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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

518th MEETING

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FRIDAY,

DECEMBER 3, 2004

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The meeting was convened in Room T-2B3 of Two White Flint North, 11545 Rockville Pike, Rockville, Maryland, at 8:30 a.m., Dr. Mario V. Bonaca, Chairman, presiding.

MEMBERS PRESENT:

MARIO V. BONACA	Chairman
GRAHAM B. WALLIS	Vice-Chairman
GEORGE E. APOSTOLAKIS	ACRS
RICHARD S. DENNING	ACRS Member
F. PETER FORD	ACRS Member
THOMAS S. KRESS	ACRS
DANA A. POWERS	ACRS Member
VICTOR H. RANSOM	ACRS Member
STEPHEN L. ROSEN	ACRS Member-at-Large
WILLIAM J. SHACK	ACRS
JOHN D. SIEBER	ACRS

ACRS STAFF PRESENT:

SAM DURAISWAMY	Technical Assistant, ACRS/ACNW, Designated Federal Official

ALSO PRESENT:

CHARLES ADER	RES/DRAA
C.E. CARPENTER	OCM
MARY DROUIN	RES/PRAB
CLINTON FERRELL	NEI
TOM KING	RES
DAVID LEW	RES/PRAA/PRAB
STEPHEN MAZURKIEWICZ	AREVA
SCOTT NEWBURY	ISL
GARETH PARRY	NRR/DSSA
STUART RUBIN	RES/DSARE
MARTY STUTZKE	NRR/DSSA/SPSB
M. TSMILTZ	NRR/DSSA
JERRY WILSON	NRR/DRIP

I-N-D-E-X

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

8:31 a.m.

CHAIRMAN BONACA: Good morning. The meeting will now come to order. This is the second day of the 518th meeting of the Advisory Committee on Reactor Safeguards.

During today's meeting the Committee will consider the following. Draft Commission Page on Technology Neutral Framework for Future Plant Licensing, Policy issues.

Subcommittee Report on Draft NUREG Documents and Technical Uncertainties. Subcommittee Report on the Interim Review of the Arkansas 2 License Renewal Application.

Election of ACRS Officers for CY 2005. Future ACRS Activities and Report to the Planning and Procedure Subcommittee. Reconciliation of ACRS Comments and Recommendations, and preparation of ACRS reports.

The meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Mr. Sam Duraiswamy is the designated federal official for the initial portion of the meeting.

We have received no written comments or

requests for time to make oral statements from members of the public regarding today's sessions. A transcript of a portion of the meeting is being kept, and it is requested that the speakers use one of the microphones, identify themselves and speak with sufficient clarity and volume so that they can be read and be heard.

The first item on the agenda was peer review comments on the technical basis for the PTS screening criteria. We already covered that yesterday, so we're not going to have to go through that.

The first half an hour of this meeting will be off the record, and we will use this half an hour to discuss the other letter that we were considering yesterday, which is the illicitation process.

(Whereupon, the foregoing matter went off the record at 8:33 a.m., and went back on the record at 9:05 a.m.)

CHAIRMAN BONACA: I shouldn't do anything to this letter then?

MR. KRESS: Well, you know, we've been briefed on this several times in the spirit of keeping

us up-to-date as they go along and exchanging views and their thinking. And this is another one of these status briefings, which we're all awfully glad to have.

A letter is not intended at this time. There's no good reason for it. And I repeat what I said at one of the earlier briefings, that I think this is one of the more exciting and important things that we're doing.

And I hope the rest of the Committee shares that view, and I have a great admiration for what they've come up with so far. And I think they're on the right track, and it's real historic, good stuff.

And I want to pass that view along to you guys. I think you're doing a great job. So, once again, this is a status report, and I think what we're going to discuss is the policy issues? Is that mostly it, or --

MS. DROUIN: We were going to walk through the SECY Paper.

MR. KRESS: Through the SECY Paper, okay. With that, I'll turn it over to Mary.

MR. APOSTOLAKIS: This is the SECY Paper we've seen?

MS. DROUIN: Yes. Thank you, Dr. Kress, for the kind words. I greatly appreciate it. My name is Mary Drouin with the Office of Research.

Also at the table with me is Tom King and Stuart Rubin. But I do want to acknowledge that there's many other players in this process, in the three that you've seen here, and they've all made a tremendous contribution to this work that we're doing.

Today's purpose, we're here, you were given a draft copy of the SECY Paper. It's in concurrence right now. It has received Division Level concurrence, so even though it's drafted, it is progressing through the concurrence chain.

And we wanted to give you a status because what's in the SECY Paper is essentially a status of the program. There's three main things in the SECY Paper, it's our effort, where we are with regard to the frame work.

It goes through the policy issues and how they're addressed in the frame work, and there's nine policy issues at this point that we've identified. And then our proposed schedule for completion, for the overall program, not just for the frame work itself.

So if I get to this overall program, the regulatory structure for, what we call the regulatory

structure for new plant licensing, there is four parts to it.

The technology neutral frame work, and then a set of proposed technology neutral requirements. A technology-specific frame work, which is showing how we plan to apply the technology neutral and technology-specific basis.

And data application then would be the derivation of technology-specific regulatory guides. So far the work is concentrated on the technology neutral frame work, which is what we're going to go through on the first part of today's presentation.

MR. KRESS: On the technology-specific regulatory guidance, do you envision a regulatory guide for every application that comes in for certification for, you know, each plant is slightly different.

Like in MHTGR, would that be of a different reg guide than a title bed modular reactor, do you think? I mean you would have special reg guides for every reactor.

MS. DROUIN: Not every reactor.

MR. KRESS: Because you're going to group them as types?

MS. DROUIN: Yes.

MR. KING: Yes, HTGR reg guide, sodium reactor reg guide, that kind of thing.

MR. KRESS: Well, do you salt the reactor?

MR. KING: In theory.

(Laughter.)

MR. DENNING: One can only hope.

MS. DROUIN: Okay, moving to the frame work.

CHAIRMAN BONACA: Mary, you are blocking a little bit the screen. Can you move to your right? Thank you.

MS. DROUIN: Sorry, I just feel so separated. I want to emphasize on the third bullet because I think that's very important. This is a working draft so far.

This is very preliminary. Everything that's in the frame work is not finalized. These are points to start dialogue and discussion with the community at large, not just in our C staff members, but our various stakeholders.

But we do feel that we've done enough work that it's feasible to develop this technology neutral frame work. There are technical issues to be resolved, there are policy issues to be resolved.

But we do think we've done enough that

it's feasible at this point. We have had some public meetings. We had a small public workshop on this.

MR. KRESS: Who came to those, Mary? Who's involved in this discussion? Are you guys connected with the IAEA? You know their working on a similar sort of thing.

MS. DROUIN: Yes, we are, because I've been sitting on that group.

MR. KRESS: You're part of that group?

MS. DROUIN: I'm part of that group.

MR. KRESS: Okay.

MS. DROUIN: So the answer is yes.

MR. KRESS: And they moving down pretty much the same direction you guys are?

MS. DROUIN: So far we've been consistent. We aren't absolutely identical, but we're consistent.

CHAIRMAN BONACA: They seem to emphasize the IAEA concept of defense in depth, six, seven letters of defense in depth. They start out with a strong statement about defense in depth. Is that consistent with what you guys are doing?

MS. DROUIN: Well, I think it's consistent in the sense that we start off with the protective strategies which we always say is defense and depth.

Where we differ is that they tend to put

more in defense and depth in the sense where I think they, everything they call defense and depth.

MR. APOSTOLAKIS: The other impression I got when I read one of their drafts, I don't know what is at stake now, is that they still believe that fundamentally the system should be deterministic.

The traditional system and PRA will help do sensitivity studies and support various decisions. Is that your impression as well?

MS. DROUIN: At the very beginning, that was our impression. It was very much so. But we've been working very hard to try and turn that around. And I think we've made a lot of headway with them becoming more risk-informed.

MR. APOSTOLAKIS: Okay.

MS. DROUIN: But that is because, you know, what's being developed by IAEA, very many different member countries and some member countries you just absolutely, this has got to be 100 percent deterministic.

But I do think that has become more risk-informed.

MR. KRESS: My original question started out as who --

MS. DROUIN: And I'm going to --

MR. KING: Yeah, I wanted to say I think it's an important question. We've had two major workshops and we both, both of those have had like 25 or 30 non-NRC people.

And it's, you know, it's NEI, it's EPRI, it's a number of the vendors. DOE, Jim Ricchio has attended from Green Peace. National Lab, some of the Lab people have been there.

MS. DROUIN: Westinghouse has been there, Framatome

MR. KING: AREVA.

MS. DROUIN: AREVA.

MR. KRESS: What is their general impression so far? They think this is a good thing and going in the right direction? Or is it too early for that?

MS. DROUIN: I think, you know, as we've shown on the second bullet there, there's a general agreement for the need, and for the conceptual bases.

But I think when we get into the details, you know, I think there's agreement in some places and disagreement. I think they're very anxious to see this document which they haven't seen yet.

So we can start getting into discussions on these details.

MR. KING: We've gotten letters from NEI and Framatome and somebody else I can't remember that you might be interested in seeing, that give, you know, their overall support as well as their detailed comments.

MR. APOSTOLAKIS: Has NEI had a report, maybe a year or two ago, addressing the issue of technology neutral frame work? Are they still working on this? That was based on defense and depth ideas, again.

MS. DROUIN: Well, I don't want to speak for NEI, but I haven't --

MR. APOSTOLAKIS: But what do you know about it?

MS. DROUIN: My indication is that there has been no update to that report.

MR. APOSTOLAKIS: So they are not working on it anymore, as far as you know?

MS. DROUIN: In terms of revising that report that, not to my knowledge. I don't know if, I know there's a representative from NEI, if they want to say something to it.

MR. APOSTOLAKIS: Do you?

MR. FERRELL: Yes, I'm Clifton Ferrell with NEI. We have an active task force right now that is

updating NEI-0202 and we are going to be using those refined comments as we work with Mary in developing the frame work, yes.

MR. APOSTOLAKIS: Okay, good.

MS. DROUIN: Good. I didn't realize that.

MR. APOSTOLAKIS: That was news to you?

MS. DROUIN: That was news to me, but good news.

CHAIRMAN BONACA: Did you choose the Ides of March for some sort of purpose?

MS. DROUIN: Yes, actually we picked those dates very deliberately because the week before is the RIC Conference, so we were trying to piggyback since a lot of the same people --

MR. KRESS: Do you think it would be worthwhile for one of us to be there?

