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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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RELIABILITY AND PRA SUBCOMMITTEE

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FRIDAY, FEBRUARY 20, 2015

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 8:30 a.m., John W. Stetkar, Chairman, presiding.

COMMITTEE MEMBERS:

JOHN W. STETKAR, Subcommittee Chairman

RONALD G. BALLINGER, Member

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR. Member

JOY REMPE, Member

MICHAEL T. RYAN, Member

STEPHEN P. SCHULTZ, Member

GORDON R. SKILLMAN, Member

DESIGNATED FEDERAL OFFICIAL:

MICHAEL SNODDERLY

ALSO PRESENT:

EDWIN M. HACKETT, Executive Director, ACRS

MICHEL CALL, NMSS

MARY T. DROUIN, RES

RICHARD DUDLEY, NRR

JOSEPH G. GIITTER, NRR

DONALD G. HARRISON, NRO*

MARK D. LOMBARD, NMSS

ED LYMAN, UCS*

JOSEPH RIVERS, NSIR

MICHAEL TSCHILTZ, NEI

*Present via telephone

C O N T E N T S

P R O C E E D I N G S

8:33 a.m.

CHAIRMAN STETKAR: The meeting will now come to order. This is a meeting of the Advisory Committee on the Reactor Safeguards Subcommittee on Reliability and Probabilistic Risk Assessment. I'm John Check -- John Stetkar, Chairman of the Subcommittee.

(Laughter)

CHAIRMAN STETKAR: It's cold and the mouth doesn't work well under optimum circumstances. Members in attendance today are Steve Schultz, Dick Skillman, Dennis Bley, Mike Ryan, Ron Ballinger and Joy Rempe. And I've been told we will be joined by Charlie Brown.

The purpose of today's meeting is to continue discussions on the status of the staff's plans for responding to direction from Chairman Jaczko to review NUREG-2150, a proposed Risk Management Regulatory Framework. And provide a paper that would identify options and make recommendations, including the development of a Commission Policy Statement.

The meetings are open to the public. This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act.

Rules for the conduct of and participation in the meeting have been published in the Federal Register as part of the notice for this meeting.

The Subcommittee intends to gather information, analyze relevant issues and facts and formulate proposed positions and actions as appropriate for deliberation by the full Committee. Mr. Michael Snodderly is the designated Federal Official for this meeting.

A transcript of the meeting is being kept and will be made available as stated in the Federal Register notice. Therefore, it is requested that all speakers first identify themselves and speak with sufficient clarity and volume so that they can be readily heard. And I'll remind all of you to please silence all of your little beeping devices.

We have received a request to make oral statements from Michael Tschiltz of the Nuclear Energy Institute and Ed Lyman of the Union of Concerned Scientists. I understand that there may be individuals on the bridge line today who are listening in on the proceedings.

The bridge line will be closed and placed on mute so that those individuals may be listen in -- may listen in. At the appropriate time later in the

meeting, we'll have an opportunity for public comments from the bridge line and from members of the public in attendance. And also, we'll open the bridge line periodically.

I understand that there are members of the NRC staff also on a separate line that we'll make sure that we open that to have comments from you. Also, if any of the presenters want help from any of the staff, just let me know and we'll get that line open.

We'll now proceed with the meeting and I'll call upon Joe Giitter of the Office of Nuclear Regulation -- Reactor Regulation, to open the presentation. Joe?

MR. GIITTER: Thank you John. I appreciate the opportunity for the staff to come here and discuss their efforts in evaluating a possible Risk Management Regulatory Framework.

Since the NRC Commission issued PRA Policy Statement nearly 20 years ago, the staff has been slowly moving towards a more risk-informed approach to decision making. In the oversight area we rely on the significance determination process to determine the appropriate level of inspection.

In the licensing area we have made strides in risk-informing fire protection requirements and in

improving change to allow outage times and surveillance frequencies. However, many of our regulations are still based on deterministic criteria that do not consider risk insights.

One of the main recommendations of the National Academy's report on the Fukushima accident is that the NRC should incorporate modern risk concepts into the regulations. And that the NRC and industry should strengthen their capabilities for identifying, evaluating and managing risks from beyond the found basis of that.

There may be no better time for the Agency to move toward an approach that would allow us to consistently consider risk in our decisions. We last discussed the Risk Management Regulatory Framework in the Subcommittee on October 17, 2014. At that meeting we described a two-phase effort focusing first on power reactors.

Then after obtaining Commission feedback on RMRF Options for power reactors, we planned to evaluate the merits of an Agency wide RMRF Policy Statement. And my understanding is that the Subcommittee was concerned that addressing power reactors first, might ultimately limit or constrain potential options for an Agency wide Policy Statement

addressing all NRC regulated program areas.

Since last October, we've had a number of senior management meetings on this topic and are now pursuing a slightly different approach. We still plan to propose several RMRF power reaction implementation options to the Commission in the initial RMRF SECY paper. But we've also decided to ask for a Commission decision on whether we should also pursue an overarching Agency wide Risk Management Policy Statement. And you'll hear more about that from the staff today.

So, today we plan to present a brief overview of what an Agency wide Risk Management Policy Statement might contain. And an update on our power reactor implementation options. And then finally a summary of our plans to move forward.

And also, because we're now considering an Agency wide Policy Statement, we're also providing presentations on the status of risk-informing the program areas of security, spent dry fuel storage and other areas within our regulatory purview.

With that I'm going to ask Dick to go ahead and start the staff's presentation.

MR. DUDLEY: Thank you Joe. Starting with slide two. What I'm going to talk about is just

the background and the current approach. First I'll describe a little bit of what we're thinking on the Agency wide policy statement. Then I'll discuss the implementation options for Risk Management Regulatory Framework for Power Reactors that we're currently considering. And Then I'll briefly touch on our plans to move forward.

After I speak, Joe Rivers will talk about the status of risk-informed activities regarding common defense and security. Following him Michel Call will talk about the status of risk-informed activities regarding dry spent fuel -- spent fuel dry storage. And also Michel Call will speak about the status of risk-informed activities regarding nuclear materials licensing.

Michael is sitting in for Dennis Damon who was on official travel. So detailed questions might not be -- if you have a detailed question and we can't answer it, we'll take it down and we'll get the answer back to Mike Snodderly to distribute to the Subcommittee.

On slide three, as Chairman Stetkar said, the Chairman's Tasking Memo of June 2012 directed the staff to review NUREG-2150 and provide a paper to the Commission that would identify options and make

recommendations, including the potential development of a Commission Policy Statement.

Furthermore, the Commission's May 2004 SRM on Near Term Task Force Recommendation One, directed the staff to reevaluate our proposed Improvement Activities -- Improvement Activity One to establish a new design basis extension category of regulations. And Improvement Activity Two to define and establish criteria for adequacy of defense-in-depth to reevaluate those Improvement Activities within the context of the Commission's direction on a long term risk management regulatory framework.

The Commission's SRM also closed Near Term Task Force Recommendation One and it increased the scope of the RMRF SECY paper by adding a requirement that we describe the relationships between the ongoing risk-informed activities. As a result in the change of scope, the staff requested an extension of the due date for the RMRF SECY paper until December 2015.

And as Joe said, since we talked to you last in October, management has reevaluated our approach to evaluating an Agency wide risk management regulatory framework. And now we're currently considering three power reactor specific implementation options for a risk management regulatory framework. But we will

also in parallel with that, this paper will ask the Commission to consider an overarching Agency wide risk management policy statement.

The next few slides are sort of an overview of what this policy statement might look like.

MEMBER BLEY: Dick, excuse me. Wasn't that part of your original charter?

MR. DUDLEY: To?

MEMBER BLEY: The Agency wide aspect of this.

MR. DUDLEY: I mean, that was -- that was the Chairman's Tasking Memo.

MEMBER BLEY: Yes.

MR. DUDLEY: Said to make recommendations regarding an Agency wide policy statement. That's correct. Or to consider that.

MEMBER BLEY: Okay. But now you're going back to the Commission to say there's a way we could do that or something?

MR. DUDLEY: Yes.

MEMBER BLEY: Okay.

MR. DUDLEY: And so what I'm going to describe in the next few slides are just of -- it's sort of a bulletized summary of what this might look like. We didn't want to spend too many resources developing

a detailed policy statement and find out that the Commission didn't want us to spend all the resources to do that.

So, we're sort of walking a fine line between trying to get enough detail to describe to the Commission what such a policy statement might look like to allow them to make an informed decision. But yet not use up all -- expend a lot of resources on something and have them say well no, that's really not what -- we didn't want you to do that. So, that's the balance we're trying to strike in evaluating the policy statement.

So, what we have is we believe that this policy statement of course would be applicable to all NRC regulated program areas, applying both to radiological safety and to security. We believe that -- a risk management approach would be used to ensure adequate protection of public health and safety and to promote the common defense and security for all Nuclear Regulatory activities.

In a risk management approach, safety and security are ensured by understanding the risks and the hazards associated with NRC regulated activities. And using that information to make regulatory decisions. Onto slide five.

The risk management approach would use a structured process to identify issues, develop and analyze options and make decisions and monitor the effectiveness of Regulatory programs to -- and make appro -- go back and make improvements to them if we found that to be necessary. It would ensure appropriate Regulatory controls and oversight are in place that recognize the variety of risks associated with the different uses of radioactive materials.

And it would employ risk-informed decision making in which risk insights of both qualitative risk insights and quantitative risk insights would be considered together with other non-risk factors commiserate with their importance to public health and safety and common defense and security.

MEMBER SKILLMAN: Dick, may I ask you to go back to slide four please.

MR. DUDLEY: Yes.

MEMBER SKILLMAN: In your second bullet, you've identified safety independently from security. Isn't security a subset of safety?

MR. DUDLEY: There is a safety/security interface where actions that you take to ensure security of a facility from external attacks or that sort of thing, there is a relationship between the two.

Ultimately, a security event, the consequences would perhaps be radiological. Joe, do you want to --

MEMBER SKILLMAN: I'm well aware of that. What I'm trying to do is get clear in my mind what I think is a distinction that you're drawing here between safety, in terms of nuclear safety, SSCs, CDF, LERF, that type of thing. Contrasted against force on force, bad guys, terroristic threat to the facility or to fuel facilities. Is that the distinction you're making here?

MR. DUDLEY: It would -- well, we would -- this policy would apply to both.

MEMBER SKILLMAN: But are you trying to have two policies or one policy?

MR. GIITTER: Dick, maybe I can take a stab at that. You know, the Agency's traditionally talked about safety and security separately. But of course we understand that security can be a subset of safety especially when you're looking to design basis threats.

For some facilities, Cat 1 facilities for example, for reactors it's radiological sabotage. But for Cat 1 facilities, you're concerned about theft and diversion of special nuclear material.

So, we do understand the nexus, the point you're raising. But traditionally, the Agency has

discussed security, although it can be a subset of safety as you indicated, as something separate and distinct from security -- safety and security is two separate and distinct things. Although we understand the interrelationship.

MEMBER BLEY: Mr. Giitter though, it is traditional, I agree with you. But on at least three occasions over the last six, seven years, the Commission has issued SRMs urging the staff to integrate their concerns with safety and security.

MR. GIITTER: Yes, we agree.

MEMBER BLEY: Okay.

MEMBER SKILLMAN: Joe thank you. Understand. Dick, thank you.

MR. DUDLEY: Okay. On slide six now, under an Agency wide policy statement, the technical analysis supporting the risk management approach should be based on sound data, information and methodologies, including the consideration of uncertainties. It should use techniques or combinations of techniques that are appropriate for the hazards and the complexity of the issue.

It should be as realistic as practicable considering the specific application. And it should promote and utilize advances in science and technology

as practicable.

MEMBER SKILLMAN: Dick, back to six please. Items one and two, at least in my view, have the attribute of metrics. You can measure them. You can figure out what you're talking about. You can put numbers, percentages, some form of measurable scale for one and two. Both three and four have the word practicable.

And what I see as practicable and what you see and what the other members of the public might see as practicable, might be vastly different. What can be done to make sure that there's a metrification there so that the measurement standard is understood and is defendable?

MR. DUDLEY: I think you've hit on the challenge. An Agency wide policy statement, we have certain programs where we have quantitative tools and safety goals. And we have other programs which rely more on qualitative risk assessments. I can't really tell you how we're going to bring them or even if we can bring them all into a quantitative arena.

I don't believe that is likely possible. But what you hit on I think, is the major challenge of an Agency wide policy statement.

MEMBER SKILLMAN: Are we pumping against

the tide? Is this a go nowhere riddle that we're going to be involved in?

MR. DUDLEY: No, I don't think so. I mean we can certainly address activities in a quantitative fashion if that's appropriate. In a qualitative fashion if quantitative tools are not yet available.

MEMBER SKILLMAN: Okay. Thank you.

MS. DROUIN: This is Mary Drouin. Another way to look at that third bullet and interpreting the work practical, is that not every analysis that we do needs to be completely realistic. You know, there will be some analysis because of how you're applying it, you don't need to be as realistic.

So this is you know, be as realistic as it's commiserate with the application or the decision that you're trying to support.

MEMBER BLEY: That makes sense to me Mary. And if I look up the work practicable, it just means is it possible to do it, right. What you're saying is, does it make sense? Which is a different concept. And if that's where you folks are headed, maybe you ought to polish up the language a little.

MR. DUDLEY: I haven't looked up practicable in the dictionary. I need to do that and maybe we want a different word.

MS. DROUIN: Yes. And recognize that you know, all these bullets that Dick has put up there, we will envision that over time you know, as we have more dialog, among the staff, as we go out for public review and comment. You know, these words are going to be massaged and worked through. This is not the end product that you're seeing here.

MEMBER RYAN: One thing that might be helpful, and I'm sure others will have, you know enjoy seeing a glossary that takes all these terms, practicable, practical, you know, any one of two or more dozen words you want to define to help give people at least some idea of what your intention for the meeting is and the document. I think that would be a useful addition.

MR. DUDLEY: Again, I want to emphasize, this is our very first draft.

MEMBER RYAN: Sure.

MR. DUDLEY: It's very early on. There will be multiple levels of management review. Clearly if the Commission supports such an approach, just what you said, we'll have to dissect these words very carefully. We'll have to have them clearly defined.

But at this point, we're just not there. We're trying to give the Commission enough of an idea

of what this policy might look like so that they can make an informed decision as to whether or not they want the staff to pursue it. But yet, not use too many resources to develop a policy statement that perhaps the Commission chooses not to have us do.

MEMBER RYAN: Well, that's a fair way to look at it. Yes. And to proceed.

MR. DUDLEY: Right.

MEMBER RYAN: Thank you.

MR. DUDLEY: Great.

MS. DROUIN: This is Mary Drouin again. Your point is very well taken. And the working group has started a glossary you know, on this. So, we have anticipated that and there's already some terms that we have defined and we are actually starting a glossary.

MEMBER RYAN: Okay, great.

MS. DROUIN: And I think Dick has that as a backup slide.

MR. DUDLEY: Yes, we have defined a number of terms.

MEMBER RYAN: Excellent.

MR. DUDLEY: And practicable or perhaps some other adjective would be added to that if that's not the right word.

On slide --

MEMBER SCHULTZ: Dick, before we go forward.

MR. DUDLEY: Yes?

MEMBER SCHULTZ: In the last -- in these three slide where you've talked about the statement and then the approach and technical analysis, in order to get to the point where this is being utilized beyond the evaluation and then getting into decision making, are we also promoting an approach that would be evaluating comparative risks associated with the technology and the decisions and so forth? In order to make good decisions related to this technology, the nuclear technology versus other technology?

