should include manmade hazards except for intentional acts.

And we recommended that the staff should periodically report their state of knowledge about all external hazards.

With regard to NTTF Recommendation 11.3 regarding real time radiation monitoring capabilities we concluded that regulatory requirements for fixed station real time radiation monitoring are not warranted.

And we noted that decisions regarding possible augmentation of current monitoring capabilities are best left to the licensee local and state authorities who

are most directly involved with emergency response plans, Next slide.

The staff replied to our December 2016 letter in a response in January. We understand the staff's rationale regarding the assumptions that they've made regarding FLEX strategies for cooling water supplies and intake air quality.

And we continue to disagree with their rationale for excluding the assessment of man-made hazards from the scope of the external hazards center of expertise. And that's it.

CHAIRMAN SVINICKI: Well, thank you very much for the presentations. We'll begin the question and answer period with my questions today.

I think I'm going to begin with Dr. Powers. Good morning. I am tempted to begin by saying when you mentioned that you presented on the Part 61 draft final rule because you stuck around too long. I don't want to put it that way. The thought that popped into my head is I know how you feel.

(Laughter)

CHAIRMAN SVINICKI: I've been here for all of your engagement with the staff and I know in your letter report from November of last year the committee included a two-page attachment which is a chronological presentation of the engagement and the issues that you had identified along the way, the subsequent Commission redirection to the staff, further issues and further reactions.

On Tuesday the Commission met with the Organization of Agreement States and the Conference on Radiation Control Program Directors, the CRCPD. I don't remember what that stands for.

But I was mentioning they raised some points of interest about the draft

final rule on Part 61.

And I mentioned to them that in my experience serving on this Commission that a draft final rule is among the soberest of things that I undertake, or deliberate on, or evaluate in my duties as a member of this Commission because of a number of factors, but one of which is that after my action and that of my colleagues and we conclude there's a certain finality to what we've done.

And the likelihood of revisiting something that we took 10 years to revisit something is, you know, it's not going to happen for a while.

The other thing is just the compulsory actions that then ensue. The significance of those actions. The resource intensity of those actions in some cases.

You mentioned, I don't know, you might have taken for you -- I shouldn't say that, but a fairly light touch in describing some of the substantive points of departure between the committee and the staff over the years that you've been looking at this.

I feel similarly and I would note -- I'm not through my review of the draft final rule, but I would note that there are and continue to be significant departures in areas of concern identified by the ACRS, but also in points of direction provided by the Commission itself on the proposed rule.

And so I think you closed by saying the staff made heroic efforts to navigate all the different interests that were reflected and I agree. I agree with your statement that it was a significant burden for the staff. There are a lot of divergent points of view on this.

But you said that in general there were meritorious elements. I'm paraphrasing here. And I feel similarly.

I think your implication was we can't seek perfection on something of this complexity. And I would say that I don't. But maybe I have an exceedingly low standard which is that I need to have my overall confidence that the meritorious elements are able to overcome the elements where we ended up in some kind of form that I continue to have concerns about. So I -- just kind of a 51 percent standard which is very far from perfection.

I'm not there yet because I just think that some substantive points have been raised along the way. And even if I don't seek perfection I'm still looking to surmount my concern about some of the proposed ultimate measures that would be required should this be promulgated and affirmed in this form.

So I appreciate the ACRS' presentation of perhaps some alternative approaches. I'm sure the staff has given very thoughtful considerations to all of that.

But I continue to be troubled by some aspects of the burden.

I appreciated that you began with a discussion of DU itself and the physical ways that it presents hazard over the course of long periods of time.

I think as human beings that tempts us into saying, wow, if 1,000 years is good, 10,000 years is better.

But I think there's a certain mirage in that which is that if that further period of analysis -- if you can't overcome the uncertainties in looking at something over that long period of time then you may have given the illusion of greater

understanding when you don't really have that.

And if it's costing you a lot to do that then I think that the benefits of requiring it at least to me are not clear.

So, again, I don't know that I have a question there other than if you want to correct me on any of that you're welcome to because I have a deep respect for your expertise.

DR. POWERS: Well, I would just add two comments into your discussion points there.

One is to recognize that a million tons of uranium hexafluoride stored aboveground does constitute a hazard that's measurable, not necessary of its radioactivity but because of its chemical activity should it ever escape. That's one.