MS. DROUIN: Yes, and you'll see that on a viewgraph that we would encourage members of ACRS to come to the workshop. I'm sorry?

CHAIRMAN BONACA: Did you say the Greek conference?

MS. DROUIN: I'm sorry, the Regulatory Information Conference.

MR. KING: Which is the eighth through the tenth of March.

CHAIRMAN BONACA: I'm sorry.

MR. KING: They'll be a lot of people there, we hope they hang around and come to this.

MS. DROUIN: Okay. Now we're not going to try and get into any details, technical details on today's presentation. There's just a lack of time and there's a lot.

We're just trying to give you a status of where we are on everything as we noted in the SECY Paper. As I said on, with regard to the frame work, I feel we've done enough to show that it's feasible to develop this technology neutral.

It is a hierarchical structure where we blend both deterministic and probabilistic criteria and the criteria and guidelines that are in the frame work. Those are criteria and guidelines that we would use, the staff would use to develop the set of technology neutral requirements.

And so there are six parts to the frame work document. The first one sets the overall safety philosophy from, which we're operating under. And then it gets directly to the protective strategies.

The protective strategies are defining those strategies that, if they're fulfilled, then it accomplishes the safety philosophy. And so we are

going to be writing the requirements or deriving the requirements to meet the protective strategies.

We've established risk objectives to help in the decisions. We also have design construction and operational objectives.

Let me go back for a second to the risk objectives. That's getting into, you know, we've outlined a frequency consequent curve.

We are looking at using some lower level subsidiary objectives, and those have a lot of issues associated with them, particularly when you're trying to do it at a technology neutral level.

MR. KRESS: Yeah, that's the one place where I felt like you were going to be beating your head against the wall, and not getting very far. Subsidiary objectives, surrogate is more --

MS. DROUIN: Right, surrogate.

MR. KRESS: -- for FC curves, in my view, are basically impossible.

MS. DROUIN: No, we're looking to a good discussion at this workshop. Safety classifications, using these risk objectives to help us define our design.

MR. KRESS: I'd like you to put that on the workshop list, is it possible to get surrogates for an

FC curve --

MS. DROUIN: Absolutely.

MR. KRESS: – in terms of some things like CDF.

MS. DROUIN: One of the things that we're doing is we're going to be sending out a Federal Register Notice, of course, advertising the workshop. But in the Federal Register Notice is we have identified a whole list of very specific issues that we would like to really get into at the workshop.

MR. KRESS: You know, I think you guys are facing up to some of the toughest issues that we have that, in my mind, have been part of the reason for a lot of the incoherence in the current regulatory system.

And, you know, I really applaud your fortitude and your guts. You're really facing up to some tough issues, and you know, I'm proud of you, I really am.

MS. DROUIN: Thank you. Laying out design construction and operation objectives. Treatment of uncertainties which gives into defense and depth. And I'll get more into that on another slide. Yes.

MR. POWERS: If you lay out the design construction and operational objectives you don't go

through the full lifecycle here. why not?

MS. DROUIN: Go ahead.

MR. KING: No, I think we do try to go through the full lifecycle. I'm not sure what you have in mind when you say we don't. I mean construction we're thinking, yeah, we only construct it once, but we do talk about maintenance and surveillance and ISI and that kind of thing.

MR. POWERS: And then, but you leave off the decommissioning and removal part of it.

MR. KING: We have left off decommissioning, that's one of the comments we've gotten from outsiders is maybe we ought to think about adding decommissioning, but we haven't done it yet.

MR. POWERS: See, that's a full lifecycle, so you're –

MR. KING: In that sense you're right, you're right.

MR. POWERS: Well, that is the full lifecycle, right?

MR. KING: Yes, it is, yes.

MR. POWERS: And the reason I bring it up, you may do it more by reference than anything else, is that the decommissioning characteristics of some of the advanced reactors may be troublesome.

And I call attention just to the challenges that you're having with a relatively limited level of contamination on some graphite, from graphite reactors.

And, I mean, it's a situation of where you've got a huge volume and not a great deal of contamination, but enough so that you can't go to a low level, disposal field, but it's so big that, I mean, it would occupy all of Yucca Mountain. One solar reactor core that was a test reactor.

It's that kind of a problem. And, I don't know what you do with it except maybe, maybe if it is activity you just say, and this has to be, set up a group to go work this issue because it's going to be a problem.

MS. DROUIN: Okay.

MR. POWERS: And when you discuss this, I'm certain you're going to give us a little more on that.

MS. DROUIN: I'm sorry?

MR. POWERS: Can you tell us more about the uncertainties that you discussed?

MS. DROUIN: Yes, I have a slide on that I'm going to get to. The last part in the frame work document is what we call the process for defining the scope of requirements.

And that is telling you how we take these five things above it, bring it together and use it to actually develop the set of requirements.

On each of these, there's policy and technical issues associated with each of them. So far there are nine that we have addressed. I'm sure as we get more into finalizing the frame work document, and having discussions with the various stakeholders, I'm sure there will be more issues that will come up, than just these nine that we have identified to date.

What are these nine? And we're going to go through each one of these, but our definition of defense and depth, which is the treatment of uncertainties. Use of the probabilistic approach to establish the licensing basis.

Scenario of specific source terms. Revision of the EPZ. The integrated risk, which we've been here and spoken with the committee on a couple of times. The same thing with the next one, the containment functional performance requirements.

Level of safety, physical protection and selective implementation. And we're going to go through each.

MR. KRESS: You can see from our previous letter that even the ACRS is split on this question of

integrated risk.

MS. DROUIN: Yes.

MR. KRESS: We still, I think we still are split.

MS. DROUIN: Oh, so you're not going to give us a little surprise today that you've resolved that?

(Laughter.)

MR. KRESS: No, we haven't come together.

MR. APOSTOLAKIS: I'm sorry, I didn't hear. What is –

MR. KRESS: That's the only thing we argued is whether you need a CDF for a site or CDF for a plant–

MR. APOSTOLAKIS: Oh, yes.

MR. SCHACK: Divide by the number of reactors in the country.

MR. APOSTOLAKIS: Some members think, some other members don't, and the Commission is –

MR. POWERS: Are you claiming that we have blue and red ACRS members?

(Laughter.)

MR. KRESS: Absolutely. And some are purple.

MS. DROUIN: Okay, treatment of

uncertainties, defense and depth. If you go back to SECY 030047, I think I have the right year. There were seven policy issues that were noted in that SECY paper. An SIM came back and out of four of those issues, they approved what the staff had recommended.

Two others, which was integrated risk and containment, they asked us to do more work. One of them they did not agree, and that was on International Codes and Standards, which we're not getting into today's presentation, because it's not part of the frame work.

But on the five, no, sorry, six that were in there, that SECY paper did say that these would be incorporated through the development of the frame work. So now we're moving over into that arena.

But going back there, what we had recommended and the Commission approved, with regards to defense and depth, was our recommendation to develop a description that would be ultimately incorporated into a policy statement, but come up with a working definition.

So what we, the approach we've taken in the frame work was that we have four main elements to it. And then, a lot of this is not new. You know, we went to the Commission's White Paper and SECY papers

on defense and depth.

We looked at what the ACRS had to say and everyone in private, and consolidate that all together. So the first was coming up with our objectives, and then we defined the principles and we developed a model where we tried to incorporate in this model, both a probabilistic and deterministic aspects are using, you know, the ACRS words incorporated in both the structuralist and a rationalist part to it.

And then develop a process for implementation. We do plan to come up with a proposed revision to the Commission's PRA policy statement to incorporate a definition on defense and depth. We haven't started that yet, but that is on our agenda to start next year, as we develop more of this part of the frame work on defense and depth.

MR. KRESS: Well, that would be one of the, that would be a real advance, coming up with a good, firm definition and a way to say this is enough defense and depth or this is necessary and sufficient.

MR. POWERS: That's the key to it, is that it's not so important to have a definition to defense and depth, it's important to have a criteria that allows you to know where you need defense and depth

and when enough has been done.

MR. KRESS: Yeah, and, yeah, go ahead.

MR. POWERS: I mean the problem always is that you can start applying defense and depth and just never quit. And, because there's no in condition on this.

And it's coming up on an in condition is enormously useful. And the problem you always have is analysts are always very confident in their ability to calculate probabilities and bound them with uncertainty ranges.

And then there's that person that's going to continually ask, what if you're wrong?

MR. APOSTOLAKIS: But as long as there is a need for structuralist approach, which I think will be there in the foreseeable future, you can't answer the question, how much is enough?

I mean, you have to use your judgement at some point. You can only answer that if you follow the rationalist approach, which is not ready for prime time I don't think.

Take the TBS, the Transitional Break Size, I mean, LOCA, people have done all sorts of studies and stuff or it has taken the lead and, you know, there are all sorts of limitations to what they have

done, and they're the first ones to admit it.

So NRR now has to apply a structuralist approach and say, you know, we will increase it by X. Why? Well, that's our best judgement. Why not X plus one or X minus one? Who knows?

MS. DROUIN: Well, what we have tried to do is blend both the structuralist and rationalist together. And our model is trying. Now whether or not we'll ultimately be successful, remains to be seen.

But the approach we're laying out is using the rationalist part to put, define that end state. To help you define on the structuralist side when you have enough defense and depth.

MR. APOSTOLAKIS: Well –

MS. DROUIN: So we do believe that you can be blending both the structuralist and the rationalist and come up with a model that would address Dr. Powers' concern.

MR. APOSTOLAKIS: My point is, yeah, this is what we attempted to do in that paper, too. But we called it a pragmatic approach.

My point is that, I mean, Dr. Kress keeps asking the question, you know, can we get a criterion, presumably a numerical criteria, that would tell us in

this case, this amount of defense and depth is sufficient. And my argument is that as long as there's a need for structuralist elements, you cannot answer that question.

But it's not criticizing you. I mean, this is it, this is the way we are today.

MS. DROUIN: No, I just don't agree with you.

(Laughter.)

MR. APOSTOLAKIS: How could you do that?

MR. KING: Well, it seems to me the structuralist piece is sort of a minimum, the floor. You'll have certain structuralist pieces of defense and depth, no matter what your design looks like.

And then beyond that, depending on the design, at least the approach we've come up with, is you take a rationalist approach to figure out where do you stop.

And where you stop will be different from design to design. But if you lay out the criteria using, you know, risk criteria, it will tell you where you stop putting in defense and depth based upon certain risk criteria.

So then you've got the two extremes. The floor, the minimum, and the maximum. And the minimum

will always be the same regardless of what your design looks like, and the maximum will vary on the design.