MR. DUDLEY: You mean comparing nuclear to this?

MEMBER SCHULTZ: Well, establishing the metrics that would allow decision making to happen. We haven't talked about that. It's not talked about here, establishing the goals and objectives.

MR. DUDLEY: That's correct. That will be easier to do for some programs then for others. And again, that was Member Skillman's point I think. We clearly have quantitative tools and safety goals for certain regulated areas. We have qualitative tools and goals in other regulated areas.

I am not sure if all regulated areas will ever make it to qualitative tools and acceptable levels of risk.

MEMBER SCHULTZ: You mean quantitative?

MR. DUDLEY: Quantitative, um-hum.

MEMBER SCHULTZ: Quantitative then.

MR. DUDLEY: Quantitative, I apologize, yes. I'm not sure that those who have qualitative tools and measures will make it into quantitative. So I can't necessarily -- perhaps your question was can you compare risk from one regulated area to another regulated area using the same scale? Was that where you were coming from?

MEMBER SCHULTZ: Well, I'm focusing on the attribute of decision making. And you can do comparative evaluations and analysis. But all of this appears to be in internal focus associated with what is being done within this Agency. And I'm also looking for an understanding of what is done outside the Agency in terms of the same types of decision making. I'm not seeing it here.

MR. DUDLEY: I mean, if one -- if you're postulating tools that would allow one to compare the risk to the public from electrical power generated by nuclear versus risk to the public of electrical power

generated by burning coal, we're not going to be doing that. I personally think that would be very interesting. I have seen some studies on that.

But, that's not I think within -- I don't have an OGC representative here. But I don't know that that's within our charter.

MR. GIITTER: Yes Dick, just let me try to clarify a little bit. For the harm part of Agency wide policy statement, that was not envisioned. We do that as you know of course, to a certain extent with the safety poll policy. But whether we would do that would certainly -- would be a Commission decision, a policy decision.

But it's currently not something that's envisioned for RMRF at this point.

MEMBER SCHULTZ: Thank you.

MR. DUDLEY: That concludes the very -- the preliminary work that we've done regarding an Agency wide policy statement. We -- the management decision to pursue that was made in January.

So we haven't been looking at this very long. So it is --

MEMBER BLEY: Just last month? January?

MR. DUDLEY: Yes. That's correct. So and it is very preliminary.

CHAIRMAN STETKAR: You have circulated a draft policy statement back last year, didn't you? For comments? Or did the -- I guess I never -- no, it was released.

MR. DUDLEY: There was one published, a risk management. Yes, that's correct.

CHAIRMAN STETKAR: Did you get public feedback on that?

MR. DUDLEY: Yes, we did.

CHAIRMAN STETKAR: Okay.

UNKNOWN: And?

MR. DUDLEY: I answered the question.

CHAIRMAN STETKAR: And I didn't follow up and silence is interpreted as move on quickly.

(Laughter)

MR. DUDLEY: No, seriously I -- I'm assuming we -- I think this Committee, this Subcommittee was very pleased with the work.

CHAIRMAN STETKAR: Yes. We were briefed on it in that October meeting.

MR. DUDLEY: Right. So yes, this Committee was pleased with that. There were other members of the public that perhaps were not so supportive. But -- so feedback was mixed. But yet as you say, this Subcommittee was very positive with

respect to that policy statement.

CHAIRMAN STETKAR: Okay. Thank you.

MR. DUDLEY: Okay. The slide seven starts the three power reactor risk management regulatory framework implementation options that we are currently considering. Option One is to maintain our existing current regulatory framework.

Option Two would be to institute a voluntary, alternative, risk-informed licensing basis. And Option Three would be a plant specific risk management regulatory framework, essentially the framework recommended in NUREG-2150 for power reactors.

These three Options were also described to you essentially in the same form when we came here in October. But when we were here in October, we had a fourth option that we have dropped. The option that we had, that we dropped, was to continue to risk-inform our regulations on a generic basis.

That activity includes things like finishing up 5046(a), the risk-informed ECCS rule. Maybe looking at the coupling LOOP from LOCA. And under that Option we were going to more aggressively and more thoroughly go through our regulations and see if there are others that could be risk-informed on a

generic basis.

I don't know that that would have been successful. Ultimately management decided we would drop that Option to simplify the paper.

CHAIRMAN STETKAR: In a sense, one could argue that's part of Option One anyway, right?

MR. DUDLEY: You could argue that under Option One, we've gone about as far as we can go.

CHAIRMAN STETKAR: Okay.

MR. DUDLEY: And I think that probably is. At least that's my view. By the time we complete 5046(a), and then perhaps look again at LOOP -- separating LOOP from LOCA.

Any other questions?

(No response)

MR. DUDLEY: Okay. So those are the three Options. Our description of these three Options should essentially be similar to the description that we gave you back in October.

Under maintain the current regulatory framework, we would not revise our framework. We believe and even NUREG-2150 states, in Chapter 4, Option A, that the current power reactor regulatory framework meets the criteria for a risk management regulatory framework.

We have the Commission Safety Goal Policy statement which sets forth a risk management objective. Our current regulations implement sufficient protection, defense-in-depth and safety margins that they would provide, that would correspond to meeting the 2150 risk management goal.

NRR has a licensing instruction, LIC-504, which has a risk-informed decision making process in it very similar to the one recommended in NUREG-2150. And in addition, the NRC has numerous monitoring and feedback mechanisms that we use to gauge the efficacy of our regulatory decisions and to identify new information that should be considered within the regulatory framework.

And I believe when I met with this Subcommittee once before to talk about Near Term Task Force Recommendation 1, we had a little over an hour presentation where we talked to you about our existing programs that do this. The Operating Experience Program, the Generic Issues Programs, the Agency Action Review Meeting. So, we have discussed these programs with this Committee before.

And finally, we like to always emphasize that maintaining our current regulatory framework is not a do nothing option. Under our current framework,

we have complete freedom to make safety improvements based on risk insights or whatever considerations we would choose whenever it's deemed necessary. And we can make changes using our existing regulatory processes.

CHAIRMAN STETKAR: But I think that just for the record that does tend to be more of an ad hoc process, issue specific, rather then a comprehensive integrated Agency wide approach.

MR. DUDLEY: It is --

CHAIRMAN STETKAR: Even within the narrow focus that you've emphasized here, even within the power reactors area.

MR. DUDLEY: I would say that's correct.

CHAIRMAN STETKAR: Okay.

MR. DUDLEY: I would not disagree.

Power Reactor Option Two. Under Option Two, the Voluntary Alternative Risk-Informed Licensing Basis, we would maintain our existing generic regulatory structure as it is, but we'd issue a rule allowing licensees who volunteer or choose to upgrade their PRAs. They could apply for approval of a licensing basis that would support a performance based, risk-informed alternative to certain deterministic regulations that their PRA would show might have low

safety benefit at their specific facilities.

So these licensees would be allowed to select a plant specific set of design changes or compliance issues, shown to be of low risk, from which they could deviate from our current deterministic requirements. Some of these would require NRC approval. Some of this might allow -- in some cases we might allow licensees to approve low risk changes themselves without our approval, as long as they also search for and mitigate all plant specific risk vulnerabilities that would meet NRC specified criteria.

So, if you want to take this approach and do your PRA and try to reduce or eliminate some low risk, significant requirements, you will have had to look for risk outliers and other things that maybe have specific risk at your facilities, even though they're in compliance with the current regulations. You would then have to under this alternative, mitigate that risk before you could then take the benefit of making the facility changes to change the existing deterministic requirements that were not risk significant at your facility.

MEMBER BROWN: Isn't this -- the first -- the second measure bullet, I guess it -- that sounds

like part of the prioritization type stuff where you have -- I mean that's -- I'm just connect -- trying to connect the dots with these. They sound very similar where you can avoid safety benefit, you can then prioritize and do some stuff on a lower level basis then you did as a --

MR. DUDLEY: They are. There is a similarity.

MEMBER BROWN: Okay. I mean, is that -- why is the prioritization separated out? I know we're going to do that this afternoon, but --

MR. DUDLEY: These activities are related. Prioritization is the first step.

MR. GIITTER: Yes, let me try to address that. What you're going to hear this afternoon is focused primarily on -- at least initially, on scheduling. So if licensing has a modification in front of them, whether it's something they're required to do or something that they are taking it upon themselves to do because they think it's going to improve their reliability at the plant, they will -- it provides a methodology for them to make decisions on what should come first. And what can be deferred to later.

What we're talking about here, similar in

concept because you're using risk insights to determine what's more important, but fundamentally it's different in that we're looking at actual changes to the license and the licensing basis for the plant. So it's a more permanent and substantial change then the risk prioritization effort that you'll hear about this afternoon.

MEMBER BROWN: Okay. Thanks.

MEMBER REMPE: If I compare Option Two and Option Three, and I know you've not fleshed out all the details, but in your mind, it would the same amount of upgrades to the PRA be needed for Option Two and Option Three?

MR. DUDLEY: Let's see, I'm -- I'm not sure.

MR. GIITTER: That's -- yes, I can talk a little bit about that We envision that there's going to be upgrades to the PRA required for both Option Two and Three. It may be a matter of degree.

For Option Two, certainly you're going to have to upgrade your PRA to a level that is necessary in order to make the right decisions. In other words, if you're looking at what all of the hazards are for the facility, you're going to need to have external event models for example. You'd need to understand how

they play in.

Now whether you actually have to do for example, a flooding PRA or something like that, there may be some flexibility in how you do that. You may be able to because right now the state of the art doesn't really support flooding PRA. You may be able to use qualitative insights or some other methods similar to what we did for the IPEEE to make those kind of decisions.

But you are going to have to have information necessary in order to make the right decision. Whatever that decision might be.

MEMBER REMPE: Okay. Thank you.

MS. DROUIN: Let me just also add to that. It's also going to be dependent on what your acceptance criteria is. I mean in Option Two, you may keep your acceptance criteria for example to reactors CDF and LERF. Or maybe you know, just to release those. So then you'd only require you know, a level two.

Now the level of detail in the scope that goes with it would probably increase. But when you go to Option Three, you know, if you're starting to talk about using for example a frequency consequence curve, then you're talking about having to do a level three PRA. Versus just keeping your PRA the CDF and LERF.

MEMBER SKILLMAN: Dick, let me make an observation and then ask a question. Option Two provides what I view as a very great benefit to licensees. But, I spent about ten years consulting. And most of my consulting was engineering effectiveness in relationship of engineering for the plant culture. Whether it's the work management program or operations.

And what I observed in those ten years is some plants that were very well run, there was a very strong relationship between the corrective action program, their work management program and just an honest to goodness understanding of Appendix B to 10 CFR 50. All 18 points, including record keeping and configuration control.

And unless a licensee is firmly set on a configuration control program that ensures the plant's configured the way it's supposed to be and its documentation shows that configuration, unless the PRA model reflects the current configuration, this can be a red herring. Because they can be asking for change under what they believe to be an appropriate PRA model when the plant isn't reflective at all of that model.

So my question is, what is the discipline that ensures that before an option like this is granted to a licensee, they are really where they are supposed

to be in configuration control, commitment to 10 CFR 50, Appendix B? They are really doing it?

MR. DUDLEY: Well, we have a very active reactor oversight program and onsite inspectors. And I think that's the tool that we would use. And that we are using right now.

MEMBER SKILLMAN: Do you believe that's effective?

MR. DUDLEY: I'm not an expert on the oversight program. I can't speak to that. I assume it's effective or we would be improving it. But I think our existing oversight program is likely adequate for that. If you would like us to get some additional information or if you're at a future meeting, something about that, we can put that together for your. But --

MEMBER SKILLMAN: That is not really what I'm driving towards. What I'm driving towards is the notion that if Option Two were to become a viable option that there needs to be part of that Option Two a recognition of the importance of compliance with the other regulations that ensure that the plant configuration and the PRA model are in alignment.

MR. DUDLEY: So perhaps what you're suggesting is, if the plant implemented Option Two, one of the conditions of that might be a special inspection

prior to that approval to make sure that their actual configuration was consistent with the configuration that was modeled in the PRA. Maybe that's something we should consider.

MR. GIITTER: Well, yes, Dick let me just -- I agree with your comment. And with any model or PRA model, it's only as good as the understanding of how the systems operate, your ability to model systems, failure modes of course. So, that is critical.

And how that's done, it's a very good point. I don't know that we would necessarily want to do a detailed PRA inspection. I mean, that's certainly a possibility we could look at. But there are -- it is something that we would have to have a high degree of assurance that the PRA model is -- represents the plant condition.

And there are -- and then Mary can talk about this more. You know, there are peer reviews that are done of course anytime you upgrade your PRA. That doesn't go into the level of detail that you're talking about. But -- so this is a very good point and it's something we'll take into consideration.

MEMBER SKILLMAN: Can I just -- let me make one more point. The real concern I have is that the more clever your team is at the site -- the more clever

the operating team and the engineering team is at the site, the potential for gaming the system increases. And it's that that I'm really both aware of and concerned about.

I think it's great to give the licensees freedom to use a PRA tool to reduce perhaps the burden where the value of some of the issues that they are protecting against is very low. I understand that concept. But I also am aware of organizations that have the potential to game the system.

And hence there needs to be at least in my mind, the ability to make sure that the rigor and discipline are there. So that a freedom is given on Option Two, we are confident that the licensees are where they're supposed to be. That's what I'm saying.

MR. DROUIN: One thing to note is that you know, there is the PRA standard now. You know, we have reviewed that standard and endorsed it in one point or another. If the Commission decided to go forward with Option Two, we would have to relook at that standard you know, in the light of does it provide us enough that we're going to have the right technical acceptability in that PRA to support an Option Two.

Now one part of the standard is not just the technical requirement for doing the PRA. A big

piece of that standard is the configuration control of that PRA. So the standard does get into requirements you know, of how to you know, maintain the configuration of the PRA such that it appropriately reflects you know, the design and operation of the plant.

So we would have to -- we would go back and look at those requirements and make sure that those are strong enough, you know, to support this kind of application.

MEMBER SKILLMAN: Thank you Mary, Joe, Dick.

MEMBER SCHULTZ: So, again, that gets to the PRA and the analysis portion of the discussion that Dick was raising. And I think what you're saying Dick, is that the other important parts of this are the relationship of that particular analysis to the configuration control, the maintenance, the plant programs, including operations and training and all of those elements that result at the analysis for the PRA for that facility.

But also maintain it over the lifetime of the plant, which is what we're asking the licensee to do here.

MEMBER SKILLMAN: Yes, let me give you a word picture that might even be more clear. I worked

at a plant where the plant changed from their old electrical load model, I think it was ohms to ETAP. ETAP is the we're told and is a very, very complicated, very detailed program. It's probably on a par with BRA. ETAP is a very complicated program.

In this particular plant, ETAP, this Electrical Transient Assessment Program, was being maintained by a college coop three months of the year. And it was the flagship program for protecting the load configuration at this particular nuclear power plant.

And so the leadership of that plant had determined that it was acceptable for a part time college student to maintain the database. And that's the program upon which ECCS loading, current flows, breaker protection, breaker relay alignment was established. And that was an alarming finding.

But it was so deep in the culture, one had to really dig for it.

MS. DROUIN: I think you raise excellent issues. And these are you know, some of the challenges that are going to be faced. I'm not trying to harp on this standard. It does require the licensee to develop a PRA configuration control program. It doesn't get into details.