And disposal of that material probably is a societal good that getting on with is not --

CHAIRMAN SVINICKI: That might be true of a number of waste forms, but please go ahead.

DR. POWERS: The other thing that you mentioned is that, gee, if 1,000 years is good, then 10,000 -- with this material there's no difference between 1,000 and 10,000 with this material.

You do not get to your peak radioactivity until about 200,000 years.

And then recognize that that peak isn't very big. It's only about a factor of 4 or 5 above the current radioactivity.

And of course these are shallow waste sites. And relatively modest changes in the environment can have impacts. So your level of uncertainty is

pretty high here. I think you're reflecting that in thinking about this.

CHAIRMAN SVINICKI: Yes.

DR. POWERS: But I will point out that the licensees do seem to be comfortable with these requirements. So they're not recognizing an insurmountable burden in adopting this regulation.

CHAIRMAN SVINICKI: Thank you for that. I think the other area I'd like to turn to are the two presentations given by Dr. Stetkar.

But first, a point of clarification. In your oral presentation you stated something -- I tried to take very quick notes but I may be paraphrasing -- on the closure of the item on other hazards.

You acknowledged, or the committee endorsed the conclusion that further regulatory action cannot be justified given current guidance on regulatory decision-making.

That's an interesting statement. Is there anything more behind that? Is it meant to telegraph that there's some disagreement that the committee has or is going to deliberate on current guidance on regulatory decision-making?

Don't we always look at the staff's conclusions in light of the guidance under which they operate on regulatory decision-making?

It would seem to presume the staff should somehow maybe should be stepping outside the current guidance within which they operate?

DR. STETKAR: Several questions there. Let me see if I can address them in order.

It was important for us to confirm our agreement with the staff's assertion

that they could not justify further regulatory action.

It does not mean necessarily that the risk is zero because the risk is not zero, it's just too small to meet the current guidance that the staff has to meet to justify regulatory action under the Commission's safety goal policy statement.

So we looked very carefully, for example, at the expected frequency and consequences from each of those hazards, in particular the ones that I highlighted that merited more attention by the staff, either in Task 2 or Task 3.

And we came to the conclusion that at least internally within our committee that the frequency and the consequences from the hazards could not meet the safety goal screening criteria that are currently applied in the regulatory decision-making process.

The second part of the question. We're not challenging those decision criteria at all. They are enshrined in current guidance.

We're also aware that that guidance is being updated even as we speak. And we are following that very closely.

We have written two letters just recently on both NUREG/BR-0058, that was a very short letter, and on a supporting NUREG-1530 which addresses the dollar per person rem in terms of cost estimates.

We're planning to write another letter on NUREG/BR-0058 in fact this week and we're following that very closely.

So we don't know exactly where the staff may be headed in terms of updating that guidance.

CHAIRMAN SVINICKI: Based on that response I determine that I was

perhaps correct in connecting the statement that you made orally with a statement on page 6 of the committee's letter report that said, "We identified several sources of numerical values that would increase the staff's calculated core damage frequency substantially for some plant-specific scenarios.

"However, even with those corrections all estimates remain very small and are well below thresholds that would justify additional regulatory actions."

I think it was more your need to call it out in the presentation and your reference just now to a risk being above zero.

I have long viewed many of the committee's letter reports to just implicitly encompass the notion that very little that the staff analyzes would result in zero risk. And so they operate within, in general, policy set by the Commission for thresholds for regulatory action.

And so I don't know if it was just time for the committee to restate that that is embedded in its conclusions, or there was something new here. So I appreciate your mentioning that it is more the statement of something that is somewhat understood I think between the Commission and the committee, that the committee's reviews have to work within, in general, the confines of the staff unless you find some inadequacy there because otherwise it's too much of a creative endeavor, I think.

I would also note that on the mitigating strategies work I appreciate the careful look that the committee has taken.

However, in the back and forth between the committee and the staff regarding the treatment of regulatory provisions regarding 10 CFR 50.54(hh)(2)

resulting from the extensive damage, or aircraft impact as we like to call it internally.

I was also here for the Commission's final deliberations on aircraft impact. And in the back and forth with the staff I would note that I find that I side strongly with the NRC staff in that they are honoring the regulatory treatment that the Commission ultimately decided for those measures as I feel the staff is compelled to do in the absence of the Commission modifying that.

And for the committee's input and advice to be relevant I think it's best if it acknowledges the constraints within which the staff works which is the policy set by the Commission.