MR. APOSTOLAKIS: No, I don't think we communicate very well.

MR. KING: Okay.

MR. APOSTOLAKIS: Structuralist means essentially you're answering the question that Dana has raised many times. What if you're wrong? Okay, you do the analysis, what if you're wrong?

Then you use your judgement and you say, well, you found wrong, I might as do this as well, to protect me. Okay? And this extra thing you do is not always quantifiable. So you can't say this is sufficient.

MR. KING: But it is based upon a judge of what the uncertainties are.

MR. APOSTOLAKIS: Absolutely.

MS. DROUIN: Yeah, and that –

MR. APOSTOLAKIS: But you don't quantify, because these are –

MR. KRESS: I think that's the key, though, George. See, instead of asking the question, is what if I'm wrong? I think they're changing the question around, it's, how wrong am I likely to be? And that's the uncertainty.

And that you can use, in a sense, to decide on how much structuralist defense and depth you need. And I think that's an approach.

MR. APOSTOLAKIS: In my mind, you would be able to do that if you were able to quantify uncertainties in duty and completeness. And I don't see how you can do that.

MR. KRESS: And that's the, well, that's the question.

MR. POWERS: I mean, it seems to me that this approach of reviewing structural defense and depth as kind of a baseline, I don't know that it's a minimum, but it's a baseline.

And then using a more rational approach, within that, that structure, is not a bad idea.

MR. APOSTOLAKIS: No, it's great.

MR. POWERS: And I think that, when I hear the words blending I get nervous because the problem is structural defense and depth is unbounded.

MR. APOSTOLAKIS: Yes.

MR. POWERS: Okay, unless you artificially bound it. And what Tom is saying is, okay, he's going to bound it because he's going to find a minimum here and he's going to bound it that way.

And then he's going to apply rationalist

where, elsewhere in the thing, because he had the rationalist approach has a bound on it. It doesn't sound like a bad idea to me, but I would not call it a blending.

I like this more minimum and then account for your uncertainty kind of rationalist approach on top of it. It's a more appealing description to it than a blend.

MR. WALLIS: It's almost as if one reinforces the other, rather than –

MR. POWERS: Well, it's a case of, you know, give Caesar what Caesar's due. They each have its place and the problem is always that, the problem with structural defense and depth is that if I apply it at too low a level, I end up with chaos.

Because, you know, if one pumps good, then two pump must be better. Well, two is good, gee, three must be even better. And there's no end to that.

MR. KRESS: And it's two different kinds of pumps.

MR. APOSTOLAKIS: I just don't think you can have such a clean separation. Because, I fully agree that you have to have the structural, as you guys define, you know, defense and depth, for example,

prevention versus mitigation, you say this is what I want to see. That's great. Then you go to the rationalist. Unfortunately, in applying the rationalist approach, you will realize very quickly, in certain instances, that there are uncertainties you have not quantified.

There may be incompleteness issues and so on, so you're reverting back now to structuralist mode, but that lower level. It's not rationalist all the way. It can't be.

MR. KRESS: But, George, I maintain you've got to do something about those uncertainties. You've got to include them in there some way.

MR. APOSTOLAKIS: Well, I mean, if you guys want to start quantifying uncertainties due to incompleteness and models, that would be great. I mean there is a first step with –

MR. KRESS: That's exactly, that's exactly my point.

MR. APOSTOLAKIS: – work that we reviewed at the Subcommittee meeting.

MR. KRESS: Yeah, but in order to do this, I think you have to have some way to deal with those uncertainties.

MR. KING: Yeah, I like to call them

qualitative uncertainties. Not going back to the structuralist –

MR. APOSTOLAKIS: In my mind that's structuralist. The moment say that then you start putting, I mean look at the you guys maybe are not up-to-date with this, but we were briefed yesterday on how to choose a position of break size in the revision of 5046.

And, you know, the staff came up with their expert opinion and recitation process, distribution, blah, blah, blah, then the decision maker now looks at all that.

And says, well, gee, you know, they did a good job but there are still uncertainties. We will go with this size. Now, in my mind this is a structuralist thinking.

Now why four inches greater than the upper percentile of the distribution and not six? That's the part you can't really quantify and say four inches is sufficient, five is too much.

In my mind this is still up in the air and I think that's –

CHAIRMAN BONACA: There was a practical decision that said let's take the largest attached pipe to the RCS. That is bringing that kind of, you

know, and that's, so since you don't have any further base to make a judgement, I mean, what you do you just anchor yourself to come kind of —

MR. KRESS: Yeah, but that's a cop out with respect to what George is saying. Suppose you didn't have that to lean on. And, George, I maintain that yes it's difficult, but it's not impossible to deal with these uncertainties in a sense of, you have to come down on how much uncertainty am I willing to live with.

And then you have to be able to quantify in some way, these uncertainties are bounded. And that's the approach that needs to be taken.

MR. APOSTOLAKIS: Idea, yeah, yeah.

MR. KRESS: But that's the only, that's only practical --

MR. APOSTOLAKIS: This conform in service inspection. How many times has Dr. Shack told us that everything we do there is a defense and depth measure, because from the risk perspective we shouldn't be doing anything. Is that true or not?

MR. SCHACK: It's roughly true.

MR. APOSTOLAKIS: It's roughly true. Risk-informed ISI is a defense and depth measure.

MR. KRESS: Well, that could be considered

part of the baseline, see. Okay, we won't deal with this in risk base, we'll just say you got to do it.

MR. APOSTOLAKIS: But that's my point. Why do you make that decision?

MR. KRESS: But those things are not part of the design, they're part of the, I think there's a lot of operational things that you're not going to include in the risk.

You're dealing mostly with design here. And those are operational issues. I think they treat them probably pretty much the same way they've been treating it for years.

MR. APOSTOLAKIS: Anyway, the fact that these issues have been acknowledged I think is a healthy step forward.

MR. POWERS: Let's see how they resolve it. And simply remember the dictate from one of your heroes, Stan Kaplan. When you're having trouble quantifying things, go out and quantify them.

(Laughter.)

MR. KRESS: Oh, I like that. I never heard that. But you can tell we're very interested in this subject.

MS. DROUIN: Please come to the workshop.

MR. KRESS: Some of us will be there, I

guarantee it.

MS. DROUIN: But I will say this. We will quit using the word blended, if that's mischaracterizing it.

MR. POWERS: No, no, I didn't mean to be too critical, it's just I like Tom's description as more consistent with my way of approaching it, I guess.

MR. KRESS: Well, will we have to let you know if we're coming to the workshop or do we just show up?

MS. DROUIN: No, you just show up. Unless you want to do a presentation as a member of the public.

MR. KRESS: No, I think I just want to listen.

MS. DROUIN: Okay, at this point I was, Tom is going to walk through the next part of the presentation and then Steve is going to do part, and then I'll pick up the tail end.

MR. KING: Yeah, the next issue on the list was what we call probabilistic licensing basis, where the Commission approved, as a policy matter, that we could use probabilistic criteria and probabilistic approach for establishing a licensing basis.

MR. KRESS: That's a big step right there.

MR. KING: Now what we're working on is what does that mean. And what it means is a different way of doing things in several areas.

One, doing away with the traditional single failure criteria and using the PRA event sequences to establish what are the failures you need to consider, both in the design and in the safety analysis to allow the use of scenarios, specific source terms.

And we have a separate slide on that, so I won't say anymore on that at this point.

MR. KRESS: When you talk about doing away with the single failure factor, what you're doing is trying to be more realistic. Instead of saying that some of these safety systems have a probability of one of not being in operation, they're actually going to give them –

MR. KING: Give them a probability.

MR. KRESS: And there's some uncertainty on it.

MR. KING: Right, right.

MR. APOSTOLAKIS: Plus you're going to have a problem with some of these new designs they use components that are kind of new, we don't have any

records and we don't know what their failure rates are.

I don't think it's as simple as it sounds, and Mario, I'm surprised you're silent. Your objection to 5046 choice of the TBS was that they're doing away with the single failure criteria for breaks above the TBS.

CHAIRMAN BONACA: No. No, no.

MR. APOSTOLAKIS: That's what you told me yesterday.

CHAIRMAN BONACA: No, you're taking bits and pieces to support your own way, and then you make your own –

(Laughter.)

MR. APOSTOLAKIS: No, that's what you told me.

MR. POWERS: And why do you find this unusual?

(Laughter.)

CHAIRMAN BONACA: No, no, in fact, I mean yesterday you talked and I listened to you. I said no, yes, and then it goes through my,

MR.APOSTOLAKIS: Anyway, let's go on.

MR. KING: You might argue that some elements of the single failure criteria concept are

still embedded in the defense and depth structuralist pieces of defense and depth.

We can deal with that in more detail later. Defining event sequence categories by frequency. What we've come up with is three categories of events that need to be considered in the design, and they are defined by frequency.

We call them frequent, infrequent and rare. There's numbers in the frame work to define those.

MR. POWERS: When did you find it necessary to define categories? I mean why did, I mean what do you use the categories for?

MR. KING: The reason we felt it was necessary to define categories, is because we're still in a risk-informed approach, we're not a risk-based approach.

So we still feel it's important to identify from these categories, things that would traditionally be called anticipated operational occurrences or design-basis accidents.

Because, for example, we're not changing part 100. We need to define something that's going to be used to assess against the citing criteria. And we still wanted some deterministic look at things, not

just strictly a probabilistic look.

So we're using those categories to select some things that would be labeled and dealt with in a more traditional sense.

MR. DENNING: Could you help me with a little bit, with the PRA that's the basis upon which you're going to do all these, this is something that an Applicant puts together?

I mean obviously there's no data on a lot of these systems that they have, and so there's a lot of hypothetical elements to this PRA at the design stage.

But you're going to, he's going to fix some PRA that's part of his submittal as his design PRA. And the thing, one of the things that concerns me is then based upon that, there will be decisions made as to what follows design-basis events and what are not design-basis events.

And then what happens as there's true evolution throughout the life of the plant and you start to have something where you really believe the PRA represents the real system, and that dramatically changes some, what happens then to design-basis events? Do they no longer, do they change with time?

MR. KING: Yeah, what you're talking about

is the very last bullet on this slide. The Licencee, the Applicant is going to responsible for developing the PRA and the technical basis that supports it. What our frame work and our requirements will have is some guidance and criteria regarding the scope and depth and quality of that, what that PRA is now.

When he comes in at the design stage, you're right, there's going to be more uncertainties than later on when they get actual information. And that's why we say use the term Living PRA in the last bullet.