But what that might translate to mean is

that we as the NRC may need to come back and write a perhaps a Regulatory Guide to give accept -- you know, our acceptable staff position of what constitutes an acceptable PRA configuration control program.

So these are all you know, questions that you know, we're going to have to explore and answer.

MEMBER SKILLMAN: Okay. Thank you Mary. Thank you Dick.

MR. DUDLEY: Back to slide nine. So, licensees who would choose this alternative would have to go out and look for risk outliers or plant specific vulnerabilities. And meeting NRC specified criteria and mitigate them even if they were in compliance with our existing deterministic regulations.

And so things that those licensees find, new information on the mitigation of these events or sequences would have to be documented. And they would become part of their FSAR in accordance with the 50.71(2) FSAR update requirements.

And we also, licensees taking this option would have to implement mandatory, monitoring and feedback as described in Reg Guide 1.174 to ensure that the changes and risks which were deemed acceptable at the time that they were made, to ensure that they remain acceptable over the lifetime of the facility.

Now monitoring and feedback would perhaps catch issues with maintenance. In other words if there are maintenance inadequacies at the plant, licensees would have to track the reliability of certain equipment. And if the reliability of that equipment was different then what was assumed in their PRA, they would have to go back and recalculate and make sure that the change in risk was acceptable associated with this change throughout the life of the plant.

And so, that might require them to increase the reliability of certain equipment and change the maintenance. Or make some other corresponding change in the facility to reduce risk to an acceptable level.

CHAIRMAN STETKAR: And I realize these are basically pretty high level talking points at the moment. But the -- when I look at Option Two and I think about Option Two that and, which you have appropriately highlighted in red there, meeting NRC specified criteria, that to me sounds an awful lot like the -- if you ever get to it, Option Three, the RMRF framework that says well, below some area we feel the risk is acceptable.

So therefore, that -- is that the notion of these NRC specified criteria? Or is this left up to the NRC saying well, despite the fact that we know

that large LOCAs aren't important to risk, we still think you need to have certain criteria for large LOCAs?

MR. DUDLEY: Well, no, I mean --

CHAIRMAN STETKAR: Because that -- so I'm trying to understand what the notion of these NRC specified criteria are. Are you setting the acceptable risk thresholds?

MR. DUDLEY: Well I mean -- Joe, can you give your example about the fire protection inspections and the vulnerability that was uncovered under NFPA-805?

MR GIITTER: Oh okay. Well, there's --

CHAIRMAN STETKAR: I'm not talking about the second point of identifying vulnerabilities. I'm talking about the notion that the NRC is going to specify some sort of threshold criteria.

MR. DUDLEY: We would have to -- it actually probably would be two thresholds. We'd have to figure out what's the threshold that you have to take action? And then what is the -- then it might be a different threshold that you have to reduce the risk to.

So, that's an implementation detail that we don't have at this point.

CHAIRMAN STETKAR: Right, but in the

notion of if I look at 2150, that to me starts to sound like the three kind of bands in 2150, isn't it?

MR. GIITTER: There are similarities to 2150.

CHAIRMAN STETKAR: Okay.

MR. GIITTER: The biggest difference John, is that we're looking at Option Two as an option in between the do nothing option and full implementation of RMRF.

CHAIRMAN STETKAR: Sure. Sure.

MR. GIITTER: And so Option Two does include an incentive if you will for licensees to move towards a more risk-informed framework where I'm not sure that Option Three does that as well. Especially if it requires development of a level three PRA.

But there are similarities. And the point there, without getting into a lot of detail, is if licensees are going to identify deterministic requirements of low risk significance, whatever it might be, tornado, missiles, or you know, who knows. Then they should also seek out and look for risk outliers.

So we don't -- what we're saying is we shouldn't allow licensees to -- it's an untoward. You don't want them to just take advantage without looking

holistically at okay, with the clearer picture of risks that I now have, are there things that are treated in a deterministic world in my -- that we might do differently based on some risk insights.

CHAIRMAN STETKAR: I understand that completely. And I'm obviously running the NFPA-805 stuff in the back of my head. And people who went through that exercise indeed did find vulnerabilities that their deterministic 10 CFR 50, Appendix B stuff, nobody even thought about.

MR. GIITTER: Right.

CHAIRMAN STETKAR: What I'm curious about though is, if I use that analogy, when you say that they must mitigate all plant specific risk vulnerabilities, meeting NRC specified criteria, do you have an example of what that means in the context of NFPA-805? Because NFPA-805 just looked at Reg Guide 1174.

MR. GIITTER: Right.

CHAIRMAN STETKAR: It said you know, if you --

MR. GIITTER: Right.

CHAIRMAN STETKAR: In that context, you use that basically as your metric for determining whether or not the change was acceptable to the state.

MR. GIITTER: And really, what we're

envisioning here is something very similar to what we did for NFPA-805.

CHAIRMAN STETKAR: Okay. Okay. That's -- I was hoping that's what those words meant.

MR. GIITTER: Yes, I --

CHAIRMAN STETKAR: And their capability.

MR. GIITTER: Right.

CHAIRMAN STETKAR: Okay. Because you got into the 1174 in terms of the monitoring and feedback and all of that part of the process. I was just kind of hanging up on those criteria. Thanks.

MR. DUDLEY: On slide ten now. This is still Option Two. And this is kind of what you wanted to hear. The regulatory processes under Option Two for self approval of certain plant specific changes would be similar to NFPA-805 approval process.

Which I believe risk-informed changes are allowed to license requirements without prior NRC approval if the change in risk -- the increase in risk where changing CDF is no more then minimal, less then ten to the minus seven per year. And changes with risk increases more then minimal would require NRC approval.

Plant licensees are expected to have an upgraded, high quality PRAs to support this risk-informed alternative licensing basis approach.

We haven't defined exactly what that is. And we would submit --

CHAIRMAN STETKAR: Well, but you have in the sense of Reg Guide or in the sense of NFPA-805. I mean they're basically supposed to comply with Reg Guide 1.200, which you know, endorses the ASME NS standard.

So, there is precedent to -- for understanding of what that upgraded, high quality PRA means. In current regulatory space. I mean, this isn't something that needs to be -- you might -- as Mary said, you might want to elaborate on some particular issues. But this isn't something that needs to be crafted out of nothing.

MR. DUDLEY: Are there any more questions on Power Reactor Option Two?

(No response)

MR. DUDLEY: Okay. Option Three is the recommended compliant specific, risk management regulatory framework implementation option from NUREG-2150. Under Option Three we would require operating licen -- all operating plants to have PRAs and upgrade them periodically. And establish -- and use them to establish a plant specific licensing base basis, which would be based on their plant specific risk

profiles and NRC specified risk management -- an NRC specified risk management objective.

We would require licensees to use a structured risk-informed decision making process. We would require that both for licensees and for the NRC under Option Three. And based on the plant specific risk profile, licensees could implement the plant specific licensing basis by determining how they want to meet the risk objective.

Then they would have to ensure that the necessary protections are in place to meet the risk management goal. They'd have to establish the risk-informed decision making process. And they'd have to establish the monitoring and feedback process. And there would also have to be a reporting process associated with this plant specific approach.

Let me go to the next slide before the questions start. Because I might answer some of them.

(Laughter)

MR. DUDLEY: So each plant's licensing basis would consist of technical requirements that would be based upon this plant specific attributes. And applicant selected design specific elements. It would include the rationales or the technical basis for why the technical requirements adequately address risk

and defense-in-depth in light of the plant specific attributes and design elements.

And FSAR level description of the plant specific attributes and the applicant selected design elements would -- and the input assumptions for the above rationales would also have to be maintained. And the process for maintaining the validity of the rationales, the technical basis through the lifetime of the plant would also have to be included in this plant's licensing basis.

So licensees would be required to use the structured process with monitoring and feedback to ensure that the plant specific licensing basis remained consistent with the risk profile of the plant, which could change over time.

MEMBER SKILLMAN: Dick, let me ask. Just conceptually, how would this be implemented? There are what about 67 sites, 104 plants, 100 plants? All part 50 plants are designed to Appendix A. Part 50 plants are designed to Appendix A at 10 CFR 50.

Does the first bullet imply some form of change to that?

MR. DUDLEY: This implementation approach could result in I could think significant differences between the design of one plant to another plant.

Plants that were initially identical might end up with designs that are significantly different.

CHAIRMAN STETKAR: Plants have designs that are different. They might have different licensing basis. But because of the differences in those designs --

MR. DUDLEY: Their licensing basis could change and they -- that might include changes in the design. In certain aspects of the design.

MEMBER SKILLMAN: I'm confused. I don't understand those words. I understand what John said.

MR. GIITTER: Yes, let me try to clarify it a little bit. Every plant now pretty much has a unique licensing basis even though we you know.

MEMBER SKILLMAN: Right. Sure.

MR. GIITTER: So, it isn't as radical as it may sound. But this approach would allow some sites to have a more risk-informed licensing basis then other sites. And so you would have some variability if you take for example two standardized plants, which we really don't have any in the United States, but theoretically if we did, one could have a risk-informed licensing basis, the other one might have a licensing basis that's largely deterministic.

And so I -- and we have that today, okay.

We have plants that have transitioned to NFPA-805 that have made modifications to the plant. They've added additional auxiliary feed water trains, non-safety grade. And then you have plants that are deterministic.

Well, so you might have a four-loop Westinghouse plant with -- I'm getting into too much detail here, but with two motor-drive aux feed pumps and a turbine driven aux feed pump. And you might have another plant that because of the vulnerability of fire in a particular area of the plant, they might have an additional non-safety grade aux feed water pump that the other plant doesn't have.

So there will -- Dick's right, there will be design differences. But you know, fundamentally you're looking a different licensing basis for a risk-informed plant versus a deterministic plant because you determined based on risk insights that you may need some additional systems or modifications that you didn't have in the deterministic plant.

You may also determine that there are some particular design features in the risk-informed plant that aren't as necessary because they're not safety significant.

MEMBER SKILLMAN: Okay, let me ask this.

To what extent would Option Three require a rewrite of the FSAR or rewrite of the Tech Specs?

MR. GIITTER: Well, we definitely require a rewrite of the FSAR.

MEMBER SKILLMAN: Okay.

MR. GIITTER: The Tech Specs at a lot of plants are going to be changed anyway because of risk-informed Tech Specs.

MEMBER SKILLMAN: Okay, so let's talk about rewrite of the FSAR. Isn't that a swamp that is just -- that is just endless opportunity for error?

MR. GIITTER: Well, FSARs are rewritten all the time based on --

MEMBER SKILLMAN: In piecemeal based on amendments that are --

CHAIRMAN STETKAR: But isn't that a swamp that the piecemeal cannot be tracked correctly so that you get inconsistencies in your FSAR?

MEMBER SKILLMAN: If your configuration control program is poor, yes. Exactly.

CHAIRMAN STETKAR: Okay but that's -- that's the current situation.

MEMBER BLEY: I mean I agree with a lot of your points Dick. But I also note as you did with your ETAP plant, this isn't a problem with Option Three or

with the PRA, it's a problem that applies to essentially everything in the plant. All the analysis, all the equipment. And if you don't have a good program, it isn't going to be what you thought it was.

MEMBER SKILLMAN: I agree.

CHAIRMAN STETKAR: If you have a good program, you have a good program. If you don't have a good program, --

MEMBER SKILLMAN: That isn't Option Three's fault, that's the plant's fault. And nobody's going to fix that.

CHAIRMAN STETKAR: Will Option Three fix it?

MEMBER SKILLMAN: Option Three would at least require you to take a comprehensive look at your plant and the licensing basis for your plant. Which currently isn't required. It's done piecemeal.

So in some sense it would at least provide that catalyst in my mind that would prompt perhaps you know, comprehensive reexamination of your licensing basis. And given the fact that it's at one time, you know, you wouldn't have this necessarily piecemeal changes over the course of you know, several years.

So it could actually provide a catalyst to take some of the -- if you want to characterize them

as marginal performers in terms of comprehensive look at their facilities and give them a shock in a sense to look at things.

MEMBER SCHULTZ: It's hard to believe that would not happen given at least this description.

MEMBER RYAN: It would seem to me that there'd be some kind of a feedback mechanism too if the staff isn't you know, not just doing this in a vacuum. There's going to be some feedback, the reactor would feedback, they adjust. And that's a cycle that goes on you know, really robust program that's healthy.

So I'm just trying to -- so how do you describe a healthy program? And if a program is healthy by whatever measure or structure you send up to make that -- or set up to make that evaluation, you know, you can demonstrate what you're trying to demonstrate.

I mean, I take your point that if it's not exercised properly it's probably not worth much. That it could be worth less. So I think it's -- it really gets down to how do you judge the program? How do you decide it's a good program or needs its work? I don't know.

Does that make sense Dick?

MEMBER SKILLMAN: Yes.

MR. DUDLEY: Yes. Are there any more questions on Power Reactor Option Three?

MEMBER BROWN: Your next is just a path forward, right?

MR. DUDLEY: Yes. Right.

MEMBER BROWN: Can I go back to Option Two?

MR. DUDLEY: Sure.

MEMBER BROWN: The -- I guess the page ten, slide ten is the one of interest. The self-approved certain plant changes list conformed to add to the license requirements without prior NRC approval of the CDF -- Delta CDF is no more then -- is less then one times ten to the minus seven.

Which always gives me a little bit of pause for thought. Because somebody's got to model ten to the minus seven to get there. And I guess I was trying to come up with an example that I could phrase my question to make it clear.

Right now in my world, the I&C world, we're dealing with the issue of how you transmit data out of a plant and whether it's a unidirectional hardware based or whether it's a firewall which has software involved in it.

The initial efforts in some of the early designs when we first looked and we were first talking

about these five years ago, six years ago, the comment was that oh, well because we've got a firewall there and we've got anti-virus software, we've got malware detection, Trojan horse, and everybody thinks this stuff is the hot -- theirs is the hottest stuff that ever walked the face of the earth.

So, we've been trying -- there's been a forcing function to try to get people to more consider you know, strictly hardware based transmissions. So there is no external capability to get in.

And I'm looking downstream, you get a plant configured like that and now you come along later, five years later and management or somebody in the plant decides gee, we're spending a lot of effort because we have to have people come into the plant, bring hardware down, go down to the cabinets. You know open them up, put you know, a lap top in connection with it.

It would be far more efficient to be able to send this from the vendor directly via the internet into the plant, into the server, the network system and then down to the maintenance cabinet. And then into cabinets you know, to change whatever you want to change.

So that would require a firewall to software as opposed to a hardware based one way. And

I can easily envision the computer weenies that think their virus software and protection software is so perfect that they will easily meet the one times -- it will be easily be one times ten to the minus 12, the way they'll advertise this.

They'll change that fire -- that barrier to a software based barrier and nobody will ever see it. And I don't know how as a regulator there are certain boundary conditions I would have a hard spot with allowing free you know, self approval. On the program I came from nobody changed it without headquarters while were the designers as well as the regulator. But we had to be careful of that.

So, I just you know, that one just -- there are some things that it would probably work just fine for. But there are others that are fraught with peril in my own mind. So I don't know how you balance that.

I'm not saying you don't go forward. But it seems to me there have got to be some look at what somebody's doing. As it chose to without prior NRC approval are very strong words. And self approval means nobody -- effectively nobody looks at it or has to look at it.

MR. GIITTER: I can address that Dick. Currently what the process laid out here is exactly what

we do for NFPA-805.

CHAIRMAN STETKAR: And other things.