So, with that I am over my time. I apologize, Commissioner Baran.

COMMISSIONER BARAN: Well, let me start by thanking you and all your colleagues for the work you're doing. It took Dennis about five minutes just to list the things you're working on right now so that's pretty impressive and we really appreciate it.

I'd like to ask some questions about the mitigation of beyond design basis events draft final rule. I'll direct these questions to John, but anyone else should feel free to jump in with additional thoughts or with their own personal views.

Let me start with one that was not actually specifically called out in your letter.

The proposed rule included a requirement for licensees to have a multiple source term dose assessment capability.

The Near-Term Task Force recommended this because the response to the Fukushima accident highlighted challenges with conducting dose assessments

that consider potentially simultaneous releases from multiple reactors at a single site.

In response to public comment the staff decided not to include this provision in the draft final rule based on backfit concerns.

Is this a provision that ACRS examined as part of its review of the draft final rule?

DR. STETKAR: We certainly did examine it. And I guess we were silent in our letter because we didn't feel it necessary to enumerate point by point each issue that was addressed by the staff.

COMMISSIONER BARAN: Okay. Can you give us a sense of your collective or individual assessment of that provision?

And I'll prompt you a little bit further by saying the staff concluded that multiple source term dose assessment capabilities should be a voluntary initiative. I guess part of my question is is that something the committee agreed with.

DR. STETKAR: I have to be careful here because this is my own personal recollection and I'm not speaking for the entire committee.

We were informed at least in our meetings when we discussed this with the staff that -- I hope my recollection is correct -- that essentially all sites have voluntarily implemented that capability. It's a voluntary implementation. They feel they have the capability and therefore imposition of a rulemaking to require it is not necessary.

COMMISSIONER BARAN: If it proceeds as a voluntary initiative do you have thoughts about what additional NRC oversight is needed to verify that

licensees maintain those capabilities?

DR. STETKAR: Well, I think that's beyond what I should certainly comment on at this time.

COMMISSIONER BARAN: I mean, even if it's not something that appeared in the letter I'm interested in anyone's personal views on this.

MR. BLEY: We haven't considered it in any detail, but I would note that we are following the Level 3 PRA work that the staff's doing.

And at the risk of being a little orthogonal to your question they're trying to do a thorough job of looking at how to best model those kind of multi source releases. We're going to follow that very closely.

DR. STETKAR: I think I -- also I -- I mentioned that traditionally, the ACRS has not commented on things like inspection, staff inspection guidance and things like that, which I -- you might be leaning toward in --

COMMISSIONER BARAN: Okay.

DR. STETKAR: -- terms of how does the staff provide assurance that a voluntary initiative is being adequately followed? We just typically don't do that.

COMMISSIONER BARAN: Given that a principle focus of the staff's reasoning here was a backfit concern, did the committee consider whether this requirement should be applied only to future license applicants? Is that something you looked at as part of your review?

DR. STETKAR: I don't think that we did. I don't recall having that discussion --

COMMISSIONER BARAN: Okay.

DR. STETKAR: -- regarding future applicants.

COMMISSIONER BARAN: Okay. To follow up on the Chairman's questions, the draft final rule provides equipment capability and communication requirements for use of the FLEX equipment. ACRS recommended applying these requirements to the equipment put in place after the attacks of September 11th to address the potential loss of large areas of a plant due to explosions or fire. The staff disagreed with your recommendation, stating that this new requirement would not enhance safety because the desired outcome has already been achieved through implementation of guidance.

You talked about this in a little bit of detail. I am interested if you want to provide a little bit more detail about the committee's concern and -- and just your thoughts about the staff's response.

DR. STETKAR: Our concern as a committee, and I think we tried to telegraph that in our follow-up letter to the staff, was not necessarily for currently operating reactors. Currently operating reactors we have been informed comply -- "comply" is a bad word -- follow the guidance under 50.54(hh)(2), and that there are mechanisms that the NRC staff has to look at that.

Our -- our concern was primarily focused on new reactors. Who will use this rulemaking? The Chairman mentioned earlier that once a rulemaking is final, we're probably not going to revisit it for quite a while. So new reactors coming in using now this new rule, 10 CFR 51.55, and developing strategies for FLEX and strategies for loss of large area, which may be different depending on the plant design -- I mean, it's difficult to anticipate what types of strategies would be

envisioned, for new types of reactors that have more passive coping capabilities may not require FLEX Phase 1 or Phase 2 type of equipment, but may require some type of coping strategies for losses of large area, which is outside the scope of FLEX.