One of the things that goes along with the concept of a living PRA, is what do you do with the changes as they come in and then the PRA is updated. And that's an issue we have to face in the sense that it could affect safety classification.

It could affect design identification, the design-basis accidents, anticipated operational occurrences. How do you factor those back in to a design that's already been approved? And we need to come up with a process that does that.

You know, right now we have changes that are made in plants and there's a process that's called 5059 in the regulations that allows a Licensee to make changes on their own, if they fall below a certain

safety threshold.

You know, he has to notify the NRC, but they can go make the changes. But above a certain safety threshold NRC approval is required. We're thinking of a similar type process.

We haven't laid it out yet given the complexities of certified designs and the fact that a living PRA could affect a lot of things. But it's clearly an issue we have to deal with, and we know we have to deal with it.

MR. DENNING: Because I think stability is really important here.

MR. KING: Yes.

MR. DENNING: And we're pinning things to PRA, which we know is going to have a lot of movement from this preliminary PRA to what really gets implemented. And as we start to obtain information, understand what the true risk from that plant, better understand. We never understand.

MR. KING: We know what the issue is. The industry knows what the issue is, we have to deal with it in this process. We don't have an answer at this point.

MR. APOSTOLAKIS: Now the DBAs that you're referring to, do not necessarily have to have the same

features that the current DBAs have, do they?

MR. KING: Right, and that's a key point. Today's LWRs have a stylized set of DBAs that they all have to design the plan for. This would be design dependent.

MR. APOSTOLAKIS: I'm sorry, design what?

MR. KING: Design-dependent. You know, depending on the design and what the PRA says, you would select those things that you would identify as DBAs based upon the criteria and the frame work.

And they would different from design to design.

MR. APOSTOLAKIS: But would they, would the requirements again include things like you have to do your thermal hydraulic analysis using conservative codes and estimates. You would have to have single failure criteria here and there.

MR. KING: No.

MR. APOSTOLAKIS: What would be the definition then of the DBA?

MR. KRESS: We're doing away with the single failure criteria. If you pick an event sequence and say that's my DBA because if, you know, it has a high consequence for example.

MR. SCHACK: And you, the Applicant is the

person who chooses these design bases?

MR. KING: They propose.

MR. SCHACK: They propose.

MR. APOSTOLAKIS: There would be some negotiation.

MR. KING: And that event sequence may have, you know, one, two or three failures in it, and then that's what you assume in your design and your safety analysis.

MR. WALLIS: Well, wouldn't you need things like if it's 2200 degrees, it seems to me that if the PRA reflected the consequence of going to 2300, 2400, 2500 degrees, you wouldn't need to specify some magical criteria.

Like 2200, if you just had it in the PRA, and you make decisions based on that.

MR. KING: Well, in the frame work, and in the technology neutral requirements we'll probably have some qualitative criteria. For example, DBAs, we don't want core melt accidents as part of your DBA.

Now what's that mean in terms of , for an LWR, and HTGR, a liquid-metal reactor, that's where the technology-specific regulatory guides would come in and say, okay, for an LWR, that means stay below 2200 degrees. For an LMR maybe some eutectic

temperature with the cladding. You know, whatever it turns out to be.

MR. APOSTOLAKIS: So are you saying, Tom, that the reason why you want to define DBAs is Part 100?

MR. KING: Yeah, I think, that's one reason.

MR. APOSTOLAKIS: What's the other?

MR. KING: I think the other reason is we want to stay risk-informed. We want some deterministic check on things, not strictly a risk-based decision process.

MR. APOSTOLAKIS: Well, the point, okay, after the, let's say in particular vendors trying to market a particular design. Okay, they come to you and they say we are proposing, here's our PRA and we're proposing these to be the DBAs.

Now if somebody, let's say they sell it to ten utilities. These ten Applicants now will use the DBAs or the whole PRA or both?

MR. KING: Both, both. It's a –

MR. KRESS: You'll have to meet the risk criteria, too.

MR. APOSTOLAKIS: But would the DBAs be analyzed using conservative methods, like it's done

now, or would they still be analyzed using PRA realistic methods, but those methods will be scrutinized to death by the staff because they're DBAs?

MR. KING: Basically, what we've said is across-the-board use best estimate methods. If it's a DBA we want to use a 95 percent confidence acceptance criteria, confidence level in comparing against the acceptance criteria.

If it's a risk criteria, like a LERF, for example, it would be using mean values. So we're trying to do it in the level of confidence that you would use in comparing your analysis, your best estimate analysis against whatever the acceptance criteria are.

MR. APOSTOLAKIS: And you would keep the margins separate from the PRA?

MR. KING: Yes, yes. Now we are thinking some guidance in the frame work and in the requirements, in terms of qualified analytical tools, how would you verify that the codes you were using are good for the analysis you're using them for?

We're thinking we need to put some guidance in. Exactly what that will say, we're sure at this point, but it's not something we can duck.

MR. APOSTOLAKIS: Why would you separate the margins from the PRA? I mean there are probabilities of failure, aren't they?

MS. DROUIN: Can I interject for something? I'm getting very concerned about the time. We're only on our second issue. We've got seven more to go. Not that this isn't a great discussion, it wasn't the intent of today's presentation to get into, you know, the detailed technicals on all of these issues.

MR. APOSTOLAKIS: Yeah, but you should get some input from us.

MS. DROUIN: Absolutely, it's not that I don't want the input, I'm just asking do we want to be able to get to all the other seven issues?

MR. KRESS: We might be able to bend on the time a little bit.

MS. DROUIN: We are going to be coming back to the Subcommittee in great detail to have these kind of discussions.

MR. KRESS: Okay, there's really nothing pressing where people have to be here following this. It's almost internal stuff, so we, you know, I'm not all that concerned myself about running over a little bit.

MR. APOSTOLAKIS: As long as it's just a

little bit.

(Laughter.)

MR. KRESS: As long as it's not a whole lot.

MR. APOSTOLAKIS: As long as Mario is not here.

(Laughter.)

MR. KRESS: Mario is not here, no.

MR. WALLIS: I might be more strict than Mario.

MR. KRESS: Oh, okay. Well, anyway, you can go ahead because we'll worry about the time and we'll just –

MS. DROUIN: Okay.

MR. KING: To go back to the margins question, what we've talked about is putting margins in the acceptance criteria. You know, you know where your failure point is or you have some idea where it is. Do you want to set your acceptance criteria some distance away from that?

That's when you say margins, that's what I'm thinking of.

MR. APOSTOLAKIS: Yeah, and I'm saying that these could be incorporated in the PRA itself.

MR. KING: They could, they could. Yeah,

that's one thing we, PRAs traditionally don't do, they don't –

MR. APOSTOLAKIS: Yeah, that's correct.

MR. KING: – put uncertain bounds on the acceptance criteria. And that's, that's something to think about. The other thing this section does, is it proposes some technology neutral risk criteria that, at this point, we're proposing would be surrogates for the frequency consequence curve.

And Dr. Kress' question, can you do that? Is a good one and I think we need to make sure the workshop covers that point. But we've proposed some, a couple of values in there for accident prevention and for accident mitigation that we want to get out and get some comments on.

We're developing a risk-informed approach for safety classification. We want to build upon 5069. You won't see much detail in the current framework, we're still working on that, but that's the idea, to use risk insights for safety classifications.

Okay, let me move on to the next, scenario-specific source terms. That's where you take the PRA and you take those event sequences, the ones you've identified for AOOs and for DBAs, as well as the ones that you're going to use for the, in the rare

category for emergency plan considerations.

And for each event sequence there could be a different source term, depending upon what happens to the fuel and what happens to the rest of the plant during that event sequence.

So our scheme would allow a designer to take credit for the plant performance and not just have a one-size-fits-all source term like we almost have now.

MR. POWERS: But would it be different levels of core damage then, instead of just having a CDF?

MR. KING: There could be different levels of core damage, yes.

MR. POWERS: Since there are different source terms.

MR. KING: Yes.

MR. POWERS: You want it just to have a signal core damage frequency.

MR. KING: Yeah. It could be core damage or it could be a breach in the primary cooling system, if it lets more out, for example.

MR. DENNING: And you're thinking again that you would have, for the design basis accidents you would use that for site dose criterion of 25 REM?

MR. KING: Yes, whatever the source term is from those things you call design-basis accidents.

MR. DENNING: And you're taking, one of the things that has me very much concerned is that you would take away a fair amount of defense and depth that we currently have where we use surrogate source term that doesn't really represent what we call design-basis accidents.

Within your design-basis accidents, could you include full core meltdown accidents at ten to the minus five? Or is that precluded at ten to the minus five?

MR. KING: We're saying for the things that you call design-basis accidents, which the cut off is ten to the minus fifth, we have a deterministic criteria we're proposing that says no core melt accidents in that range.

MR. DENNING: No core melt.

MR. KING: No core melt.

MR. DENNING: So you'd have only trivial releases, probably –

MR. KING: Well, it could be cladding failures, and it could be –

MR. POWERS: Well, not for prior part 100, he has to take a substantial core damage if you're

going to use part, retain part 100. It's required to do a substantial core damage.

MR. DENNING: So that's my question.

MR. POWERS: It's part of the rule. If you have, if you're going to use part 100, and not change, as written now, you'd have to have a substantial core damage.

It doesn't ask you what the probability is, it just says a substantial core damage. And that's been interpreted as release of some substantial amount of, I mean a non-trivial amount of radioactivity.

MR. DENNING: Well, that's what I'm trying to find out, or are you saying we do away with part 100.

MR. KING: Well, not do away with part 100, but not, not strictly apply that provision that says you have to have substantial core damage.

MR. POWERS: That provision carries over into the 50, is it 52, that's the advanced reactor, specifically cool down?

MR. KING: Well, we're proposing to apply that in a different fashion. To use your PRA sequences and base your source term upon whatever ones from the PRA you pick as design-basis accidents.

MR. KRESS: You're going to get real, is what you're saying.

MR. KING: I'm going to get real.

MR. KRESS: And really all that source term does is propose an artificial beacon train on the container.

MR. KING: Yeah, that's what it's used for.

MR. DENNING: But please, recognizing PRA space we scarcely look at the amount of fuel damage accidents at all, because they're such a trivial contributor to risk.

You know, so there hasn't been very much looking at what's a realistic source term for a non-core damage accident.

So, I mean I think the thought of comparing that to 25 REM at the site dose, even site boundary, if all we're talking about is our, you know, clad failure events and stuff like that. Those are really trivial consequence accidents and I don't think they're appropriate for siting type of calculations.