MR. GIITTER: And other things, thank you. Yes. I agree with your comment on the degree of precision sometimes when you come up with a quantitative value for core damage frequency. That people who practice PRA understand there are limitations and that you can't you know, when you get really small numbers like that you have to be careful.

But the point is that we have to ensure that there would be only minimal increases in risk or even preferably decreases in risk in the modifications that are being made. So it's -- what you're really looking at is the relative order of magnitude. You want to make sure that the risk increase if there is one is actually very small to allow licensees to self approve.

And we do audit that. It's not like we're not taking a look at it. We do you know, that is something we will look at. And through the audit process or through our regular oversight process. But at some point you know, we have to kind of let go of things that are of very low risk significance because --

MEMBER BROWN: Well, I don't think that -- what I -- the example I gave is not a low risk

assessment.

MR. GIITTER: No, but what we're talking about is.

MEMBER BROWN: Not even close.

MR. GIITTER: No and I understand that. I understand that. But what we're talking about is, is items that are clearly of low risk significance. Or preferably if you're even looking at modifications that improve safety and decrease risk. That wouldn't require NRC approval unless it changes the licensee basis of the plant.

So, there is precedent here. We're not just making this stuff up. It's based on the you know, the regulatory infrastructure we have in place. And we've implemented it and NFPA-805 in other areas as well.

MEMBER SCHULTZ: So would the example that Charlie has brought up, would that be caught in the first bullet where we're talking about maintaining compliance and insuring that NRC's specific specified criteria are met? In other words, what Charlie is saying is there's certain things that you would not want to fall out of the control process because someone's come up with a great idea that reduces a particular system vulnerability they think to a low, low level and

they're wrong.

So, he's looking for a backstop that will catch that and prevent it from happening.

MEMBER BROWN: And I don't think an audit, I mean, audits or spot checks. And I am just not sure that an audit would catch them. And obviously I have strong feelings on this particular incident.

CHAIRMAN STETKAR: That's a bit of the problem is that you have strong feelings about one particular aspect of the digital I&C design. A materials guy has one -- has his own strong feelings about one particular materials issue. A pump guy -- everybody has their own strong feelings about individual issues.

And everybody is not equally got. Now the nice thing about risk assessment is you look at everything under the same umbrella.

MEMBER BROWN: Well, and all I'm saying is I got the risk --

CHAIRMAN STETKAR: And you see that the risk models may be less, the current risk models may be less capable of evaluating with six significant figure in numerical precision, elements of software in digital I&C programs. And that's true.

On the other hand, they can also evaluate

uncertainties. And in many cases the differences don't make any difference.

MEMBER BROWN: I guess I would think that -- I understand you point.

CHAIRMAN STETKAR: But part of this --

MEMBER BROWN: But I think --

CHAIRMAN STETKAR: Part of this notion without pointing fingers, is to remove I think in my opinion, a bit of that issue specific focus among designers, you know, maintainers, regulators, everybody and say let's at least use the risk assessment process to look at all the contributors to risk.

MEMBER BROWN: My only point is and my -- and this again, like you say, I have a very parochial thought process and very focused on the areas for which I have -- my greatest interest. But software is very amorphous. It is not predictable.

The way people program it varies from individual to individual. What one guy thinks is satisfactory in terms of how he structures his software is fine. Another guy has a different way of doing that because he thinks the other guy is not doing it the right way.

And I think that's a far greater vulnerability then in some of the more hardware, what

I call the blacksmith tech -- I know, I'm not being facetious, I mean the blacksmith you know, materials, et cetera, et cetera. It's a little bit more amenable to looking at small variations because they're just not as intractable as the variability of software is.

CHAIRMAN STETKAR: You talk to sump pump designers and they say they'd like to have a factor of three margin or net positive suction head available divided by net positive suction head required. Other people say no, maybe one and a half, maybe you could get down to one. Maybe a little bit of cavitation is okay. What's the difference?

MEMBER BROWN: That is not the same. I don't think those --

CHAIRMAN STETKAR: That's a -- okay. Okay.

MEMBER BROWN: That's like moral equivalence. Okay, I don't think they're totally. I understand your point but they are not equivalent, okay. You can put your hand on that. You can't on the software. It's buried in ones and zeros.

CHAIRMAN STETKAR: Okay.

MEMBER REMPE: Since you went back to this one --

MEMBER BROWN: I'm sorry. Excuse me, go

ahead.

MEMBER REMPE: Well there's one point I thought about mentioning and didn't. But more then minimal, ten to the minus seven per year is different for an AP1000 perhaps then an older plant. And so why did you decide to go with something like that to quantify more then minimal then saying like ten percent or five percent or something like that of the frequency? And have you thought about changing that type of statement to have a percentage of the core damage frequency for example?

MR. DUDLEY: Well, these are based on what we do for NFPA-805. And Joe, do you want to apply that to -- can you expand that to other new plant designs or any?

MR. GIITTER: Well, yes, without getting into new plant designs, it's a metric that's consistent with how we measure risk. So, if you look at a percentage, I mean, you could always do that. But the way that the standards are written and the regulatory guidance is written and the standard practice within the PRA community is to look at core damage frequency or other as measures.

So it's -- I understand your point, why don't you look at it in relative terms because you have

--

MEMBER REMPE: You may have a small modular reactor coming in.

MR. GIITTER: You may have a small modular reactor which has a much lower risk profile then an operating -- currently operating reactor. You know, it's something we will -- you know, we can consider. I understand your point.

MEMBER REMPE: Okay. I just thought I'd mention it.

MR. GIITTER: Quite frankly I don't think we've given it any thought. But --

MEMBER REMPE: It's just something to think about.

MR. GIITTER: Yes.

MEMBER REMPE: Okay.

MEMBER BROWN: Also, don't take my comments that I'm not against some relaxation to allow people to do stuff on their own. I mean that's -- we can over complicate stuff and drive costs out of sight. So I understand that.

I just, along with Steve's comment about backstops. I just think that somewhere at the higher level, but not down in the lower levels. I mean, I can look at stuff going on in the I&C where some changes

they make would be perfectly acceptable without going through your thing.

But if there's certain boundary conditions I think that ought to be put in place on some things. I quit.

MEMBER REMPE: The Charlie Brown software rule.

MR. DUDLEY: I had one more slide. And maybe I can just do that before the break. Again, this last slide is on our path forward.

We had written a draft white paper that we had hoped we could have made public prior to this meeting. And we were unable to do so.

CHAIRMAN STETKAR: We were pretty hopeful that would have occurred too. I'll just put that on the record.

MR. DUDLEY: Right.

CHAIRMAN STETKAR: And we're pretty disappointed that we didn't get to see that.

MR. DUDLEY: Right. Right. That paper is now under review by NRC Senior Management. We will incorporate management comments into an updated draft of that white paper as soon as we can. And we will publically release it and the Committee will get it at that time.

We'll have a public meeting to discuss the white paper probably in April, maybe late April to discuss the white paper. At one point -- at some point along the process we'll solicit written comments on a version of the white paper. It probably won't be the first version. We'll probably want to iterate on it a little -- a time or two so that we have a little more fully developed paper when we go out for public comment.

So, I can't tell you exactly when we'll ask for public comments. The paper will be available as it evolves over time on the Regulations.gov, the Federal rule making website. And at some point we will ask for written public comments.

We will then receive those comments, summarize those comments and I think that that's probably the best time for us to come back and meet with you. But we're certainly open to discussions as to how you would like the interactions to take place. But we think that can happen sometime this summer.

And the due date for the SECY paper we're tasked with providing is December 18, 2015. This date was established before this op -- of this effort evolved to include an Agency wide policy statement. So I am not a hundred percent certain --

CHAIRMAN STETKAR: Wait, until you return

to the original tasking memo, which required an Agency wide policy statement?

MR. DUDLEY: Well the SRM 1 recommendation would change the scope also and there were some -- there were some redirections associated with that. But you're right. I -- December 18 is the current date. I will strive to try to meet that date. Depending upon how much detail we get into on an Agency wide policy statement and how long it takes to reach Management agreement on that, will determine whether or not I think we can meet that date.

And that completes my presentation on the status of our activities on the risk management regulatory framework.

MEMBER BLEY: We'd sure like to see the white paper as soon as we can.

MR. DUDLEY: Yes. We understand that and we're providing it as soon as possible.

MEMBER BLEY: Do you have a date set for the public meeting?

MR. DUDLEY: No.

MEMBER BLEY: How far before the public meeting do you have to have the paper?

MR. DUDLEY: We generally -- well, I think we're going to have like a 60-day public comment period.

So we usually like to have the public meeting right in the middle of the public comment period.

MEMBER BLEY: Okay.

MR. DUDLEY: So that people have had time to read the paper. And then they can come to the meeting and we can have our discussions and then they can produce -- then they still have time to produce informed comments.

So the public meeting should be right about in the middle of the public comment period, about 30 days after we've released the --

CHAIRMAN STETKAR: So you're looking roughly a month from now at the latest if this late -- late April date for the public meeting is --

MR. DUDLEY: That is correct. Yes, I'm one of the Senior Managers and I've asked Senior Managers to provide their comments to me on this current draft by next Tuesday. I'm not sure how many iterations we'll go through.

That would depend some -- once I see the first round of comments I'll have an idea of whether we're converging or whether we're still -- have differing views that we need to work out.

CHAIRMAN STETKAR: Anything else for --

MEMBER SCHULTZ: Just to clarify Dick, I'm

confused by these different versions that you intend to create. Isn't one version going out for public comment? Or are you going to iterate on the version sometime during the public comment period?

MR. DUDLEY: As soon as we get a white paper that is approved by Management, we'll release it to the public, post it on Regulations.gov.

MEMBER SCHULTZ: Got you.

MR. DUDLEY: Over time, as we work with that, we'll update that white paper so that the publically available version will evolve. And when we get to the point we think it's appropriate that we've got enough detail in that particular version of the white paper, then we will solicit formally written public comments.

So the public can follow this entire process on Regulations.gov by looking at -- each white paper will be there. And as it evolves from time to time, members of the public will be able to see that. After --

MEMBER SCHULTZ: But they're not providing comment?

MR. DUDLEY: Only at one point when we think there's -- we have the proper amount of detail in that paper, then we would solicit written public

comments. But only one time. But the paper is out there available hopefully, you know, in two or three weeks. And as it evolves over time, we will continue to make the updated versions available on Regulations.gov.

MEMBER SCHULTZ: and then there'll be a public comment period of some duration of --

MR. DUDLEY: And we will meet after 60 days.

MEMBER SCHULTZ: And then we'll meet again after the public comments have been provided but not resolved, most likely.

MR. DUDLEY: Right. We'll summarize for you the public comment.

CHAIRMAN STETKAR: Well, I think the Subcommittee probably would want to meet before that. When you say we, the full ACRS certainly -- well, I can't speak for the full ACRS. But the Subcommittee would want to engage, you know, earlier rather then later.

MR. DUDLEY: That sounds good.

CHAIRMAN STETKAR: The full ACRS you know, that's up to the Committee.

MR. DUDLEY: Yes, this next meeting will be a Subcommittee meeting.

CHAIRMAN STETKAR: Anything else for

Dick?

(No response)

CHAIRMAN STETKAR: Well, what I've done is, I know we have some staff members out on -- we have two bridge lines set up for this particular meeting. And I know we have some staff members on one of them. And I've asked that that line be opened up. We'll open up the meeting for public comments closer to the end of the meeting.

But because we're finishing this general discussion on the RMRF and the different Options, I'll just ask if anybody from the staff is out there, if you want to add anything to the discussion, you've been on mute. So this is your opportunity.

MR. HARRISON: This is Donnie Harrison.

CHAIRMAN STETKAR: Hi Donnie.

MR. HARRISON: Hi. As we were going through the slides and the discussion on like backstop, it dawned on me that we need to recognize in both Options Two and Three, at some point the staff's going to have to deal with or struggle with the ideas of defense-in-depth, safety margins and that type of thing.

Since we're not risk-based, we're risk-informed. So, the discussions on the slides are

all geared towards risks and there's other factors we need to include.

CHAIRMAN STETKAR: That's a good point. I mean you know, 1174 addresses those issues. But perhaps not as quantitatively as you might want.

MR. DUDLEY: And the paper on Near Term Task Force Recommendation One had some substantial recommendations for improving our definition and criteria for adequacy of defense-in-depth. So we would likely include that sort of an effort into one of these options if we were to you know, if we were to recommend it. Although so that it would be a risk-informed and not risk-based approached.

CHAIRMAN STETKAR: Well, Donnie's right. I mean, it applies both to Options Two and Three as they're --

MR. DUDLEY: That's correct.

CHAIRMAN STETKAR: As they're cast now.

MR. DUDLEY: But we have to have better handle on defense-in-depth, safety margins and other related facets.

MR. HARRISON: Right. I didn't want to leave the impression that just because someone could say a large LOCA with one train of safety systems is always going to be a low ten to the minus seven,

therefore I can get rid of the second train.

MR. DUDLEY: Right.

MR. HARRISON: We would have a -- we'd have to add defense-in-depth metrics as well to say what's the minimum interpretation of defense-in-depth so those things wouldn't happen.

MR. DUDLEY: Right. Right.

CHAIRMAN STETKAR: Good. Anybody else from the staff out there?

(No response)

CHAIRMAN STETKAR: If not, we'll cut you off again and put you on mute. And we'll take a recess until 10:15.

(Whereupon, the above-entitled matter went off the record at 10:01 a.m. and resumed at 10:16 a.m.)

CHAIRMAN STETKAR: We are back in session. I guess you're up Joe.

MR. RIVERS: Okay, we basically thought that it would be a good opportunity to give you folks on the ACRS some insights into some of our activities on trying to risk-inform security. This dates back to probably about 2009 where we started actively working in this area when former Chairman Klein and that time Commissioner Klein gave a talk at a November 2009 ANS

meeting and one of his statements he made in that presentation was that NSIR needs to better risk-inform security.

And so the next day I was called into Jim Wiggins' office and Jim said Joe, you have a new area of responsibility. Get to work.

And so that sort of -- and we have been doing things related to this before, but not formally talking about it as risk-informed in security. So we can go to the next slide.

But one of the first things we did is we worked with the Office of Research to put together a workshop. We had Sandia actually conduct the workshop for us. It was actually held at a classified level. That was held at Sandia in the fall of 2010.

And essentially what came out of that workshop was six sort of areas of opportunities were identified to potentially risk-informed security. One was the uncertainty of initiating events. Always the -- one of the bigger challenges in security.

Simulation tools, collaboration between safety and security, cyber security, improving metrics and also the possibility of a demonstration project like WASH 1400. So, once that workshop was complete, that was about the time that the Risk Task Force that

was headed up by Commissioner Apostolakis began.

And so we decided to lay low a little bit there to see what came of that Task Force before we proceeded in any of these initiatives. Next slide please.

One of the things we found from the workshop that Sandia hosted was that it cost us a lot of money. So I came up with the brilliant idea that we ought to get a professional society to host one of these. And essentially it would cost us travel costs and registration fees.

And so we asked them to host a workshop on risk-informing security. It was initially scheduled for October 2013. The Government shutdown sort of impacted us there. We rescheduled it for February 2014. And these were the five general areas that we worked on that workshop. Next slide please.

MEMBER SKILLMAN: Joe, what is INMM?

MR. RIVERS: It's the Institute of Nuclear Materials Management.

MEMBER SKILLMAN: Thank you.

MR. RIVERS: So it's that along with the American Nuclear Society are probably the two that cover most of the activities, but that this Agency's involved at.