So we are more concerned about consistency going forward so that there was an expectation of new licensees within the construct of the rule, how they would need to -- to address the -- the equipment -- both the equipment capability and -- and communications requirements, which is for event response, consistently, regardless of what types of events that they are considering.

COMMISSIONER BARAN: So the -- so just to kind of sum this one up, staff responded on this, I take it the committee wasn't really satisfied with the staff's response?

DR. STETKAR: Where we are on this, we have -- as I mentioned, we have received a response back from the staff March 17th, and we have agreed that the Commission is aware of the staff's position, and the Commission is aware of the ACRS's position.

COMMISSIONER BARAN: Okay. Fair enough.

Another ACRS recommendation that you talked a bit about was to modify the guidance for the overall seismic risk screening criteria -- that is, omit it, would maybe be more precise. But I -- I understood your letter to say that the guidance that the staff endorsed might not be conservative enough in all cases and may not provide much margin to withstand the reevaluated seismic hazard of some plants. In their response, the staff stated that they don't plan to modify the guidance, and I

guess I will throw kind of three related questions at you.

One, did I understand your letter correctly? Can you talk a little bit more about the concern or thinking behind the recommendation and your reaction to the staff's response on that one?

DR. STETKAR: Sure, and I will -- I will try to stay away from numbers as much as possible here.

You did interpret the letter correctly. The concern is that the reevaluated seismic hazard, the frequency -- if I just characterize a -- it simplistically in terms of peak ground acceleration, tends to be in the range of somewhere between about 10^(-5) per year and 10^(-4) per year. It varies from site to site, but that is sort of a ballpark decade range.

If the reevaluated seismic hazard for a particular site was less than 5x10^(-5) event per year, which is the screening criteria proposed in the guidance, then in principle -- I am not saying that this is actual -- in principle, everything could fail seismically, and you would still meet the guidance. That does not demonstrate robust seismic capability.

Now, we know that that equipment will not fail. We don't know the likelihood of its failure because those analyses have not been done. The staff, in their response to us, has said, well, we recognize that limitation in the guidance for the regulatory guide. However, the staff said we will be evaluating those margins as the seismic risk assessments come in in response to NTTF Recommendation 2.1. Remember, this only applies to plants that have to reevaluate seismic hazards, so it's only currently operating plants --

COMMISSIONER BARAN: Right.

DR. STETKAR: -- that it applies. We're not talking about new reactors or anything else.

And we acknowledge the fact that if the staff's reviews will look at those margins critically on a -- on a plant-specific basis now in the context of a risk assessment that looks at both the frequency of the hazard and the likelihood of equipment or structural failure given that hazard, that assessment should be adequate to -- for the staff to gain assurance of the available margins, both in terms of the existing plant equipment and FLEX equipment, and that is why we requested the staff to come to us with two or three representative examples of their evaluations of the -- the current submittals for sites that do have -- we even specified sites that have greater than a factor of two in their reevaluated seismic hazard over a range of vibrational frequencies where you would expect to see damage to equipment or structures.

COMMISSIONER BARAN: Thanks. That is helpful. Let me just ask one more question, again on a piece that wasn't directly addressed in the ACRS letter.

The draft final rule would require licensees to demonstrate their mitigating strategies through drills or exercises initially, and then every eight years thereafter, and that is I believe the same as what was in the proposed rule. I think the eight-year --

MR. STETKAR: Yes.

COMMISSIONER BARAN: -- frequency --

MR. STETKAR: Yes.

COMMISSIONER BARAN: -- was proposed. Do you have thoughts about the eight-year frequency? Do you think that it strikes the right balance for beyond-design-basis event scenarios?

MR. STETKAR: The -- the committee had I will say extensive discussions about that eight-year periodicity, and the -- we didn't -- as you noted, we didn't discuss it explicitly in our letter. I will tell you that because we didn't, we agree with it.

COMMISSIONER BARAN: Okay. Can you -- can you talk just briefly about -- and, you know, anyone can chime in on this -- just to the extent that you had a lot of conversation about it, how you collectively weighed the pros and cons of that, or what the conversation -- the nature of the conversation?