Siting may not be the right term to you now, but for example, for designing containment or something like that. It's there for severe accidents that are, in your vernacular here, are going to be less than ten minus five per year.

MR. KING: We haven't neglected containment and we haven't neglected severe accidents. You're going to hear what the containment story is. We also have, in probabilistic space and criteria for large release frequency, that would look across all the event categories and set some probabilistic goal or criteria for when you can have a large fission product release.

Which will affect your containment, it'll affect your entire plant design.

MR. DENNING: Well, why are you bothering to even look then at the source terms for these, these trivial source terms from design-basis accidents. I don't think, they're not really used to establish the design for anything.

The, you know, the surrogate source term that we currently use with design-basis accidents, does establish the design for the containment. And we create the containment and stuff like that.

MR. KING: When you're thinking LWRs, I think you are making a valid point. When you start thinking HTGRs and the design they have, you start to get some sources from, from –

MR. KRESS: You get substantial amounts of fission products that are tramped, fission products

that are plated out on the walls of the HTGR and are floating around in the heating. And those are significantly high.

MR. KING: Or a sodium plant, where the sodium gets highly radioactive.

MR. KRESS: Sodium may do the same thing, you know.

MR. KING: And you don't have to damage the core to get a tremendous source term.

MR. DENNING: Well, sodium plant may be a little bit different, particularly if you have a sodium fire or something like that. But I don't, I don't think, you know, as far as, LWRs are included in part of this consideration.

And I think that we have to think about what we were really using the design-basis accidents for previously and what their function was.

And right now, if we use trivial source terms associated with them, they don't serve that function of protecting the public.

MR. KRESS: Most of the design-basis accidents don't even deal with source terms.

MR. KING: Well, most of the, like the large break LOCAs, they assume the core melt source term, the same one that you do for part 100.

MR. DENNING: Right, it's a surrogate because you've used the large-based LOCA, but everybody knows it doesn't have that source term.

MR. KRESS: But it shows up on the equipment qualifications and it shows up in things like how good is your spray?

MR. KING: Containment design.

MR. KRESS: It shows up in the leakage rate of the containment. It doesn't show up in the actual size and strip of the containment, that's based on the pressures that come out of there.

So they really don't, those source terms really don't have a big impact on the design, it's the design of fuel of the safety, I think has an impact on the quantity of spray you have.

MR. KING: Well, they have an impact in the sense that it sets diesel generator start times and valve closure times and so forth on a stylized source term.

MR. KRESS: Things it really shouldn't, things that really shouldn't happen.

MR. KING: Right, things that may not, you know, reflect realistic accident scenarios. We're trying to be more realistic and your point is valid that –

MR. DENNING: I'm willing to move on, but I think you do have to recognize that's major differences and also that these design-basis accidents, in general, are going to have trivial source terms.

It wouldn't serve the same function of what we're doing today.

MR. KING: Okay. The thought I want to leave you with is we haven't forgotten about containment and we haven't forgotten about core melt accidents in this process.

They will show up and they will affect the design.

MR. POWERS: Let me turn to your comment on verified analytic codes and this may be outside of the scope of your particular work, but I'd be interested in your thoughts on it.

I see lots and lots of these advance reactors coming in with very, very novel fuels and designs and things like that. And people saying that there is, there's no efficient product release from this, even though I heated up to plasma-level temperatures and things like that.

And this is unbelievable stuff, and you say well how did you come about that conclusion? And

they said well I've got a computer code, it's a wonderful computer code. And whatnot and so you ask them well what experiments have you done, and they say well I haven't done any experiments but there were some German experiments done on fuel that has no relationship to the fuel that I'm going to use, but it looks about the same.

So, I, those must be those fuels, so should wonderful things, even though they were subjected to a temperature scenario that bore no relationship to the temperature scenario I'm going to subject it to.

The point being that the cost of experimentation has gotten so high now, there's reluctance to use experimental data even when we're delving into very novel technologies where predicted capabilities are sparse.

And people are, don't seem to have a good criterion for saying when is it that your physics embodied in your code may have all the right equations, but I want to see an experiment.

Is that something that you deal with when you say verified. Do you mean verified or validated here against experiments?

MR. KING: Yes, that's something we're

trying to deal with. I don't have an answer for you, but it's one of the issues we've got to wrestle with. What kind of criteria do we put in that's going to essentially require some experimental verification of what's being proposed.

And the flip side of that is what does NRC want to do in terms of some confirmatory testing to validate those things.

MR. POWERS: I presume NRC really can't make that as a generic judgement until after they've seen the application.

MR. KING: Right, right. And that's not something we're going to put in a set of requirements, but it's still an issue.

MR. DENNING: But please change that to verify and validated, because –

MR. POWERS: Verified to me means you went through and checked the code.

MR. KRESS: To see if you didn't make any mistakes in coding.

MR. KING: Okay.

CHAIRMAN BONACA: Are we ready to move on?

MR. KING: It's an issue and there will probably be a lot of arm-wrestling over the answer to that issue.

MR. POWERS: Yeah, and how you decide when you need experiments. I mean it's just not in the source term, it's in a lot of other areas.

MR. KING: Okay.

MR. APOSTOLAKIS: Isn't that related to the issue we were discussing earlier about the uncertainties?

MR. KING: Umm hmm.

MR. APOSTOLAKIS: Not that I know how to do it, but it seems to me they're related. The larger the uncertainty, so, perhaps, the more controversial the uncertainties are.

The more evidence you want from real world to eliminate some of them.

MR. KING: Yeah. I mean in theory you could say, well I'm just going to develop some bounding source term and not worry about it anymore.

The designer could choose to do that, and not go through the cost of a bunch of experiments and code assessment. And that option is in the framework, if they want to do that.

MR. POWERS: The trouble with the bounding approach is that it's bounding for some applications that, ipso facto is not bounding for others.

MR. KING: Yeah, it could cause some

problems in other areas, that's right.

MR. KRESS: One of the things we've talked about off-line in a bar somewhere, is that should this technology and neutral framework deal with the sabotage of terrorist-type issues, safeguards?

One way it could is to say, well, your PRA has to include that, would be one way to do it. And then all your criteria would be okay. I mean, just, it would be part of another set of sequences.

MR. KING: Umm hmm.

MR. KRESS: The other way is leave it out altogether and deal with it separately. Do you have any thoughts on how you're going to deal with that in this?

MR. KING: We have a placeholder in here on physical security.

MR. KRESS: Placeholder right now.

MR. KING: There is a separate paper being written by NRR.

MS. DROUIN: We have a slide on this, we're going to get to.

MR. KING: Yeah, we'll get to it.

MR. KRESS: Sorry, I didn't mean to jump ahead.

MS. DROUIN: No, that's okay.

MR. KRESS: It's just that emergency –

MR. KING: What the Commission approved last year in the EP area was we don't need to make any near term changes in the EP area, for things like the pebble bed, because, one, the regulations already provide some flexibility for HTGRs in the EP area.

But they did agree in the longer term, when we're thinking about defense and depth, think about how EP fits into that and they approved us thinking about some criteria that could be used to make an assessment on whether to change the emergency planning zone, with keeping defense and depth in mind.

So that's what we've been trying to do in this framework, and we've come up with some criteria that are in the framework. They're not on this slide, because we want to give the Commission a chance to look at them before we put them out for everybody else to look at.

But assuming the Commission sees this paper and doesn't object to us putting those out, they will be contained in the framework that will be one of the topics discussed at the March workshop. So, at that, I'll just leave it at that for now.

MR. DENNING: Quick comment. And that is I think emergency planning is overrated as far as its,

I think from a risk-informed viewpoint, if you look at the values of evacuation, that emergency planning is, many people think that's it's really, really important.

If you look at risk studies, as in NUREG 1150, and see what are the advantages of having rapid evacuation verses not evacuating and this kind of stuff. See, it doesn't really buy you that much in risk space.

People's perception is quite the opposite and they look at it as important defense and depth and some of the Commissioners, I know, think it's really, really important.

The reality is, for risk-informed, I don't think it's really that important. If we look at driving down core damage frequencies and lower source trends, if we really, you know, although Dana really doubts some these potential, it isn't at all clear.

You really need emergency planning zones. That they buy you anything really in a risk-based, look at this in comparison to their cost.

MR. POWERS: I find that remarkable. I find that just absolutely stunning statement.

MR. APOSTOLAKIS: I thought that we distinguished between late and early releases, based

on whether there's time to evacuate. So it should make a difference.

MR. DENNING: Well, it does make some difference, but if you look at NUREG 1150 and you do the sensitivity studies, and they're in there, in NUREG 1150, the sensitivity studies, for some, it doesn't make any difference at all.

Like the Sequoia, no difference at all, because they had early releases all the time. And so they were just as good to sit there and shelter.

Now it is important to go in and relocate after the passing cloud. But if you look at the value of emergency planning actions, in the sensitivity studies done in NUREG 1150, it buys you something like factor 4 on early fatalities for typical large drives and stuff like that.

In comparison with its cost, it isn't clear to me that for future plant designs it's necessarily warranted. So I think you have to allow the possibility that you've got a plant design with low enough core damage frequency and release characteristics that are such that, you necessarily –

MR. KING: Well, our approach is one, there needs to be some baseline emergency planning and then bang on your plant characteristics how much more over

and above that do you need? That's our basic approach.

But, again, I won't get into the details here. We're going to have plenty of time later to talk about that.

MR. KRESS: That could be viewed strictly and defense and depth and may not need it for risk consideration. But it's there because what if I'm wrong.

MR. DENNING: But I think you can look at the results of sensitivity studies and see does it really make that much difference or doesn't it?

MR. KING: Okay, let me move on.

MR. APOSTOLAKIS: We do other things on risk basis.

MR. KING: Integrated risk, the next two –

MR. POWERS: The only way I get away from prompt fatalities and most severe accidents is by evacuation. It's the only way I can do it.

MR. DENNING: Well, Dana, I challenge you to look at NUREG 1150, and look at those and there aren't that many prompt fatalities.

MR. POWERS: Because they evacuated.

(Laughter.)

MR. DENNING: No, not in the sensitivity

studies in which they don't evacuate and just shelter.

MR. POWERS: I have looked at the sheltering capabilities for frame houses, large concrete houses, subterranean concrete structures and one other facility and they give you a factor of two dose reduction.

MR. DENNING: And in many accident sequences you just don't have that large of a source term. It's the large, early releases that have the big source term, as well as not giving you much time for evacuation.

But the source terms vary tremendously, depending upon how long the containment stays intact, well, particularly if it doesn't fail at all. Sorry.