So, the area of safety and security risk assessment is we had discussion at PRA and NRC. We had some other presentations, one by Los Alamos on an extensible risk-informed decisions work method. Another lab person presented on implications of security challenges for safety assessment tools.

And then DNDO presented on some of its risk models that it actually develops under Executive Order requirements. Next slide please.

Then I convened a panel on material attractiveness, an effort that we've got to try to understand what special nuclear material was -- how attractive it is to potential adversaries. We made a presentation on the NRC approach that was under development.

DOE provided some technical support for that NRC approach. We had Matt Bunn provided some thoughts on where he thought that approach ought to go. Industry gave some insights that they had.

The United Kingdom gave comments on their concepts for dilution, which is the primary focus of our approach. And the French provided a presentation on security in civilian facilities.

One thing to make note of is that at the 2012 Nuclear Security Summit, the U.S., France and the

United Kingdom gave -- made the commitment to have a workshop on material attractiveness and this workshop and this specific panel actually met that commitment that was made at that Nuclear Security Summit. Next slide please.

The likelihood of event --

MEMBER BLEY: Before you do that.

MR. RIVERS: Yes?

MEMBER BLEY: There's a conference coming up in March, is that -- that's associated with --

MR. RIVERS: I'm going to talk about it.

MEMBER BLEY: Oh, you've got that coming up. I didn't see it when I -- I didn't flip far enough. Okay, I'll wait.

MR. RIVERS: Okay. Very good. We've got several conferences coming up.

MEMBER BLEY: Okay.

MR. RIVERS: So, after we've done that, of course the real challenge we have here is that unlike in the safety world where we tend to think that things will happen randomly and security it's actually a -- when the aberrant started to think -- thinks it's a good opportunity to do it and he has the best chance of success. And so, that tends to be somewhat of a challenge.

So we had presentations on possible approaches and options. Just how some of those approaches might be used. And then DoD funds an effort out of the University of Maryland on -- at the National Consortium for the Study of Terrorism and Responses to Terrorism Approach that has some insights on how they might consider doing that type of a thing.

So there's no clear cut way of doing it. There will be a lot of uncertainty if you try to do that. And that's generally one of the reasons in the security world we either do things based on a conditional risk or focus on trying to look at the consequences that might be associated with an event. Next slide.

CHAIRMAN STETKAR: Joe, is some of that thought changing though?

MR. RIVERS: I don't think it's changing that much. We're trying to introduce as many risk insights as we can. But for example when DHS is doing its integrated terrorism risk assessment models, especially the Rad Nuc Terrorism Risk Assessment, they go to the intel community and say what is the likelihood that there is going to be an initiating event?

And when they do that, what they find -- you find is that you get a number. But really, what is the -- I mean the uncertainty around that number,

and it's probably plus or minus 100 or 200 percent.

CHAIRMAN STETKAR: Sure. But I mean, you know, in the safety arena we deal with that also. And in some senses, although the uncertainties may be very, very large, you still may be able to rank order threats if you will relative to one another.

MR. RIVERS: Yes. We -- you know, we used the -- you know, NRC has the Intelligence Liaison and Threat Assessment Branch and their job is to try to understand, you know, we look at the terrorist activities worldwide. And then we try to assess what is the likelihood that they're going to show up on our doorstep.

And so we do some of that and then we inform the Commission. And the Commission makes some determination as to whether or not we need to adjust the design basis threat or not based on that.

So there are things that are happening in other parts of the world that we don't assess will happen here in the United States.

MEMBER BLEY: I kind of like what you're doing there. Because I -- this guy's done a lot of PRAs. I disagree with many of my colleagues on this part. You can get some kind of comparative stuff that would be useful by doing the whole thing at once. But

this is unusual from most of our other kinds of analysis in that that initiating that first strike, is a time varying thing.

And trying to keep -- I mean, taking advantage of the government agencies that are tracking that and trying to be up to date on that makes a lot of sense to me.

MR. RIVERS: And we have a lot of activities that we work and the interagency with the White House that if certain things become evident in the chatter and things like that and the intelligence understanding of things that we have approaches that we can use to immediately implement certain requirements that we wouldn't normally consider as being appropriate. So, we do work within the interagency to try to be able to effect those types of changes if something pops up.

CHAIRMAN STETKAR: My only -- the only reason for my bringing up the topic is that a focus only on consequences and protection against what are deemed to be severe consequences can sometimes overlook I'll call them scenarios that might have not as severe a consequence as your worst possible focus, might have a higher frequency. You know, opportunistic attacks --

MR. RIVERS: Well, and I think that --

CHAIRMAN STETKAR: And that's the notion of trying to understand you know, the more integrated some of that.

MR. RIVERS: I think we debated some about of that at the Y12 incident --

CHAIRMAN STETKAR: Yes.

MR. RIVERS: Where it was the protesters. You know, when I think back to the '80s, long before 9/11, before Oklahoma City, you know, I can recall that the security -- DOE Security Manager Rafi Flasch used to have all the Saint's Days, she had her little church's calendar up on her door and she highlighted the ones she thought the nuns would be showing up for.

And so that was fairly common back in those days. And we really focused a lot back in the '80s on these protests that would take place. At the Nevada test site we had a you know, certain procedure that we worked with the protesters that they would cross a line, they'd get arrested. The next group would cross a line, they'd get arrested.

But I think 9/11 and Oklahoma City and other events caused us to put more of a focus on the big major terrorist events. But I think the Oak Ridge event, the Y12 event, caused us to relook that. And

I know that we as a government are working closely with the British and the French to try to understand what is the best way to actually prepare for those types of civil disobedience type things and how do we address those in an appropriate fashion.

So that's an ongoing challenge right now. Okay, one of the things I know coming from the DOE world, you know, DOE world is very heavily and actively involved in using VA simulation tools. A lot of those tools actually were developed by the same people that developed the PRA tools that we use in the safety world.

What I also realized is that my likelihood of getting a regulatory requirement to force them to use these tools was probably slim to none. And so what I did is I worked with the vendor communities who encouraged them to approach the reactor utilities to talk about how their tools might actually be useful.

Both ARES Corporation with AVERT and Rhino Corporation with Simajin actually have done that. And so that -- I'll talk about that in a few minutes. But at this workshop we had both of them make presentations. Also Sandia and DTRA on some of their modeling aspects. And then also Pacific Northwest National Laboratories developing a tool that sort of merges cyber and physical type security within the tool. So it's a fairly

interesting development there. Next slide please.

Cyber security of course is a new and ever-changing environment. We had some discussion on the pros and cons and challenges of risk-informing cyber security. NRC talked about our regulatory program. And PNNL talked a bit about their cyber model. Next slide please.

Okay, basically post that workshop, what we've done is we've you know, I wanted to highlight some of the things that we're working on. Risk prioritization initiative and of course I won't mention that, talk about too much now as we're talking about it this afternoon.

CHAIRMAN STETKAR: Joe, I have to interrupt you in deference to Charlie who's not here. If I go back to the cyber security, the previous slide, and you don't have to go back to it. Is that -- that's an ongoing --

MR. RIVERS: Essentially the --

CHAIRMAN STETKAR: You said PNNL and those --

MR. RIVERS: Well, Jim and I talked about cyber risk model, but if we're looking at the regulatory program, of course we put requirements into place. It's big -- it's not fully implemented now.

CHAIRMAN STETKAR: But if I stay away from the regulatory part of it and just put my sort of engineer hat on, you said PNNL talked about a cyber risk model or they actively --

MR. RIVERS: They're actively pursuing this.

CHAIRMAN STETKAR: They are?

MR. RIVERS: Yes.

CHAIRMAN STETKAR: Okay. Thanks. That's what I wanted to -- oh, thank you.

MR. RIVERS: So, I'll talk about each of these individually. But this is sort of what's going on right now and what I'm working on in risk-informing security. So you can go to the next slide.

Risk prioritization initiative of course we'll talk a bit more about it this afternoon. But one of the things that we find is that they do a really reasonable job on looking at the safety aspects of risk prioritization.

But trying to get the industry to better understand how to actually look at the security risk is somewhat of a challenge. And then trying to -- how to integrate that with the safety risk is also not the easiest thing. But it's something that we've committed to work with industry on. Next slide please.

MEMBER SKILLMAN: Joe, before you change. Would you comment on attempting to prioritize emergency preparedness?

MR. RIVERS: Well, that also -- basically if we look at the industry initiative, they are looking at safety, security, emergency preparedness and radiation protection, all of those. What you tend to find is that the emergency preparedness and radiation protection tend to be not as risk significant generally as the security and the safety elements.

Emergency preparedness of course is trying to mitigate if something does happen. So you've already had an event. So, what --

CHAIRMAN STETKAR: We'll hear it -- we'll hear a bit more about this this afternoon.

MEMBER SCHULTZ: But your point is that security and emergency preparedness, they are different --

MR. RIVERS: Yes, they are different.

MEMBER SCHULTZ: In terms of characterization with regard to risk prioritization --

MR. RIVERS: Right.

MEMBER SCHULTZ: And with regard to the way in which one can benefit from application of risk-informed preparation.

MR. RIVERS: Right. Generally the emergency preparedness is how do we mitigate if something actually does happen. Security, what you find is that you can have security events that can cause the same types of things that safety events might cause.

And so --

MEMBER SCHULTZ: Correct.

MR. RIVERS: Trying to figure out how to actually integrate the safety and security things, it's somewhat of a challenge because one of the things I think we found was that the people that were generating the -- initially generating the industry sort of model for risk prioritization didn't actively involve a lot of their security people. So they didn't have the understanding of how security actually fit into the process.

But you can ask more about that this afternoon when it's probably a better venue to do that. Next slide, okay.

Risk Management Regulatory Framework Working Group, that's what we're here right now for. We've been actively involved with that to make sure that the security aspects of things are appropriately addressed within the working group. Next slide please.

Okay, they used the simulation modeling. Essentially through some of my efforts we have at least two of the vendors, ARES Corporation and Rhino Corp that are actively working with industry right now to look at how simulation modeling can actually help in them securing their facilities and also addressing regulatory issues. ARES Corporation is actually modeled two or three of the nuclear sites to date.

And we're trying to work with industry to better understand what is -- what do we need to have here at NRC in the way of oversight of that to allow that to fit into the regulatory program? So, you know, I think one of the concerns, we have to understand how the facilities were modeled, how the data was generated to do that.

And I heard earlier this morning about the concern about gaming the PRA type models. The same thing can be done on the security models. And so, we want to make sure that we have an understanding of you know, what's common and data elements drive the models so that we can focus our attention on those elements in our oversight process.

MEMBER BROWN: If this -- excuse me. Is this the physical plant? This modeling?

MR. RIVERS: Well, I could talk about the

fact that at least one of the National Laboratories, Pacific Northwest National Lab is actually trying to develop a cyber risk model. And also one that integrates cyber and physical.

MEMBER BROWN: Yes, I see you haven't gotten to that slide yet. I just wanted to see if there was a separate that this was being applied to.

MR. RIVERS: Okay, so next slide please. Material attractiveness. This is something I actually worked on when I was at the Department of Energy and when I came here to NRC I was asked to continue working in this area.

But it's essentially taking what we -- how we categorize material and security for predominately the fuel cycle facility, but it will also impact the research and test reactor facilities. Where you know, is all uranium and all plutonium the same? And the answer is no.

One example would be that if I have five kilograms of high enriched uranium metal in a button versus five kilograms disbursed in soil on a railcar, do they require the same protection? And the answer is no. The adversary is going to focus on the metal button more so then that five kilograms disbursed in a railcar.

And so that's what this approach is looking at. Next slide please.

To support that we actually conducted a study at Los Alamos National Laboratory. They developed a logic module that sort of put things into four phases. One is acquiring the special nuclear material. Looking at a wide variety of facilities and types of material that might be present in those facilities. What type of processing is required to take that material that's acquired at those facilities to convert it into a weapons useful form.

Then weaponization goes from a design of an improvised device to engineering that improvised device. And then one of the questions that I've always been asked over the years by the policy makers is, okay, that's what Los Alamos and Livermore can do, but what can a real adversary do? And so we actually have an approach in that model to perform a yield reduction based on some understanding that they aren't going to be necessarily as skilled as one of our National Laboratories.

And then in the end what it does is it provides yield -- an estimate of the likelihood of an actual nuclear detonation and also a yield associated with that detonation.

MEMBER REMPE: For a minute if you don't mind going back to slide 13 with the material attractiveness and your statement. That's assuming that the adversary is going to do something with the material for alternative uses when you make that assumption about which -- whether they'll go for disbursed materials or not disbursed materials. And they may have other priorities.

MR. RIVERS: Well from a security standpoint, when we're looking at this specific approach, we're predominately focused on the theft of that material to potentially be used in an improvised nuclear device. Essentially a mock up of that.

MEMBER REMPE: Right. And so what -- are you considering other types of adversaries who may just want to reek havoc? That the disbursed material would be just as attractive to them.

MR. RIVERS: Well we -- one of the things we look at and that we're also looking at in this rule making for material attractiveness standpoint is, of course with the radioactive materials, we put in certain requirements in 10 CFR Part 37 to address the potential use of that material in a disbursal device and exposure device or other things. And a lot of it's based on the IAEA Code of Conduct concept of what's

important.

Given that some of these special nuclear materials could also be used in a disbursal device, we as part of the study that we had conducted at Los Alamos and also one conducted at Sandia National Laboratories, we looked at what comparable quantities of special nuclear material could produce similar effects to those radioactive materials?

And so trying to align the protection requirements for those smaller quantities of special nuclear material, generally in the category three realm, where if we were just protecting them from an improvised nuclear device threat, we probably wouldn't put a lot of requirements on because you wouldn't have enough to do anything. But you might have enough to actually disburse and cause problems.

And so in the rule making that's currently under development, we would actually add some requirements to some of those nuclear materials that could have a radiological fence price. Okay, so the next slide.

So essentially, what we've done is we've developed this model and based on a lot of information that we got from this model that Los Alamos developed for us we identified you know, what are the appropriate

protection mechanisms? It led us to determining that probably the best property of material to be used in an attractiveness concept is probably dilution.

And so that's essentially how we you know, developed the material attractiveness approach for the ongoing rule making. Next slide.

MEMBER BALLINGER: But you're limiting now this to the special nuclear materials?

MR. RIVERS: This is special nuclear material. Cyber security, this panel discussed a number of things that we talked about. We're looking at -- some of the things that we're looking at are reactor cyber security implementation that's underway. Highest consequence, critical visual assets are addressed.

And we're trying to use a consequence based approach to consider lesser requirements for critical visual assets with lower consequences. So, in the implementation to meet the NRC requirements, there are eight milestones essentially that all of the plants have implemented for seven milestones. The last milestone is focusing on those lower consequence critical digital assets.

And we're in the process of trying to understand do we need to implement all of the same

requirements on those final visual assets that we did for all of the previous ones? And I think the general direction is to try to do it in a more risk-informed approach where you probably wouldn't expect all the same security measures to go into place for these lesser assets then you would in the previous ones.

MEMBER BROWN: How do I phrase this? When you say implementation is underway at the plants, what are the elements? What kind of elements of that implementation are there?

I mean if -- I mean, we've had absolutely no, I don't think we have, any discussion of that, of how you're looking at implementing the you know, the 5.71, Reg Guide 5.71 where it talks about CDAs or critical digital assets. But nobody's gone through and okay, when we're looking at this from the top down and looking at the plant, what are the elements? Where -- is there a level of work through? You're talking about reactor cyber security, what does that mean?