Because presumably, you know, in terms of striking the right balance, on the one hand, you don't want to drill it so frequently that you're drilling it more frequently than things that are much more likely to occur. On the other hand, you don't want it to be so spread out that the capability is not really demonstrated that frequently, or that people aren't, you know, really drilling it in their -- in the course of their career. So, you know, you're trying to strike a balance.

DR. STETKAR: And that is -- that indeed is the crux of our discussions. We felt after discussions with both the staff and licensees, because we were briefed by NEI, and NEI had individual licensees come in and talk to us, that on balance, that eight year periodicity seems to make sense, considering the fact that we're talking about events that are indeed rare events. And indeed, there is quite a bit

of burden on licensees for drills and exercises to address events that are -- are quantitatively more likely.

We were also briefed that -- that the structure of current drills and exercises can and most likely will test capabilities that are within the scope of those mitigation strategies. It may not -- it may not fully test mitigation of a particular beyond-design-basis event and look at all elements of the emergency operating procedures on out through the emergency response organization, but it can test the availability of mobilizing onsite portable equipment, connecting that equipment. It can test communications capabilities between the plant on-shift staff, the technical support center, and the emergency response organization.

Those communications capabilities would be the same regardless of the initiating hazard, and I think that gave us added confidence that we aren't going eight years without testing any element whatsoever of -- of these mitigation strategies.

COMMISSIONER BARAN: Okay. Thank you. That is helpful. Thank you.

CHAIRMAN SVINICKI: Thank you. Commissioner Burns?

COMMISSIONER BURNS: Thanks again for -- here you have a diverse set of topics sort of bookended by two major rules that the Commission has in front of us, and the other thing I was just, I found myself idly playing with --

(Laughter.)

COMMISSIONER BURNS: -- a paperclip, and I will never look at it the same again. And I will have you know I am up to 843 flicks on it, so I will submit a

report to the ACRS when it fails.

(Laughter.)

COMMISSIONER BURNS: So no, it's -- actually, it is a very valuable way of being able to look at it. So actually, I am going to --

DR. RICCARDELLA: I learned show and tell really well.

COMMISSIONER BURNS: Yes, show and tell.

MEMBER RICCARDELLA: Since grammar school.

COMMISSIONER BURNS: It is great. Actually, let me -- let me start with you, Dr. Riccardella. I will get your other colleagues here on the ACRS to address some of the issues that you raised.

One thing, I guess one question I would have with respect to the -- the new regulatory guidance on the fatigue is are there particular implications for the scope of the guidance being expanded from the pressure boundary components to all metal components exposed to the environment?

DR. RICCARDELLA: I think the main issue here is reactor internals that they're providing. In some cases, reactor internals have been designed with a fatigue usage factor calculation.

COMMISSIONER BURNS: Yes, okay.

DR. RICCARDELLA: And those are part of the licensing basis, and so if they have been, it is thought --

COMMISSIONER BURNS: Yes.

DR. RICCARDELLA: -- that they should be addressing this.

COMMISSIONER BURNS: Yes, okay. And the other thing I guess is

with respect to current -- because described in terms of the application of the guidance, particularly in the renewal term or -- or going forward, are there particular implications for operating plants? I just wanted to -- I think you may have addressed it, but I wasn't trying to make sure I understood whether --

DR. RICCARDELLA: Well --

COMMISSIONER BURNS: -- there are any practical implications for the revised guidance.

DR. RICCARDELLA: I think the practical decision was, well, let's not apply it to current --

COMMISSIONER BURNS: Yes.

DR. RICCARDELLA: -- license conditions because there's enough margin. I mean, we are talking about, you know, ten-inch-thick reactor vessels, not --

COMMISSIONER BURNS: Right.

DR. RICCARDELLA: -- paper --

COMMISSIONER BURNS: Right.

DR. RICCARDELLA: -- clips, and --

COMMISSIONER BURNS: Right.

DR. RICCARDELLA: But as far as going forward, you know, the utilities are considering this as part of their aging management programs, and -- and addressing it.

COMMISSIONER BURNS: Yes. And of course, that is the significant thing in terms of as you get into renewal periods, either the initial or the so-called

subsequent renewal period?

DR.RICCARDELLA: Yes.

COMMISSIONER BURNS: Okay, thanks.

DR. RICCARDELLA: Yes.