MR. KING: Integrated risk. I think we've had our controversy on this and our approach is, in the framework at this point we're dealing with integrated risk for modular units only.

We acknowledge the ACRS letter and the differing views. What we want to do is talk about those in the March workshop. We've got specific questions in the draft Federal Register Notice to get others views on that, to see whether we want to extend that to non-modular plants, and deal with it on a site-basis or a nationwide-basis. So we felt we

needed some more input before we were ready to tackle the ACRS letter.

But on the second, the next page, for modular plants, basically we're saying is that we feel integrated risk does need to be considered. For accident prevention, it would be considered primarily on a frequency basis.

It wouldn't matter what size the module was. And there is a definition of modular plants, by the way, that's in the frame work, it's the same one that's in the proposed Energy Bill.

So there is some limitations on what do I mean by a modular reactor. Excuse me?

MR. APOSTOLAKIS: Is this still proposed? I thought it was approved?

MR. KING: No, as far as I know, the Energy Bill has not been approved, it's still proposed.

MR. KRESS: If you stuck strictly with an FC curve, the question wouldn't come up.

MR. KING: Well, I'm not sure it wouldn't come up. Again, do you call an individual module a reactor or do you call that group of modules that's –

MR. KRESS: You just have an FC criteria for all of them.

MR. KING: So it doesn't matter what size

they are, they all have to meet the same thing?

MR. KRESS: Yeah.

MR. KING: But then how do you integrate? You don't deal with integration at all, is what you're saying? That's one way to do it.

MR. KRESS: The FC curve takes care of it. It takes care of it automatically.

MR. APOSTOLAKIS: But that's for the site, not for individual margins. The FC curve should be for the site.

MR. KRESS: Yeah.

MR. APOSTOLAKIS: But then there is the additional question of what do you do about the core damage frequency of each module? And that's where the ACRS was split.

MR. KING: Yeah, the frequency –

MR. APOSTOLAKIS: The FC curve doesn't take care of that because the defense and depth thing says you also have to worry about core damage, at least. Right?

MR. KING: Right.

MR. KRESS: Yeah, I understand.

MR. KING: Yeah, and we're saying you need to deal with both.

MR. APOSTOLAKIS: I don't think we

disagreed when it came to the site criteria for the release, right? There was no disagreement there. The disagreement was on the core damage frequency.

MR. KING: No, you're right, that's what your letter said.

MR. APOSTOLAKIS: What I don't remember is which side I was on.

(Laughter.)

MR. POWERS: It seems to me that in recent discussions on advance reactors, the concept of modular reactors has fallen substantially from favor relative to where it was when you guys started. Is that your perception as well?

MR. KING: Yeah, I think it's, the interest has decreased somewhat. It hasn't gone away. The pebble bed folks are planning, we got a letter from them recently.

They're planning to come back in and reactivate the review. The IRS people are still talking about doing a review. But you're right, the ones that are now undergoing certification are large plants.

MR. APOSTOLAKIS: The gas cold fast reactor was talking about 300 megawatt.

MR. KING: Yeah, that falls under modular.

MR. APOSTOLAKIS: Modulars are 300? So they're still talking about modular.

MR. POWERS: If they can get rid of their core instability problem.

MR. KRESS: George, when I said that FC Curves could take care of it, you can have two types of FC Curves. You can talk about the frequency of release of fission products from the fuel.

MR. APOSTOLAKIS: Oh, okay.

MR. KRESS: That's a type of FC Curve.

MR. APOSTOLAKIS: Okay, okay.

MR. KRESS: And if you set a limit on that, then that would take care of your CDF automatically because fuel may be dispersed into modules, or maybe one big one, or maybe part of the spent fuel pool.

So what you need is if you're going to have two sets of criteria for LERF and the CDF, you need two sets of FC Curves.

And I think I've said that in one of the little write-ups I gave you on things that you should be focusing on the fission products. And this is a way to do it.

To get this, to get this integration, that would be one way to do it. So you can take that as a suggestion from me.

MR. KING: Okay.

MR. KRESS: Rather than talking about CDF, talk about the frequency release from fuel first.

MR. KING: Okay.

MR. APOSTOLAKIS: I really wonder how, what that curve would look like?

MR. KRESS: It would be interesting.

MR. APOSTOLAKIS: The shape probably would be funny. It's not going to be that smooth thing we are used to seeing.

MR. KING: It's going to go the other way. Instead of coming down, it's going to go up. Frequency gets lower, the amount you can release gets higher.

MR. APOSTOLAKIS: Yes, yes. But that's the same –

MR. KING: It's an interesting concept.

MR. KRESS: At least it's a thought, we can give some thought to it. Maybe that's a better definition than the CDF.

MR. APOSTOLAKIS: It probably would be very steep. Then once you start releasing, then very quickly you're releasing too much. So, instead of some, but we can take the logarithm with the logarithm, can't we. We can always smooth the top.

MR. KRESS: Anyway, that gives you something to think about.

MR. DENNING: Let me make another comment that you don't like. And that is that the focus should really be on those radio nuclides that affect latent cancer fatalities rather than early fatalities.

I noticed that in here there's a, you're looking at earlies. From a risk viewpoint, you know, we look at individual risk for both. If you look at severe accident scenarios, the number of predicted latent cancer fatalities is hugely bigger than the number of early fatalities.

Hugely. Ten to the fourth, something like that. Some of that may be a little bit unreal, because is involves low doses and linear threshold theories. So if you take that rationale, then I think what you really do is you focus on cesium, for example, and you focus on –

MR. KRESS: I think they're focusing on dose. And if you look at their FC curves they come up with, and their rationale for how they deal with latent cancers, they have a good approach.

And I really congratulate you on that part of it.

MR. DENNING: Population dose –

MR. KRESS: Yeah.

MR. DENNING: – you're saying? Well, then you would be focused on –

MR. KRESS: The only thing I didn't see in that, they talked about latent cancers. They didn't really deal with the total deaths the same way.

MR. KING: No, we don't deal with total deaths, but these –

MR. KRESS: Then I'd like to see that, to tell the truth. Use the same process you use for the latent cancers and see what you come up with for total deaths.

MR. KING: The lower end of the Frequency Consequence Curve is based upon dose that would trigger an early fatality. But the area under the curve is based upon preserving the latent fatality QHO. So we try to deal with both.

MR. KRESS: I really –

MR. DENNING: No I'm not talking about, I wanted to make the important it's not the distinction, not the individual fatality. It's looking at the total consequences of the accident and that's quite different.

And there is where you see this tremendous dominance of latent cancer fatalities versus early

fatalities and those radio nuclides that contribute to large population doses as being the things that really dominate those.

If you take that philosophy, then if you look at core damage frequency, you would megawatt, you would megawatt average or weight your core damage frequencies in modular reactors.

MR. KRESS: Yeah, but we've always seen core damage frequency limits or acceptance criteria as being divorced completely from consequences.

MR. DENNING: But when you get to modular reactors and you're asking this question of how do you deal with core damage frequency, the way you would do it you, would be, you would megawatt base it.

Megawatt weight, the core damage frequencies if you're going to come up with a single measure.

MR. KING: We are proposing that for accident mitigation.

MR. DENNING: Because the total megawatts of cesium are largely dependent upon the total megawatts.

MR. KRESS: Oh.

MR. KING: Well, we are proposing a megawatt weighting when we get to mitigation. But

we're not when we get to prevention.

MR. KRESS: I don't think you want to do it for prevention. I like my suggestion better, that you need some sort of FC Curve for prevention.

MR. KING: That's an interesting idea, we'll think about that.

MR. ROSEN: I understand we're talking about health consequences here. But is there any question to begin to talk about societal consequences beyond health, like land contamination issues?

Economic consequences? Is that all in this framework?

MR. KING: What we've tried to make, yeah. You'll see in the framework dealing with, there is a section on land, I don't know if we caught land contamination, but it looks at land contamination from the standpoint of, if we meet, if the future designs meet the risk criteria we're proposing in here, what's that mean for land contamination.

And the benchmark we use to compare it against, is the extraordinary nuclear occurrence criteria that are in 10 CFR Part 140, as sort of the threshold we want to stay below.

And given the frequencies we're proposing, we try to make the case that you will not exceed the

extraordinary nuclear occurrence criteria.

MR. KRESS: That was a very interesting section. I thought there was some good stuff in there. I think you can use the same approach for total deaths.

Yeah, what we're trying to do is set the level of the FC Curve. And so we can meet all these criteria at the same time. And one or more of them is going to control it.

I don't know which one. I think it would be, in terms, when you look at it from the standpoint of dollars, like you did, I think that's a great idea, a wonderful idea. I made a talk once suggesting that.

CHAIRMAN BONACA: Just one word. We have, we're not even through half the presentation and we have ten minutes scheduled.

So, even if we are going beyond that, there isn't, so let's try to remind us.

MR. KING: Yeah, I think maybe we ought to move on. We'll go to containment. Stu is going to talk about that.

MR. RUBIN: Yeah, okay. Fortunately, we have an issue here that's not all that controversial like the others. Stu Rubin, Office of Research.

What I'll be covering in the next four

slides is where the staff is at this point on our efforts to develop functional performance requirements and criteria for containments for new plants.

This is a Commission policy issue, obviously and an important defense and depth issue for the framework. And it's particularly important for HTGRs in their licensing.

As background, as shown on this slide, in the SRM on SECY 030047, the Commission directed the staff to develop some performance requirements and criteria for these new plant containment designs.

And to do it in a way that accounts for the design and the performance characteristics of important SSCs in features such as the fuel and the core and heat removal systems.

And the Commission also directed the staff that we should work with designers and experts in the new plant arena, as well as other stakeholders, in coming up with these proposals for requirements and criteria.

And then to submit options on these requirements and criteria. Now as far as the approach is concerned, it's kind of summarized on this next slide. The approach that was taken to develop and assess the various containment function or performance

options, was first to identify, with the help of stakeholders, all of the functional areas where a containment would have or contribute to a safety role.

And some of the functional roles that were identified through the workshops and other means, were reducing radio nuclide releases to the environment.

Protecting risk-important SSCs from internal and external hazards. Protecting on-site workers from on-site radiation hazards. The next step in the process was to develop a specific proposed performance requirements for each of the identified functions.

And to try to state it in a way that was technology neutral and risk-informed and performance based.

MR. WALLIS: Could you address the issue of whether or not you need a containment at all?

MR. RUBIN: Yes, because if you go through the functions, there is a placeholder there for, and I assume you mean reducing radio nuclide releases to the environment –

MR. WALLIS: I was thinking about the AP-600. I mean if you believe the risk numbers the containment is worth 700 bucks a year or something. And you would never invest in that.