MR. RIVERS: Well, basically we right now only our -- have an active requirement at nuclear power plants. All of the other ones were in a process of deciding how much cyber security is appropriate for each of those.

MEMBER BROWN: You mean fuel facilities

and things like that?

MR. RIVERS: Just for example there is --

MEMBER BROWN: I'm looking -- I'm only asking about reactor -- nuclear power plants right now.

MR. RIVERS: Looking at nuclear power plants, Reg Guide 5.71 is what we tend to be using. It tends to focus on essentially the NIST process for addressing cyber security which has several hundred elements that they're supposed to look at for each of these digital assets.

They put together a cyber security plan. We evaluate that. We send inspection teams out to assess whether or not they're implementing the plan appropriately. This isn't my area of special expertise.

MEMBER BROWN: Okay. So I shouldn't ask.

MR. RIVERS: So, I can't give you a lot of detail on that. But I'm sure that if you'd like to talk to our cyber security folks, Barry Westreich is the Director of the directorate. He or his deputy would be very happy to talk to you.

MEMBER BROWN: Okay, so we've got a meeting coming up if I remember correctly in a month or so?

CHAIRMAN STETKAR: Fuel cycle facilities.

MR. RIVERS: It's for fuel cycle facilities.

CHAIRMAN STETKAR: It's not nuclear power plants.

MR. RIVERS: But I'm sure that because you'll have the right people there that they can answer your questions on reactors and such.

MEMBER BROWN: But we could -- we'll have to talk more.

CHAIRMAN STETKAR: Well PNNL apparently is developing some models for cyber security. At least Oconee for example ought to have in place. Remember there aren't too many operating plants in the country that have the integrated safety and you know, protection control systems. Oconee is one though. So if we're interested to find out you know, what they've actually done in terms of hardware and otherwise.

MEMBER BROWN: Well, I was interested also not just -- you know, not just looking at the plant/plant type stuff. But you know the other activities that are conducted within you know, what I call the overall governance and management of the plant and how is that looked at if you're not --

MR. RIVERS: Right, but I'm not the expert on that.

MEMBER BROWN: That's fine. I understand. I'm not going to go -- we're not going to do that.

MR. RIVERS: Sorry. So --

MEMBER BROWN: We just -- I think we need to.

MR. RIVERS: Well I think you can talk to our folks that are involved in that because we have to address all of the things including their business systems and their access authorization systems. All of those things get factored into.

MEMBER BROWN: Yes, my concern is how those would integrate down into the configuration control and other plant management to interact. You know, how they interact because right now they're not supposed to electronically interact but they --

MR. RIVERS: That's right. They're supposed to be --

MEMBER BROWN: But we can pursue that separately.

CHAIRMAN STETKAR: Yes. That's a good idea.

MEMBER BROWN: All right. We might even have to have a separate meeting on that.

CHAIRMAN STETKAR: Another Subcommittee.

MEMBER BROWN: But I'm not sure we'll have enough time if the other one's just a half day.

MR. RIVERS: So anyway, on the fuel cycle essentially that's gone to the Commission. We've got I think three of the four votes back on that. So we'll be waiting an SRM on that.

We're also had -- there's a paper that was developed on research and test reactors. Then we'll also be looking at radioactive materials as well. So we're trying to look at all of those. But the first initial focus was on power plants because they have the biggest potential consequence. Next slide please.

I chair an IAEA Coordinated Research Project in Vienna that's been ongoing for a couple of years right now on the development of essential guidance on how to conduct security assessments. So it fits right into this idea of risk-informing security.

So the intent is to develop sort of two levels of guidance. One that is a more complete type guide that would sort of supporting nuclear power plants or category one fuel cycle facilities. And a lesser guide that would be a little bit more straightforward to be able to be used by a wider variety of facilities.

A lot of times for example if I get to an irradiator facility, the person doing the security is a radiation safety officer. And so he's not going to have either the interest or the knowledge to necessarily understand a very complex guide that you might use in a nuclear power plant.

To support this we're also doing case studies that help people understand how to implement it within their own type of facility. And the five that we currently have ongoing are nuclear power plant case study, an irradiator facility, radioactive material transport, and LEU fuel fabrication facility and a spent fuel storage facility.

To basically figuring that a general guidance document generally a lot of times isn't enough. That you need to have these case studies that can be used to support those guidance documents and also potentially support training activities. Next slide.

Also, we've got a number of workshops that will be carried out this year. These are the three workshops. Next slide please.

The INMM and Reducing Risk Workshop is actually the seventh in a series of reducing risk workshops that INMM has put on. This one will be put on at GW University next month, the week after the RIC.

It will have four panel discussions. One of them will be on cyber security.

I've set the cyber security panel discussion to focus on essentially risk associated with security -- cyber security at a nuclear power plant. It will have panel members from NRC Cyber Security Directorate, three of the National Laboratories and also industry.

There will be three other panels during the workshop. One will be on insider mitigation. A third one will be on perception of risk. And a fourth one, because we're doing this in conjunction with the Elliott School of International Affairs, will be on essentially the changing relationship with the Government of Russia.

Given with what's been happening in the Ukraine and things like that. So it will be a fairly diverse workshop. Next slide please.

MEMBER BLEY: Are you getting mostly the people you interact with anyway? Or are you getting some -- a bigger cross section? You've gotten some good ideas coming out from these?

MR. RIVERS: We tend to get a bigger cross section. We also get a lot of international fly in on some of these workshops. I know that one of the names

I've seen that's registered is Philippe Galland from Russia, not from Russia, from France, from CEA. Usually we get representation from the UK, from Japan, from other governments that will send people to these workshops.

We also try to open them up so that we get non-governmental organization participation. For example, on the perception of risk work panel discussion, Ed Lyman will be a participant on that. We'll have a couple of folks from NRC that will participate. And so that -- I think somebody from Monterey will also be on that panel.

So, we try -- when I do these workshops I try to do it in such a way that we get a very wide and diverse group up in the panel so that we get a lot of participation from the workshop participants as well.

One of the things to come out of both the Sandia and the Stone Mountain workshop were that we needed to really engage the risk, safety and security people. So working with Nathan Su and John Nakoski in research, we identified that an ANS meeting that was being given at Sun Valley, Idaho in April as being a targeted opportunity that will have a lot of the safety risk analysts at that meeting.

And so, we are working with ANS to put on

a one day workshop on the day prior to the ANS meeting to have a day of engagement between the safety and security risk professionals. Next slide please.

One of the things that has never really taken place is actually a real workshop on vulnerability assessment tools. And since I think when I mentioned it to Chris Lui and my boss that we had set up the ANS INMM one on safety and security, she walked in the next day and said well, when are you going to do one on vulnerability assessment tools.

So, we got the INMM to agree to put on this. It will be a three-day workshop in Boston in September. We'll have a discussion of VA tools that will talk about the validation, verification and accreditation of tools, of software tools. It will have a discussion of modeling issues. A discussion of data.

We'll have a demonstration by vendors. And this is one where I'm actually pulling in the NUSAM project I mentioned before where there's a case study on nuclear power plants where we'll actually give the vendors that are participating the case study on nuclear power plants. So each of them can demonstrate how their tool assesses the security effectiveness at that nuclear power plant.

We'll also give a half day for the vendors

to actually interact directly with all of the workshop participants. Then we'll have some panel discussions at the end where we'll have users, regulators, industry and vendors discuss these vulnerability assessment tools.

MEMBER BLEY: Is DOE coming? Are they part of this?

MR. RIVERS: DOE is actively working, supporting me in setting this workshop up.

CHAIRMAN STETKAR: I haven't heard of this one Joe, what are the dates in September? Do you have them? That's all right, we can get them.

MR. RIVERS: It's mid-September time frame. If you go to the INMM website, www.INMM.org, it has a -- in the upcoming events, you can click on this and get the dates for it.

CHAIRMAN STETKAR: Okay. Thank you.

MR. RIVERS: And probably in the next week or so, we'll probably put up the draft agenda for the workshop on the website as well.

Okay. And I think that's the last slide other then the questions slide. If you have any questions, I would be happy to answer them.

CHAIRMAN STETKAR: Anything more for Joe?

MR. RIVERS: But basically we're not

sitting idle and you know, we have our initiatives ongoing in the security world to try to better risk-inform security.

CHAIRMAN STETKAR: Thank you.

MEMBER BROWN: Just one question. You said this earlier and I just probably missed it. The risk-informing security, there's some aspects of that are a little tenuous. I mean how?

MR. RIVERS: Well I think it's you know, my training is you know, as a statistician. So you know, risk has certain consequences, expected loss basically is what risk is.

But knowing that we can't necessarily do all of that real well in the security world, it's trying to look at those elements of risk that can help us do a better job in security. You know, and I gave some examples of some of the ongoing activities.

You know, some of them include trying to get more use of simulation modeling at nuclear power plants. Trying to better understand what can an adversary really do. Trying to understand what consequences can actually be achieved because that's very important to understand. So, all of those types of things.

MEMBER BROWN: Is access -- I mean, access

points are a big part of maintaining a secure environment.

MR. RIVERS: Correct.

MEMBER BROWN: And I mean is -- at least that's a high level.

MR. RIVERS: Yes.

MEMBER BROWN: Is a way to look at it. I mean, is that part of the modeling in terms of trying to look -- I mean, if you're a plant, how many access points do you have?

MR. RIVERS: Well, when you look at -- one of the issues that you have at a nuclear power plant or a category one facility is, is you do control access. Adversaries can use a number of approaches to getting into the facility. Some of it can be through deception where they actually fake credentials, steal credentials or whatever to try to get in to get in through certain levels. But you may also just use brute force where you just basically crash through the fences and use explosives to breach walls and things like that.

So, all of those have to be considered when you're looking at security risks.

MEMBER BROWN: Okay. Thank you.

MR. RIVERS: Yes, and one of the things if

you look at the material attractiveness thing that we're working on right now in the fuel cycle facilities, one of the thoughts is that if we actually determine that some materials that are currently put into the material access areas in those secured areas don't really credibly have to be there. Those activities that are performed at those plants can be performed in less secure areas which means that fewer people are gaining access to the most secure parts of the facility.

So, we're looking at a lot of those types of elements and risk-informing security.

MEMBER SCHULTZ: I think the most important feature that -- well one of the most more important features that you'd be looking at, I didn't see it in a conference, but probably it's in the discussions is barrier evaluation and development.

MR. RIVERS: Yes, if you look up -- yes.

MEMBER SCHULTZ: Because the consequences are interesting. But in fact minor consequences could have a major impact on industry. So, the important features would be to assure that the event doesn't come to fruition.

So, a varied evaluation and opportunities to dissuade.

MR. RIVERS: The barrier analysis is a

very important part of this. It's a development of a lot of the things that I talked about.

CHAIRMAN STETKAR: I need to keep us moving here a bit because we have time slotted for a presentation by the industry. Another turn by UCS. And I need to get public comments and comments from the Committee. And I need to leave Michael enough time so that he doesn't have to speak too rapidly. So Michael?

MR. CALL: Thank you. Just wanted to give you a brief overview of some efforts that we're doing in the area of spent fuel storage in my division, which is the Spent Fuel Management Division in NMSS. This effort is relatively young. And so there hasn't been too much that's gone forward in it yet. So it's just we'll be bringing up to speed on the general outline of what it's like, what we're doing and the significant workshop that we had last month.

This effort we're looking to try to set up as a goal, we have a framework -- aiming for a framework to better enable risk-informed regulatory decisions in the areas of us looking at both spent fuel storage and transportation. But with the interest being mainly in transportation right now, we felt it's important to focus our efforts initially in spent fuel dry storage.

The reasons you know, like I said, this is

relatively new. Some of the reasons for taking on this effort is partly because of understanding the NUREG-2150. Come out of the follow up efforts that we're talking about here today as well as public interactions where we present but we've received a petition for rule making from NEI where they felt if we made -- they proposed certain changes that they felt would be useful to make Part 72 of the storage regulations more risk-informed.

In our reports we're looking at trying to set up this framework through a process -- in taking seven major steps, looking to see what risk information is out there already. For example, you may be familiar with, there are a couple of PRAs that have been done. NRC did their own pilot PRA, which is NUREG-1864 as well as EPRI had done a PRA of their own.

So, just trying to identify what information is available. And the next step which is where our workshop from last month comes in, was to try to see where a defense-in-depth, how we would go about defining defense-in-depth for purposes of application and spent fuel storage. I believe that's the next slide. Yes, it's right there.

So, we had -- this workshop we had, held it on the 15th. It was well attended by both we had

NEI participation and a number of public participants both in person as well as through the webinar that we had. In fact we had so many trying to register in that we -- assignment of a system telling people that we were overloaded, we can't take anymore.

So, maybe next time we have a public webinar we'll expand the number of lines that we make available for that. The NRC and NEI, we asked NEI to make a presentation on their views of what defense-in-depth would look like as well as presenting our own, and that is discussed a little bit more on the next slide.

For NRC we are looking and thinking in terms of threes. We're looking at three layers to ensure performance of three safety functions. And understanding how operations of spent fuel storage occur. Breaking that out as far as how we looked at it in terms of three different phases of operation. NEI's is more a -- applying more succinct way of looking at it in terms of identifying barriers, controls, personnel and so forth to prevent and contain or mitigate exposure to radioactive materials.

As I said, we had a number of public comments ranging from you know, in favor of you know, the NRC is looking at this as a good thing because it

can help enhance and make the framework we've got now being more clear. And to help us identify what's really needed to be looked at in terms of certifying casks for storage.

There were some questions about the level of detail and some questions about different things such as well how are you going to determine if you have adequate defense-in-depth. And so there were some discussions on those points.

So that's where we are at this point. We're looking at taking the comments that we had from that meeting and putting together some kind of brief paper to consolidate that thinking. And then move to the next step which would be like I said, there are seven steps that we're looking at. I think we're looking at what are we going to use of making decisions, decision metrics. And how those would play into a decision process.

Eventually we're going to lay out a preliminary framework and then use a pilot -- selected a pilot to run that through and see where we need to make changes to that and finalize our approach before going forward with that.

So, if there are any questions? I know that that was a brief presentation. But this is where

we are in terms of a significant activity in spent fuel storage.

MEMBER BALLINGER: Are you interfacing with the folks that are looking at license renewal for these casks and long term dry storage and things like that?

MR. CALL: License -- well, I realize --

MEMBER BALLINGER: You have a unique opportunity here.

MR. CALL: Right. I think I -- when we've been looking at these things as far as looking at what elements might be in each of these layers, we're not just looking at an initial storage period, but also looking at what might be things in a renewal period also. So there is some thinking toward that effort.

Like I said, we're relatively -- this is a relatively young and so as we go forward, we can definitely keep those things in mind to make sure that we reach out to that adequately.

MEMBER BALLINGER: I would encourage you to do that. Because there's a huge effort on defining what kind of inspections are going to be needed. And expensive. Very expensive inspections and technology which need to be balanced against other types of inspection which ensure that you don't get released

material.

MR. CALL: Okay. Yes, we will definitely keep --

MR. LOMBARD: Actually if I may Ron, Bill Demoross.

MEMBER BALLINGER: Demoross, who is that?

CHAIRMAN STETKAR: Identify yourself sir.

MR. LOMBARD: I need records for a schedule of management. He can schedule management within NMSS and the folks who are developing HMS programs, managing regulatory framework are the same division, same compliance.

CHAIRMAN STETKAR: I'm sorry, we need your name on the record too.

MR. LOMBARD: Mark Lombard.