COMMISSIONER BURNS: I turn to Dr. Ballinger. In terms of the -- the review, and this is maybe more a process question in terms of the impact on -- on ACRS's review, and as I take it, the -- from the February 21st letter, the committee has agreed to do more I guess a sequential or serial-type review on it. And I guess if there's any reflection you might have on how that may compare to -- to past reviews and whether that is presenting any particularly unique challenges for the committee as it goes forward?

Dr. BALLINGER: I have no experience with the past review --

COMMISSIONER BURNS: Okay.

DR. BALLINGER: -- so this is my first one as Chairman of one of the committees. What I can say is that -- and this is not a trite -- trite expression -- the staff has really worked hard, the ACRS staff a well as the NRC staff. And we meet very frequently to make sure that things stay on track. I am sure there's a lot of gray-haired people being developed as we get through this. But it is -- it is working -- from my perspective, it is working well. It would not be working well were it not for the fact that everybody is -- ACRS staff and

COMMISSIONER BURNS: Yes.

DR. BALLINGER: -- NRC staff is really putting in a lot of effort. The heavy hitting is starting next subcommittee meeting, where we do Chapter 19, so

we will see how that goes, but I am sure it is going to go very well.

COMMISSIONER BURNS: Okay. Did you want to say something?

DR. POWERS: I would just comment that I was extremely suspicious of this piecemeal, multi-phase license certification.

COMMISSIONER BURNS: Yes.

DR. POWERS: As we got into it for the EPR, it was never carried to completion. It worked remarkably better --

COMMISSIONER BURNS: Okay.

DR. POWERS: -- but I think that you do have challenges in that a certain amount of integration --

COMMISSIONER BURNS: Yes.

DR. POWERS: -- of design and response don't get coupled unless you go to an effort to do it yourself because they are separated in time. But because it is done in two stages -- there is one stage in which issues that have not been resolved are still outstanding, and then a subsequent stage when those are all resolved -- you get the -- eventually get to the integration, and you can make sure the knee bone is indeed connected to the thigh bone --

COMMISSIONER BURNS: Yes.

DR. POWERS: -- and things like that. It worked much better than I thought, and I think Dr. Ballinger is absolutely correct. It is because the staff, NRC staff has just been extraordinary in their expertise they have applied to these certifications, so we're getting pretty good products coming to us in the first stage, and there are only a few things that really gnaw on you, and they are these

integrations between --

COMMISSIONER BURNS: Sure.

DR. POWERS: -- Chapter 9 and Chapter 3 and things like that --

COMMISSIONER BURNS: Sure.

DR. POWERS: -- that -- that really gnaw on you, but they are addressed in I think it is -- I forget the staff numbering all the time, but I think it is Stage 5 in this process.

COMMISSIONER BURNS: Okay. Good.

MR. BLEY: Yes. You know, I will chime in. It has improved a lot. Ten years ago, the first couple we got involved in, it was very difficult, and changes were happening on the fly. We --

COMMISSIONER BURNS: Yes.

MR. BLEY: -- we would go to review, and no, that's not what it is anymore. The staff has done a really good job, and I would agree with Ron, both NRC staff and ACRS, in trying to resolve that issue and get things up to date when we get to these meetings.

COMMISSIONER BURNS: Okay.

MR. BLEY: So it is working much better.

COMMISSIONER BURNS: Yes, and given your comment, I somewhat hesitate that you used the word "maturity" in this context, but -- with respect to the design. So -- because what you -- I think what you describe is I can remember, you know, 10, 12 years ago, in terms of some of the designs coming in front of you, particularly in the design cert, you know, and these were, although, you know, we

had this experience in the '90s with the AP600, and, what, System 80+ and all, but still -- and I recall moving up toward, even with the -- right before I left, when I was General Counsel, the Commission coming into, you know, December 31st AP1000, the significant revision is approved, and then, you know, the Commission has the COLs in front of it.

Here, when I say "mature" is that the designs being -- the designs being built and all that, so I am sort of prattling on here, but it almost sounds like to some extent, that may help it work here. But I think what Dr. Powers is saying is well, maybe -- maybe a little bit more maturity and -- maturity may also be more experience at this point on both sides with respect to -- to handling the DCs.

MR. BLEY: And for our review, the staff has found ways to make sure we are getting the most up-to-date versions of documents before our meetings, which wasn't happening 10 years ago, and it seems to be working much better. I know --

COMMISSIONER BURNS: Okay.