MR. RUBIN: But the performance requirement will kind of, it's performance based. And if there is a float in terms of how –

MR. WALLIS: Yeah, but there's no performance to be desired, because nothing will ever happen, why do you need the containment?

MR. RUBIN: Well, I mean it is a defense and depth issue.

MR. WALLIS: Okay, that's what I asked.

MR. APOSTOLAKIS: How much of that is enough?

MR. RUBIN: And how much of that is enough, and that plays out in the options.

MR. WALLIS: That's the big issue.

MR. RUBIN: That's the big issue.

MR. WALLIS: – signs may come up with no containment.

MR. RUBIN: How do you write this performance –

CHAIRMAN BONACA: – the public will have a lot to say.

MR. ROSEN: Well, how do you do performance requirements for something that has no function?

MR. RUBIN: Well, take a look at the statement and then we'll decide if there really is, in

fact, a null requirement or some positive value on the requirement, just to get to that.

The technology neutral statement that was developed for reducing radio nuclide releases was the containment must reduce radio nuclide releases to the environment sufficiently, so that the dose predicted for each of the events in the event categories meets the dose criteria.

Now what does sufficiently mean? In some plant designs, designers would argue that sufficiently means no reduction required, okay? If you go into, is that really accounting for defense and depth, it may or may not, in conclusion.

In fact, HTGRs would tell you that the reduction of radio nuclide releases is not required or is not important in terms of the functions that containments provide for that design.

MR. APOSTOLAKIS: But didn't the technology framework, in one of its incarnations, have requirements regarding mitigation and prevention?

MR. RUBIN: Yes.

MR. KING: It still does.

MR. RUBIN: Yes, yes.

MR. APOSTOLAKIS: So why –

MR. RUBIN: Yes, I'm going to get to that,

that point.

MR. APOSTOLAKIS: So that means there is a containment, doesn't it? I mean why are we discussing the absence of a containment.

MR. KING: Well, HTGRs arguably some of them do, but you know you can do it with a confinement.

MR. APOSTOLAKIS: Oh, confinement.

MR. KING: You can meet those numbers with a confinement.

MR. APOSTOLAKIS: Is that what you meant?

MR. RUBIN: Don't get hung up on the term containment.

MR. APOSTOLAKIS: No, he meant completely.

MR. RUBIN: That's a third level barrier, I like to use that term.

MR. APOSTOLAKIS: Yeah, that is a structuralist defense and depth measure.

CHAIRMAN BONACA: Let me propose that in that case you would have the public to deal with. I mean, I think that the rationalist considerations are, you know, more important than if you're inside the core and all that kind of thing, unless you come close to the issue of the containment, emergency plan, etcetera. You have to convince the states.

MR. APOSTOLAKIS: It will cost you more to convince the public, than actually building the containment.

CHAIRMAN BONACA: Absolutely.

(Laughter.)

MR. APOSTOLAKIS: I think that's what's going to happen.

MR. KRESS: But the HTGR people claim that there, that the containment detracts from safety because it ruins their alternate heat. And there is a, there is a basis for that.

MR. RUBIN: And we took account of those comments by developing metrics. And one of the metrics that we identified was does the option have a potential adverse on effect on safety.

That was one of the metrics that we used. Another was the flexibility and there are many. So, in some designs that was a negative in terms of the metric that we had.

Okay, so needless to say, we did have metrics in developing our options. Now the options is where really the, and let's just turn to the options page, thank you.

We have four performance options or standards on how that statement or requirement would

be met. And each performance standard demonstrates, provides, in turn, greater defense and depth for unknowns and uncertainties.

And greater capability to reduce radio nuclide releases.

MR. WALLIS: Suppose that one and two don't give rise to any source term, when you actually analyze the ideal reaction?

MR. RUBIN: Well, that's right. I think these were comments made on some of the new plant designs. Option one, you might not need a containment, with option one.

I think that's right. If you just hone in on the events that are more within the frequency ban for design basis events, then you're not going to need a containment.

Now, what Option two says, though, is that we're going to look at those events, but we're also going to select credible events that have a potential for a large consequence source term.

Now this is getting now to the traditional way of looking at design basis events.

MR. WALLIS: This is incredible because the contention of the designer will be that the likelihood is so small that it's incredible.

MR. RUBIN: Well, I can't answer the question today. It's going to be something that's going to be looked at, at the time a design is proposed and they will say this is our frequency, it's ten to the minus eleventh.

And the staff will say, no, I don't think so, for this reason. And those high consequence scenarios will have to be decided if they will be fleeted up into the design basis category.

And so that's the essence of Option two. It includes, what some people call these cliff-edge events, where the consequences really start to increase steeply.

MR. WALLIS: Well, you have a lot of problem now and you can't make your leak tight without knowing something about the pressure inside it. And if you've got an accident which will never happen, you'll never get any pressure inside it and –

MR. RUBIN: Okay, are you on Option four? I haven't gotten to Option four yet.

MR. WALLIS: I was just wondering how you apply these here. Now, I haven't gotten to Option 4, sure.

MR. RUBIN: Okay, well Option 3 is the same events that you would look at in Option 2, but in

addition you would require that the containment have a capability for controlled leakage and controlled release of the delayed accident source term.

That would provide additional structuralist defense and depth for unknowns and the events that you consider.

MR. ROSEN: You used the word leakage, do you treatment then leakage? Such as in a filtered and then containment?

MR. RUBIN: Not necessarily.

MR. ROSEN: So there's no requirement for treatment of the –

MR. RUBIN: No, not at this point, no. But you still have to, you still have to meet the required, the dose limit, in any event.

MR. ROSEN: Oh, yeah, but if you're talking about defense and depth, even though you meet the dose limits, if you want a leak, have the capability of the controlled leakage, before you can do that you must filter whatever it is you intend to leak. I mean that would be one way to go about it.

MR. RUBIN: Yes.

MR. ROSEN: That's not what you have.

MR. WALLIS: Maybe controlled leakage implies that the control –

MR. ROSEN: Well, that's what I was asking and he said no.

MR. WALLIS: I think it should.

MR. KING: Or it could or it could just be a very leak tight building that controls it that way. You can do it either way.

MR. WALLIS: That's Number 4.

MR. RUBIN: Yeah, well Number 4 is traditional light water reactor containment which is essentially leak-tight for both the prompt and the delayed source term.

And I didn't get into the pros and cons for each of these options. They're laid out in the paper and you can read what those are. At this point, our view is that Option three is the best option among the four, given the pros and cons that you would look at.

It would involve a substantial structuralist component to defense and depth, and with that kind of requirement, the fission product reduction capability would not depend on the performance of any of the other barriers, mechanistic barriers.

And so you would have additional –

MR. WALLIS: It all depends on what kind of

accident you're going to postulate which will provide the maximum challenge to this.

MR. RUBIN: Yeah, you'd have to look at the specific design, that's right. And pick the events that have potentially high source term, but are credible.

MR. APOSTOLAKIS: I wonder whether it's the Commission's philosophy not to depend on a single element. I think it's the Regulatory Guide 1174 philosophy.

MR. RUBIN: That's three and four. Three and four is a structuralist--

MR. APOSTOLAKIS: No, I understand that. But, I mean, it says the second bullet there is consistent with the Commission's defense and depth philosophy which provides a safety function should not depend on a single element.

Has the Commission ever said this? I don't think so. I think it was in –

MR. KRESS: I think in the white paper it was written.

MR. APOSTOLAKIS: No, it was, no, they defined it differently there. They said it's the provision of multiple barriers to prevent accidents from happening or mitigating when, if they happen.

But this particular thing of not depending on a single element, I think is Regulatory Guide 1174.

MR. KING: It is in, I think if you look at the current strategic plan of the Commission, this definition is in there.

MR. APOSTOLAKIS: Well, I'd like to see that.

MR. KRESS: I've seen it somewhere.

MR. KING: It is, the Commission has put these words out.

MR. RUBIN: Okay, at this point we plan to engage stakeholders in March on this topic as well, and take a look at the options, the evaluation of the options and clearly it will be an important element of defense and depth to the frame work when it's decided.

MR. DENNING: Does it have any function of keeping things out, as well as keeping things in?

MR. KRESS: Yeah, I think that's one of the functions. He didn't list it on that slide –

MR. ROSEN: Hopefully the next time we meet we'll get more detail-specific.

(Everyone is talking at once.)

MR. APOSTOLAKIS: So what's going on? Where are we? Oh, are we done?

MR. RUBIN: No, I'm done with my part. Tom

still has a part –

MS. DROUIN: No, with containment we're done.

MR. KING: I wanted to get back to Steve's question just for 30 seconds, having to do with societal, how we deal with societal risk and land contamination.

MS. DROUIN: I'm timing you.

(Laughter.)

MR. KING: And I mentioned the extraordinary nuclear occurrence criteria, which if they're exceeded triggers Price Anderson, which is when society starts paying for the clean-up.

So what we've done is tried to make the case that the criteria we've got in here will keep you from exceeding. And extraordinary nuclear occurrence talks about dollars, has some criteria for clean-up cost as well as land contamination, square meters of land contamination.

So we tried to make the case that if you meet these criteria you don't exceed the extraordinary nuclear clearance criteria, therefore you're dealing with a societal issue, and you don't need anything special to deal with it.

So that's, in a nutshell, what we're

trying to do.

CHAIRMAN BONACA: I don't think you deal with it as a societal issue. I mean once you have an accident of that type that's, you know, you have to account for much more than that.

MR. ROSEN: You have dealt with one aspect of society.

MR. KING: One aspect of society.

CHAIRMAN BONACA: One little aspect, and then you have all the cascading.

MR. APOSTOLAKIS: The question really is, isn't it, I mean if you have a land contamination goals, would that require us to do something to the plant that now we are not doing? That's really the question.

MR. ROSEN: Exactly, exactly. And what Tom is saying is that that's not going to happen, because of the way they've set it.

MR. APOSTOLAKIS: Yeah.

MR. ROSEN: They've set these other criteria, so you'll never trigger the extraordinary nuclear events.

MR. APOSTOLAKIS: So maybe that's something to think about?

MR. ROSEN: Nothing is never.

MR. APOSTOLAKIS: Whether there is something missing as a result of us not having a land contamination objective. Although the Commission in the past, I believe, was not too agreeable to establishing something.

But that was for light water reactors, that was for light water reactors, yeah.

MR. KING: We looked at the safety goals.