CHAIRMAN STETKAR: Thank you.

MR. LOMBARD: Yes, we deal very closely with NEI, the same folks who interfaced with us on other spent fuel storage issues almost on a weekly basis.

CHAIRMAN STETKAR: Any other questions?

(No response)

MR. CALL: And just moving on, as Dick mentioned earlier, I'm filing in for Dennis Damon. He's the NMSS Risk Analyst that would normally be making this kind of presentation. Just wanted to give you

again, a brief informational presentation about some efforts that have gone on that are NMSS wide as well as just point to some things that are active in the different divisions within the NMSS.

Sometime ago there was a risk task group that was organized and developed a guidance document that's referred to as the Risk-Informed Decision Making document or RIDM. The current revision is -- we have one that was put out in February 2008.

But the activity started much earlier in a response to the SRM on SECY-99-0100. In that SECY just to give you a little bit of information, the staff's proposal to implement a framework for using risk assessment in regulating nuclear material uses and disposal was approved along with the proposal for addressing risk management issues in those areas including development of risk metrics and goals. And then there was a joint ACRS/ACNW subcommittee that was established to peer review those staff efforts.

The document itself has four objectives. To provide a step by step procedure on how to make risk-informed regulatory decisions. To suggest quantitative health guidelines. And provide a discussion of three regions of risk, which would be considered negligible, acceptable or tolerable I

should say, not acceptable and negligible are the terms that they were using. And then to discuss how the RIDM method would be applied to nuclear material and waste regulatory areas.

In the SRM on SECY-04-0182, the Commission approved staff's plan to continue to apply risk-informed methods to these activities, materials and the waste repository activities and directed that the staff should consider applying the guidance in the document to planned and emergent activities. Next slide please.

So as I mentioned, part of the guidance that was developed and in the document itself there are quantitative health guidelines. They developed six. Two of which will look similar to the guideline -- to the goals that are for the reactor safety goals.

They're all in terms of individual risk. So that there are six. Three for the public, three for workers. In addition to acute fatality and serious injury or like in cancer fatality, the serious injury guideline was also adopted or suggested.

I would note that these are not -- unlike the safety goals for reactors, these are not endorsed by any type of Commission policy statement. And what they are, you'll notice that we've called them

guidelines instead of goals. Instead of conveying a sense that these would be something that would need to be met at some point in the future or at some day, these are more of guidelines which would be anticipated according to the guidance document levels below which do you really need to consider doing much more to ensure that the risks are any lower then this.

MEMBER SKILLMAN: So these are thresholds for action?

MR. CALL: Kind of. Looking at -- yes. And they're not really -- it's not a hard and fast. It's kind of -- it's like I said, it's a guideline to suggest considering whether any further effort is needed. So whether you're in the negligible risk area and need to do anymore or not. Of course there will be other considerations that may weigh into that. But from a risk values perspective, that's where this is looking at.

MEMBER SKILLMAN: Thank you.

MR. CALL: On the next slide. To see if you know, since that time we note that these guidelines are not widely known or incorporated into risk-informing applications within the NMSS programs. However, there's various concepts have you know, the different groups are aware of the various other

concepts in the guidance and made use of those as they felt was deemed appropriate. Just describing some of that here with the different organizations. The Economic Directorate, my division in terms of spent fuel storage, the fuel cycle and the materials and decommissioning.

And some of these are in terms of ongoing efforts. For example, in fuel cycle they're looking to revise their oversight program. And they feel that some of the milestones that they've set up for activities there would be well suited to employ guidance from, or consider guidance from the RIDM document.

On the next slide. In addition to that, just wanted to also make you aware that there have been various activities both past and ongoing within the different divisions that are risk-informing in nature or that support risk-informing efforts. Many of these if not all I would imagine are or have been or are currently listed on the NRC's public website. And it describes the different risk-informing activities of the Agency.

And then I've listed here some examples for the different areas. You'll see that this covers the range of what we regulate at NMSS.

And then that's the last slide, so if there are any questions?

MEMBER SCHULTZ: Michael, are you familiar enough with the fuel cycle effort with regard to the integrated safety -- the overall plan as to know what the schedule is there?

MR. CALL: For the revised oversight program?

MEMBER SCHULTZ: Yes, exactly.

MR. CALL: That I'm not aware of the schedule, no. I just know that they are working towards some. They have an effort engaged in that area.

MEMBER SCHULTZ: I'll look it up. Thanks.

CHAIRMAN STETKAR: Any other questions for Michael or the staff?

(No response)

CHAIRMAN STETKAR: If not, thank you all. It's good overview of not only the RMRF initiative, but what's going on in the other areas that would be affected by the integrated policy statement and regulatory framework.

With that I'd like -- we have next on the agenda a slot for NEI. If you have some comments to

come up.

Mike, we haven't received any material from the slide or whatever.

MR. TSCHILTZ: No. No.

CHAIRMAN STETKAR: Or is it just -- okay. It will be on the record.

MR. TSCHILTZ: Certainly. I contemplated developing slides for this discussion, but when I was initially asked to come and speak before the Committee, it was under the presumption that the paper would be available and the industry would have an opportunity to comment.

And so I think my comments won't be so much aimed at the content or the presumed content of the paper, but more at a higher level as to where we're going with this initiative and where the industry may come out as far as seeing the benefit or not seeing the benefit. I guess just looking at the process for moving forward, you know, Dick Dudley described the white paper followed by a public comment period followed by potentially a meeting to discuss a resolution of comments.

One perspective I would offer is that these initiatives seem to be voluntary initiatives. And they're not something that would be imposed upon the

licensee, it would be something that they would voluntarily apply for and implement similar to NFPA-805 or Option Two was the example that was given there.

So, the observation that I would have is that NUREG-2150 was developed and written by an NRC Task Force with little public involvement. The development of the white paper, the Options is being developed with little public involvement. Just one opportunity it appears for stakeholder feedback on the white paper.

So, my concern is that there's going to be a lot of effort potentially put into the development of Options that there's no clear identified person or utility that would implement it. So to me, it seems that it needs to be more closely linked to the people -- the development of the Options need to be more closely linked to the people who would ultimately implement that.

So, in separation of those two activities, I think is problematic. And the reason that I wouldn't offer more detailed comments I think are the devil's in the details. I think whether these Options are looked upon favorable and then people decide to implement them are largely based upon the details that are going to be developed for the Options.

So in that regard I think it's very

important that you know, we allow sufficient time in the development of these Options for meaningful interactions. And I would say it would be beneficial to look at a potential examples of applications for Option Two.

Just looking at Option Three on the surface, it would appear that it's what I would characterize as a heavy lift. And with all of the other activities going on in the post-Fukushima era here, there's a lot to consider. So, someone's volunteering to take that on, at this stage I think that would be questionable. But I think that's something that we need to explore as we move forward.

The other observation I would offer is that the industry and the NRC have formed risk-informed steering committees. And there's joint meetings where the industry's steering committee meets with the NRC's steering committee. And they identify the issues that they think are most important to be addressed in the near term as far as risk-informed regulation.

And I think if you look at what we focused on in the past year and the things that we're focusing on in the coming year, it's going to identify the things that are really issues that people face right now that they need answers to. For example, this year one of

the issues was PRA realism. And to a large degree that was as a result of some of the issues that arose during the development of fire PRAs for NFPA-805.

And the industry has a sense of urgency in the need to resolve those issues with fire PRAs because of the consequences of having these conservatisms. So -- and the potential negative consequences and diversion of resources to things that don't have a true safety benefit.

So, I would say the risk-informed steering committee is a good place and this is -- this issue, the RMRF is one of the topics that the staff steering committee has raised as a potential, one to be considered in 2015. But I think the industry is looking at more practical application, things that can be used in the near term. The treatment of uncertainty in decision making. Aggregation of risk and development of external vent PRAs.

The flooding PRAs being an issue. I know you've heard of the challenges that the industry and the staff has faced with evaluating flooding hazards to the deterministic methods that are used per site in new reactors and the challenges that are created by that. And not having a risk-informed or accepted risk-informed method for dealing with those hazards.

So, I would say that being said, I mean, we're ready. I have a small working group formed to review the paper when it's issued. And we'll provide our comments and engage the staff.

I think the general belief out there I think from when NUREG-2150 was initially issued was that the regulatory framework doesn't really need to be revamped at this stage. That our efforts would be better spent encouraging and sustaining the existing policies that have been put in place with the PRA policy statement that exists.

And there's still a lot of work to be done. We heard comments today on defense-in-depth. It has just been out there since the initial implementation of misconformed regulation. And people still struggle with how to apply those concepts. So I think we can clearly make progress in those areas in an evolutionary way as opposed to a revolutionary way of reframing the regulations.

So I'll stop there and take any questions.

CHAIRMAN STETKAR: Any questions for Mike?

(No response)

CHAIRMAN STETKAR: Thank you very much for your comments. And again, I share your frustration

about not having something more substantive to actually comment on. But, that's the way it is. We will have that opportunity in the future. And I'm sure you'll be back.

MR. TSCHILTZ: Thanks.

CHAIRMAN STETKAR: And we have a request from Union of Concerned Scientists. So I believe Ed Lyman is here. Is Ed here? Oh, is he on -- okay. Ed is apparently out there screaming at his communication device. Ed, we'll get the line open for you in a second here.

MR. LYMAN: Hello?

CHAIRMAN STETKAR: Ed, are you there?

MR. LYMAN: Yes. Can you hear me?

CHAIRMAN STETKAR: Yes, we can.

MR. LYMAN: Yes. I apologize for not being there in person today.

CHAIRMAN STETKAR: No. That's fine.

MR. LYMAN: So, as always we appreciate the opportunity to provide comments. But I don't want to pile on here. But again, we were also expecting to get the white paper to comment on. And so without having that, my remarks are just going to be reactions to some of what I've heard this morning.

With regard to the risk management

regulatory framework, I guess there are two separate aspects here. One is the -- is it appropriate to implement this policy statement Agency wide for all aspects, even those where there may not be a clear or useful application of risk management concepts? And I think the answer to that is no from our perspective.

One clear example being security. I am glad to hear that there doesn't seem to be an effort to try to quantify the unquantifiable with regard to initiating events for security. But that's certainly something we would not support.

The other aspect is are the -- is what we heard with regard to the Power Reactor Options on appropriate. And I think the answer to that is also no. I think there is a great need for the Agency to clarify the way risk is being used to clear up some of the issues and inconsistencies. And it doesn't sound like this particular vehicle is going to accomplish that. And you may not hear this very often, but I totally agree with the NEI speaker about I think the --

CHAIRMAN STETKAR: There's laughing going on in the room Ed, if you can't hear it.

MR. LYMAN: But I actually am going to say the same thing. I don't see how what the elements of

the policy statement that were presented are any improvement over the PRA policy statement. In fact I think it may be a step backward.

For instance, I'm concerned about the first bullet which sounds to me would perhaps the plant adequate protection or equate adequate protection with the idea that that's really risk management. And I don't think you can really justify and I think risk management is the only aspect of adequate protection. And I'm concerned about the implications, the legal implications of a statement like that.

I would say adequate protection is probably closer to risk-minimization. Or that would be our hope then risk management. You could always keep in mind that you know, the public is one of the customers of this policy statement and I think the Agency needs to focus on improving the priority with how it applies in it's decision making. And I don't see that happening here.

One aspect I think that highlights it, we heard how NFPA-805 was actually it sounds like it's leading to greater inconsistencies between those who voluntarily choose to implement it and sign vulnerabilities that require correction and those who don't. And that seems to be going in the wrong

direction.

So until that problem is fixed, it doesn't seem like it's a good model for going forward. And I don't see how Option Two, clearly industry is not going to want to go on a hunt for unrectified vulnerabilities that they're going to have to pay to fix. So that -- to expect that that's going to be a reasoned outcome of this process is not a reasonable expectation. So if it were going to happen, I think it would have to be a mandatory Option Three type.

We've made pitches in the past for a new vulnerability, you know, systematic vulnerability assessment across the whole fleet so that you can at least get consistency. And it seems to increase inconsistency by allowing this process to be voluntary would make matters worse.

So I think that's all I have to say on that. On risk-informing security, we have some views on the material attractiveness rule making that Joe Rivers is well familiar with. I won't rehash them here, but I think Dr. Rempe's comment goes to one of our main concerns, that material attractiveness is not an intrinsic aspect of material properties.

But it does imply some modeling or presumption of an adversary, their capabilities and

their contentions. And that has to be accounted for better in the rule making process to make clear that there is some target adversary in mind when you're talking about what materials are attractive and what are less attractive.

The last point I wanted to make has to do with defense-in-depth for spent fuel. I think here is this is an area where there might be some value in considering risk. And we think that if you apply the defense-in-depth, the metric for evaluating the expedited fuel transfer issue as I said before, that that would make expedited fuel transference dry casks look more attractive then if you've done a cost benefit analysis expected.

So I would hope that that program would also be applied not just to spent fuel in dry storage but also comparative of risks of densely packed spent fuel pools compared to dry storage.

And I think that's all I have. Thank you.

CHAIRMAN STETKAR: Thank you very much. I've lost track of what lines are open. Was Ed on the general public line?

MR. SNODDERLY: No. Ed was on the staff line.

CHAIRMAN STETKAR: Was on the staff line.

Okay. Let me ask, as long as we have the staff line open, are any other members of the staff out there that wanted to make any comments on anything? As long as we have your line open.

MR. HARRISON: No comments here.

CHAIRMAN STETKAR: Okay. Thank you. What we'll do then is open up the other line, which is the public line. And while we're doing that, let me ask if is there anyone in the room that has any comments that you'd like to make? Please come up and do so.

Now, if there's a member of the public out there, because of our high tech system here, could you just please say something, hello or anything so that we can confirm that your line is open.

(No response)

CHAIRMAN STETKAR: It's always troublesome.

MR. SNODDERLY: There wasn't anybody.

CHAIRMAN STETKAR: Okay. We have indications that there isn't anyone on the public line. And if that's the case, then thank you all for your comments. And again, NEI and Ed Lyman, you're on the record for the meeting. So, we have your comments.

What we always do at the end of one of these Subcommittee meetings, I'll go around the table and ask

each Member if you have any final comments that you'd like to make. And also, if -- ask whether you think that at this stage in the game it merits bringing the issue before the full Committee.

I always like to get a little feedback from other Members on that topic in terms of timeliness. And because Joy got a chance to go last a few days ago, you can go first today.

MEMBER REMPE: Oh. I wanted to thank you for the presentations and comments. I look forward to the white paper when it's released. I would encourage us to have another Subcommittee -- my viewpoint is we should have another Subcommittee meeting after the white paper is released. And then I would take it to the full Committee. I think at this time that we're going before the paper is released to the full Committee.

CHAIRMAN STETKAR: Charlie?

MEMBER BROWN: Same comment on the presentations. Got something out of it. And I agree with Joy that we ought to get the white paper done first before we go to the full Committee.

CHAIRMAN STETKAR: Ron?

MEMBER BALLINGER: Same.

CHAIRMAN STETKAR: It's going quick.

Mike?

MEMBER RYAN: It's a work in progress. And I agree with the comments from my colleagues.

CHAIRMAN STETKAR: Dennis?

MEMBER BLEY: I agree with them except we might want to wait until the public comments are in on the white paper before we take it to the full Committee.

CHAIRMAN STETKAR: Okay. Dick?

MEMBER SKILLMAN: Yes, I agree with Dr. Rempe. I'd like to hear again after we see the white paper, after the public comments, that would probably be better. But I also want to thank Dick and Joe for putting up with my focused questions. Thank you Dick Dudley and Joe.