MR. BLEY: -- that they have worked very hard.

DR. BALLINGER: And I might think to add that to some extent, the agreed-upon limit on the time it is going to take to do this with the applicant, that is -- that is bad news, but it is good news also because it has really forced everybody to really integrate --

COMMISSIONER BURNS: Okay.

DR. BALLINGER: -- how things are done.

COMMISSIONER BURNS: Okay.

DR. BALLINGER: So that is actually helping.

DR. POWERS: I will just mention that when we did AP1000 and APWR, the System 80+, that you got a fairly complete document suddenly, and very intense. Now, because it comes to you piecemeal, but spread out over time, there are a lot of these issues, especially in the thermal hydraulics issue, that benefit from protracted thought.

COMMISSIONER BURNS: Yes.

DR. POWERS: And because it is spread out in time and not one critical event, I think it is helping in some respects. There are little troubles with how this and -- and a compliment to the licensees that they are not taking the route of the scoundrel and saying, well, that is in Chapter 14, and we're not going to discuss that here.

COMMISSIONER BURNS: Yes.

DR. POWERS: They really are trying to --

COMMISSIONER BURNS: Okay.

DR. POWERS: -- feed things in --

COMMISSIONER BURNS: Okay.

DR. POWERS: -- to you when you have questions of connections and things like that. That spreading out has a benefit, whereas the piecemeal -- that compensates --

COMMISSIONER BURNS: Yes.

DR. POWERS: -- in some ways --

COMMISSIONER BURNS: Yes.

DR. POWERS: -- for the piecemeal nature.

COMMISSIONER BURNS: Okay. No, that is good. Thanks.

I will stick with you, Dr. Powers, and come back to Part 61. Is there a suggestion the ACRS would have on how the Commission might implement the -- or the suggested implementation where the Commission may want to define "minimal compliance period" but not have a rigid limit? Is there some particular perspectives you all might have on how we might do that in the Part 61 context?

DR. POWERS: Well, I think the Commission certainly imposed a specific institutional control time period, because it's a period that is trackable, 100 years -- you can think about 100 years. When you go out to say 500 years, which is now the evaluation time, there is a distinction that I see. There is a distinction, not a difference, between evaluations.

You get into a region where an enormous amount of uncertainties come in, climatological uncertainties not the least of them. I was in fact thinking about uncertainty analysis in these performance assessments, and it suddenly dawned on me, for shallow deposits, we have to worry about invasive species because there are trees that grow roots long enough to get down into the -- not native to the United States, but there's -- invasive species are a problem. Oh my God, how do I factor in invasive species into a compliance assessment?

But the truth is compliance assessments and the associated uncertainty analyses have become much more sophisticated. One of the side benefits of the hiatus on the licensing of Yucca Mountain has been that lots of people that work in compliance assessment have had an opportunity to hone their skills a lot.

And so I think what you would find is there's a point at which extending

the -- the compliance period had no further impact on public health and safety simply because of these uncertainties, and so it would become apparent when your compliance period, it didn't matter.

COMMISSIONER BURNS: Yes.

DR. POWERS: Pick a million years. It won't help you as far as public health and safety to any discernible level of confidence, and that is -- that is certainly the approach that I would take on it --

COMMISSIONER BURNS: Okay.

DR. POWERS: -- you know, that sort of thing.

COMMISSIONER BURNS: Thank you. Thank you, Madam Chair.

CHAIRMAN SVINICKI: Well, thank you all again for your presentations, and also to the ACRS members who are present here today. Thank you for your work on the committee. I observe as a personal observation that I think at this point, the committee is well-served by a mixture of longstanding members and new members, and I -- I think I see some of that reflected in the letter reports, that some -- there has been some turnover, which is a useful thing, but I think also that having continuity on these issues which take us many years to examine is -- is also a great strength of the ACRS.

And in the next semiannual meeting that this Commission has with the ACRS, I think that we should expect from Commissioner Burns a report on how many additional cycles he has put his paperclip through.

(Laughter.)

CHAIRMAN SVINICKI: And I won't rope Dr. Powers into it, but some of

us feel the functional equivalent of many, many cycles of -- of fatigue.

(Laughter.)

CHAIRMAN SVINICKI: So it is not a matter I guess of how we feel, but how much testing we have done. So with that, again, thank you all, and we are adjourned.

(Whereupon, the meeting went off the record at 11:24 a.m.)