MR. APOSTOLAKIS: Yeah, and they said no. Would cesium be involved in that, do you think?

MR. KING: Let's move on.'

MS. DROUIN: Well, we're out of time. We're five minutes over our time.

MR. KRESS: Shame on you.

MS. DROUIN: Shame on me, absolutely. It always is. Level of safety. I don't know all the issues are controversial but this issue seems to have taken, at least with the public, probably the biggest controversy.

The Commission, in their SRM to the SECY paper, did approve the staff's recommendation on implementation of the Commission's expectation for enhanced safety for advance reactors.

So we do have an advanced reactor policy statement that states the Commission's expectations.

So the question on our part is how do we implement and achieve this expectation?

What we have done is to try and adopt an approach in the frame work that says we're going to meet that enhanced expectation by meeting the safety goals.

It has a lot of controversy and I expect to see a lot of discussion on this in our March workshop.

MR. KRESS: But you know you've got to come down on something and that's probably the best, you know, what else are you going to choose.

It's either define a new one or to accept that one.

MS. DROUIN: Well, this is key because this starts at the very foundation of our structure, of our safety philosophy. And if we change this, then it's going to, you know, have a domino effect –

MR. KRESS: Sure.

MS. DROUIN: – all the way through the whole framework document.

MR. APOSTOLAKIS: The level of safety –

MR. KRESS: I think that basically we're saying that's how safe is safe with us.

MS. DROUIN: Yes.

MR. APOSTOLAKIS: So you're, I guess I missed it. Are you saying that the frame work will be written in such a way that the current QHOs will be satisfied?

MS. DROUIN: Yes.

MR. KRESS: The FC Curve –

MR. APOSTOLAKIS: Because don't forget that it's –

MR. KRESS: the FC Curves will satisfy the QHO.

MR. APOSTOLAKIS: Yeah, yeah.

MS. DROUIN: Right.

MR. APOSTOLAKIS: But the current goals, not, and then they will say there is expectations that you will do better. But don't forget there's an important element in all this, which will not affect the frame work.

But there is a tough competition out there among designers.

MR. KRESS: VPR?

MR. APOSTOLAKIS: Down selecting, no the Gen 4.

MR. KRESS: The Gen 4 people.

MR. APOSTOLAKIS: So they're going to fight to do better, I'll tell you. They have economic

incentive for doing better.

MR. KRESS: Good.

MS. DROUIN: Good.

MR. APOSTOLAKIS: Because, you know, the DOE will select one, I don't know, in a few years.

MR. KING: And that's the argument we get back. We're going to do it so you don't have to require it.

MR. APOSTOLAKIS: Yeah, that's right.

MR. KING: So, it's an issue of expectation versus requirement.

MR. DENNING: Well, let's recognize also how easy it is to satisfy the quantitative safety goals.

MR. APOSTOLAKIS: I don't know about that, Rich.

MR. DENNING: Well, look at NUREG 1150 and –

MR. APOSTOLAKIS: I look at NUREG.

MR. DENNING: – you believe that those plants, and with large margin they satisfy.

MR. APOSTOLAKIS: Do you think they satisfy the condition –

(Several people talking at once.)

MS. DROUIN: Rich, not to delay today's

discussion, but I would encourage you to go read a chapter in 1560, which uses the results of 1150 to show there are quite a few plants that don't meet the safety goals.

MR. DENNING: Ones other than in NUREG 1150, are saying if you apply the same thing to other plants, you're saying?

MS. DROUIN: Yes.

MR. DENNING: Other than the NUREG 1150?

MS. DROUIN: Yes.

MR. DENNING: So I'm over oriented towards those specific plants.

MR. POWERS: I will go on and argue that in many, many cases you can show that perhaps even for the NUREG 1150, when I take into account fire, seismic and shut-down risk, don't meet the safety at all.

MR. APOSTOLAKIS: If the two plants that did, though, do meet them? There were two plants for which we did have a seismic. That was Peach Bottom and –

MS. DROUIN: And Surrey.

MR. APOSTOLAKIS: I don't know.

MS. DROUIN: No, Peach Bottom and Surrey.

MR. APOSTOLAKIS: Even for those?

MS. DROUIN: For those, for the full scope

when you did the seismic and the fire and the low power shut-down.

MR. APOSTOLAKIS: Did they –

MS. DROUIN: I can't say, I'm not sure about the low power shut-down, but I know for seismic and fire they did.

MR. APOSTOLAKIS: They did? They did meet them?

MS. DROUIN: Yeah, yeah.

MR. ROSEN: Okay, we've got ten more minutes, that's it.

MS. DROUIN: Okay, I think I can get through these next ones pretty quick. Physical protection. We originally were treating this in it, but at this point we have deferred it in this paper, in the frame work. And the reason why is that there is a separate paper being developed right now on this issue.

Whatever the Commission directs, that comes out of that paper, is what we will implement in the frame work.

MR. ROSEN: Is this the same Commission Security Paper that's being written to be used in conjunction with 5046? We've heard about that in several different contexts in the last few days.

MS. DROUIN: I don't believe so.

MR. ROSEN: About a paper, a paper that's being written in security. So it doesn't have to be considered, for instance, credit for manual actions in fire, no security because it's in this paper.

5046, no security because it's in this paper. Now new reactors, technology neutral frame work, no security because it's in a paper. And I'm trying to figure out if it's the same paper?

MS. DROUIN: I do not believe it's the same paper. But I don't know, Jerry, if you want to – maybe not.

Selective implementation was raised as a potential policy issue. At this point we are saying it's not a policy issue, because we are not saying that you aren't going to have the exemption process.

That's still going to be part of the process, so the exemption process will deal with this issue of selective implementation. So at this point, we don't consider it any longer to be a policy issue.

CHAIRMAN BONACA: What do you mean that in some cases you would require implementation and in some cases you would just exempt?

MS. DROUIN: What we we're talking is that when you look at, let's go down into the future where

you have this whole set of technology neutral regulations.

CHAIRMAN BONACA: Yes.

MS. DROUIN: Could you pick and choose. That would mean selectively implement. And we were originally saying no, you should not be allowed to do that. But then, by having that, that would say, well, you aren't allowing people to go through the exemption process.

Since we, the exemption process will be part of this, if people want to ask for exemption from a part of it, they have the right to do that.

MR. ROSEN: But they have to follow all the requirements in the exemption procedure?

MS. DROUIN: Correct, correct.

MR. ROSEN: And you may get it or not.

MS. DROUIN: They may not get it, that's correct. The one thing I want to really emphasize on this slide, when I say proposed, this, as I told you, the SECY Paper is only right now going through concurrence.

Once it goes through all the concurrence changes before it goes up to the EDO, this schedule could potentially change. I have not received feedback from NRR right now, so I don't know if they

have completely agreed to the schedule that we proposed here.

So I just want to make that very clear, that what could go forward ultimately may not be reflected as what's on this viewgraph. But this is what we have proposed in the SECY Paper and we're working it through concurrence.

The big things is that we do want to issue an early January copy of the working draft. That's on target to happen, but we'd like for the Commission to see it for a couple of weeks before it's released to the public.

We do have a date scheduled for March 14th and 15th, for the public workshop. We'd like to come back in April to meet with the Subcommittee in detail. We're prepared to come earlier if the Committee feels that, you know, there's a need to come earlier.

We thought it might be better to wait until after the workshop to come back to the Subcommittee.

MR. APOSTOLAKIS: What's the difference between issuing a working doc to the public an issuing something for public comment?

MS. DROUIN: It's perception. We wanted to make it very clear that this is all very preliminary.

These are not a final staff position. We're still working the staff position on this.

MR. APOSTOLAKIS: So public comment period refers to something that the staff feels is ready to go, and you are soliciting public comments? Whereas the other one is, look, we're still working on it, do you have any ideas to help us?

Is that really the difference? The first one is really entirely voluntary on your part. The second one you cannot avoid.

MR. KING: Usually when you put out something like a proposed rule for comment, it's the staff's best shot at that time. This is work in progress.

There's some holes in it, there's some things that we're, you know, putting out as a straw man to stimulate discussion. So it's a little, it's not a final –

MR. APOSTOLAKIS: And it's not mandatory, you just choose to do it?

MR. KING: Right.

MR. APOSTOLAKIS: As the other one is.

MS. DROUIN: Right. Because you can see when we have December of 2005, that's where we want to issue, what I would call more formally. Where we

among the staff, you know, have agreed that this is our best shot. This is what our position is.

MR. APOSTOLAKIS: Right, I understand.

MS. DROUIN: But in going there, and you know we have direction from the Commission to engage stakeholders very early in the process and this was an approach, if you remember we took with Reg Guide 1174.

We took the same approach with Reg Guide 1.200, and it was very successful bringing in the stakeholders very early into the process.

MR. ROSEN: What happens in June, 2006? You issue it, but does it become a regulation? Or how is it, what –

MS. DROUIN: This is a frame work document. This is a NUREG. This is for the staff use. And the next part, I mean if you go back to that slide, the next part is to develop the set of technology neutral requirements.

And all of this is forming the technical basis, ultimately, for the technology set of regulations.

MR. KRESS: And eventually that will go through rule-making.

MS. DROUIN: Right.

MR. APOSTOLAKIS: Has DOE shown any

interest in this?

MS. DROUIN: Oh, very much so. DOE has contracted Idaho doing a lot of work that we hope to use in this frame work document.

CHAIRMAN BONACA: Okay.

MR. APOSTOLAKIS: All right.

CHAIRMAN BONACA: Do we wrap it up?

MR. APOSTOLAKIS: We'll come to the workshop anyway.

MS. DROUIN: We've talked about, you know, we're going to have the workshop. We're going to send out a Federal Register Notice that's going to have a lot of, and here's just a short example.

I mean the actual list of topics is about four or five pages. It's quite detailed what we have developed that we want to go through on the workshop.

I hope two days is long enough for this workshop. There's a lot of issues that need to be discussed.

CHAIRMAN BONACA: If ACRS members attend, it won't be long enough.

(Laughter.)

MR. ROSEN: It says attend, it doesn't say participate.

(Laughter.)

MR. KRESS: Where do you expect this workshop to be?

MS. DROUIN: Right now we do have the auditorium reserved downstairs. I personally, I think we're going to have a large turnout, a very large turnout at this workshop.

MR. KRESS: Thank you, Mary and Tom.

MS. DROUIN: Thank you very much.

CHAIRMAN BONACA: All set, I think we will break. Back at 11:30? Break until five after 11:00.

(Whereupon, the proceedings in the above-entitled matter were concluded at 10:49 a.m.)

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