CHAIRMAN STETKAR: Steve?

MEMBER SCHULTZ: I appreciate the presentations and also the -- got the involvement by both the staff and the other organizations that have provided input to us today. And would suggest that we have the Subcommittee meeting as we get the additional information and join in with the public comment period.

CHAIRMAN STETKAR: Yes. My inclination -- thanks. You have -- well, my inclination is to do that Dick. Is that you're path forward that identified interactions with the Subcommittee I think during the

summer period. I think we want to probably interact with you earlier then that so that you have the benefit of the Subcommittee feedback in parallel with the public comments.

And then see where we go after all of the public comments are in and you have a final version of the paper you know, later in the year. So, I think we'll probably be looking at scheduling a Subcommittee meeting in the April/May time frame. Well have to figure out a slot to put that in. But I think earlier the better I think is what you're hearing from us.

MEMBER BLEY: You want to wait until after they have that meeting I would think.

CHAIRMAN STETKAR: I think we want to wait until after they have that meeting. But not necessarily wait until they have all of the public comments and are working on the you know, the final draft.

And with that, if there are no other comments, we are adjourned.

(Whereupon, the above-entitled matter went off the record at 11:30 a.m.)

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Staff Recommendations Regarding a Risk Management Regulatory Framework

Briefing for ACRS Subcommittee

February 20, 2015

Outline of Staff Presentation on Risk Management Regulatory Framework (RMRF)

- Background and Current Approach (R. Dudley)
  - Agency-wide Policy Statement
  - Implementation Options for Power Reactors
  - Path Forward
- Status of Risk-Informed Activities Regarding Common Defense and Security (Joe Rivers)
- Status of Risk-Informed Activities Regarding Spent Fuel Dry Storage (Michel Call)
- Status of Risk-Informed Activities Regarding Nuclear Materials Licensing (Dennis Damon/Michel Call)

Summary: Background and Current Approach to Evaluate Risk Management Regulatory Framework

- Chairman's Tasking Memorandum of June 14, 2012 directed staff to "review NUREG-2150 and provide a paper to the Commission that would identify options and make recommendations, including the potential development of a Commission policy statement."
- Commission's May 19, 2014 SRM on Near-Term Task Force Recommendation 1:
  - Directed staff to reevaluate objectives of Improvement Activity 1 (new design-basis extension category) and Improvement Activity 2 (adequacy of defense-in-depth) within context of Commission direction on long-term Risk Management Regulatory Framework
  - Closed NTTF Recommendation 1
  - Increased scope of RMRF SECY paper (describe relationships between ongoing risk-informed activities)
- Staff has requested extension of due date until December 2015
- Management has re-evaluated the staff's approach to evaluating agency-wide RMRF
  - Staff will consider 3 RMRF implementation options for power reactors
  - Staff will also ask Commission to consider an overarching, agency-wide risk management policy statement

Overview of Agency-wide Policy Statement

- Applicable to all NRC-regulated program areas (radiological safety and security)
  - A risk management approach would be used to ensure adequate protection of public health and safety and promote the common defense and security for all NRC regulatory activities.
  - In a risk management approach, safety and security are ensured by (1) understanding the risk associated with NRC-regulated activities and (2) using that risk information to make regulatory decisions.

Overview of Agency-wide Policy Statement (continued)

- The risk management approach would:

1. Use a structured process to identify issues, develop and analyze options, make decisions, and monitor the effectiveness of regulatory programs to make improvements as necessary,

2. Ensure appropriate regulatory controls and oversight are in place recognizing the variety of risks associated with different uses of radioactive materials, and

3. Employ risk-informed decision-making, in which risk insights are considered together with other factors commensurate with their importance to public health and safety and common defense and security.

Overview of Agency-wide Policy Statement (continued)

- The technical analyses supporting the risk-management approach should:

1. Be based on sound data, information, and methodologies, including consideration of uncertainties,

2. Use techniques or combinations of techniques appropriate for the hazards and complexity of the issue,

3. Be as realistic as practicable, and

4. Promote and utilize advances in science and technology, as practicable.

Three Power Reactor Implementation Options

- Option 1 – Maintain Current Framework
- Option 2 – Voluntary Alternative Risk-Informed Licensing Basis
- Option 3 – Plant Specific Risk Management Regulatory Framework from NUREG-2150

Power Reactor Option 1 – Maintain Current Framework

- No overall revision of NRC's regulatory framework
- The current power reactor regulatory framework meets the RMRF criteria in NUREG-2150, Chapter 4 - Option A
  - Commission Safety Goal Policy sets forth the "risk management objective"
  - Current regulations implement sufficient protections (e.g., defense-in-depth and safety margins) corresponding to NUREG-2150 "risk management goal"
  - NRR's LIC-504 sets forth a risk-informed decision process with steps consistent with those described in NUREG-2150
  - NRC has numerous monitoring and feedback mechanisms to (1) gage the efficacy of regulatory decisions and (2) identify new information that should be considered within the regulatory framework
- Not a "do nothing" option -- staff would still make safety improvements (based on risk insights or other considerations) whenever deemed necessary using existing regulatory processes

Power Reactor Option 2 – Voluntary Alternative Risk-Informed Licensing Basis

- Maintain existing generic regulatory structure
- Issue rule allowing licensees who upgrade PRAs to apply for approval of a licensing basis that would support a performance-based, risk-informed alternative to certain deterministic regulations of low safety benefit
  - Licensees allowed to select a plant-specific set of design changes/compliance issues of low risk-significance that would deviate from current deterministic requirements (NRC or self-approval) **and** must search for and mitigate all plant-specific risk vulnerabilities meeting NRC-specified criteria
  - New information on mitigation of risk-significant events and/or accident sequences (risk vulnerabilities) must be documented in an updated Final Safety Analysis Report (FSAR) in accordance with 10 CFR 50.71 (e) requirements
  - Mandatory monitoring and feedback (as described in RG 1.174) to ensure changes in risk remain acceptable throughout the lifetime of the facility

Power Reactor Option 2 – Voluntary Alternative Risk Informed Licensing Basis (continued)

- Regulatory process for licensees to self-approve certain plant-specific changes would be similar to NFPA-805 approval process, i.e., risk-informed changes allowed to license requirements without prior NRC approval if risk increase (Δ CDF) is “no more than minimal” (e.g., < 1E-7/year)
- Changes with risk increases “more than minimal” (e.g., > 1E-7/year) require NRC approval
- Plant licensees are expected to have upgraded, high quality PRAs to support this risk-informed alternative licensing basis approach

Power Reactor Option 3 – Plant-Specific RMRF from NUREG-2150

- Require PRAs and establish plant-specific licensing basis based on:
  - Plant-specific risk profiles
  - NRC-specified risk management objective
- Structured, risk-informed decision-making process used by both NRC and licensees
- Based on the risk profile, licensees would implement the plant-specific licensing basis by:
  - Determining how the risk objective is met
  - Ensuring that the necessary protections are in place to meet the risk management goal
  - Establishing the risk-informed decision-making process
  - Establishing the monitoring/feedback and reporting process

Power Reactor Option 3 – Plant-Specific RMRF from NUREG-2150 (continued)

- Each plant's licensing basis would consist of:
  - "Technical requirements" based upon plant-specific attributes and applicant-selected design specific elements/constraints
  - Rationales (technical bases) why the technical requirements adequately address risk and defense-in-depth in light of the plant-specific attributes and design specific elements/constraints
  - FSAR-level description of the plant-specific attributes and applicant-selected design specific elements/constraints that are the inputs/assumptions for the above rationales (technical bases) which must be maintained
  - Process for maintaining the validity of the rationales (technical bases) throughout the operating lifetime of the facility.
- Licensees would be required to use the structured process with monitoring and feedback to ensure that the plant-specific licensing basis remained consistent with the risk profile of the plant, which could change over time.

Path Forward on RMRF

- Draft white paper and outline of policy statement now being reviewed by NRC Senior management
- Incorporate management comments into updated draft white paper and release to public
- Public meeting (late April) to discuss draft white paper
- Solicit written public comments on later version of white paper via www.regulations.gov
- Summarize public comments and meet again with ACRS (summer)
- RMRF SECY paper currently due to Commission on December 18, 2015

Backup Slides

Definitions

To ensure a common understanding of this example policy statement, it is important to know the differences between the terms “risk management,” “risk assessment”, and “risk-informed approach.”

- *Risk management* is the recognition of the threat or danger involved with the use of nuclear materials and establishing controls and oversight to manage the potential threat or danger. That is, it is coordinated activities to direct and control an organization with regard to risk. *[From ISO 31000, “Risk Management – Principles and Guidelines”]*
- *Risk assessment* is the evaluation of what can go wrong, how likely is it, and what would be the consequences? This consideration may be addressed either qualitatively or quantitatively. *[From SRM-SECY-98-144, “White Paper on Risk-Informed and Performance-Based Regulation,” March 1999]*

Definitions (continued)

- *Risk-informed approach* to regulatory decision-making represents a philosophy whereby [quantitative and qualitative] risk insights are considered together with other factors to establish requirements that better focus licensee and regulatory attention on design and operational issues commensurate with their importance to public health and safety. A risk-informed approach enhances the deterministic approach which is used to define many of the design and operational requirements for NRC licensees. Risk-informed approaches lie between the risk-based and purely deterministic approaches. *[From SRM-SECY-98-144, "White Paper on Risk-Informed and Performance-Based Regulation," March 1999]*

NUREG-2150 Hierarchy and Structured Decision-making Process

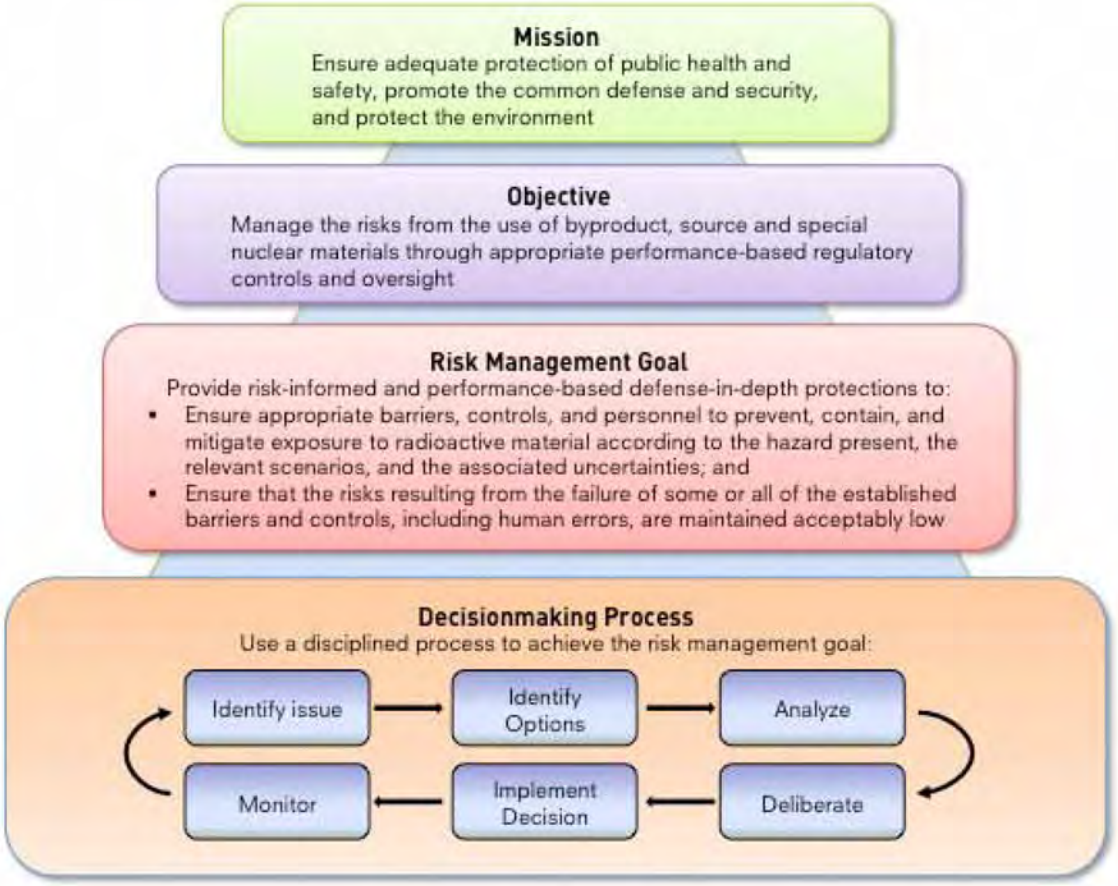

Figure ES-1 A Proposed Risk Management Regulatory Framework

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Status of Risk-Informed Activities Regarding Common Defense and Security

Joe Rivers, NSIR

February 20, 2015

ACRS Subcommittee Meeting

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NRC Sandia Workshop 2010

- Six Areas of Opportunity Identified
  - Uncertainty of initiating events
  - Simulation tools
  - Collaboration between safety/security
  - Cyber Security
  - Improved metrics
  - Demonstration project like WASH 1400

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February 2014 INMM Workshop

- Safety/Security Risk Approaches
- Material Attractiveness
- Likelihood of Event
- VA Simulation Tools
- Cyber Security

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Safety/Security Risk Approaches

- Discussion of PRA at NRC
- Presentation of an extensible risk informed decision support method
- Implications of security challenges for safety assessment tools
- DNDO risk models

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Material Attractiveness

- NRC approach under development
- DOE support for NRC approach
- NGO thoughts on approach
- Industry thoughts
- UK comments on concept of dilution
- French presentation on security at civilian facilities

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Likelihood of Event

- Surveys of possible approaches and options
- Discussions of how approaches might be used
- National Consortium for the Study of Terrorism and Responses to Terrorism approach

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VA Simulation Tools

- ARES Corporation – AVERT
- Rhino Corp – Simajin
- Sandia modelling
- DTRA modelling
- PNNL tool to address physical and cyber attacks

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Cyber Security

- Discussion of pros, cons and challenges of risk informing cyber security
- NRC regulatory program
- PNNL cyber risk model

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Current Activities

- Risk Prioritization Initiative
- Risk Management Regulatory Framework Working Group
- Use of Simulation Modelling
- Material Attractiveness
- Cyber Security
- NUSAM

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Risk Prioritization Initiative

- Attempt to prioritize plant projects informed by risk associated with safety, security, emergency preparedness, and radiation protection
- Industry Pilots conducted

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Risk Management Regulatory Framework Working Group

- Addressing recommendations of RMRF Task Force
- First, focus on reactor safety
- Expand to other disciplines
- Include concept of defense in depth
- Look at beyond design basis accidents

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Use of Simulation Modelling

- Industry initiative to incorporate vulnerability assessment modelling tools into regulatory process
- Industry pilot to model a number of NPPs
- NRC staff assessing process to determine requirements for use in regulatory process

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Material Attractiveness

- Development of an approach to grade security based on the attractiveness of the nuclear material to the adversary
- Approach allows alternative measures to be applied for varying levels of dilution
- Will apply to fuel cycle facilities and RTRs

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Los Alamos Model

- Logic model developed
- Four modules
  - Acquisition
  - Processing
  - Weaponization
  - Yield reduction
- Provides an estimate of likelihood

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Cyber Security

- Reactor cyber security implemantation under way
- Highest consequence critical digital assets (CDAs) adressed
- using a consequence based approach to consider lesser requirements for CDAs with lower consequences

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NUSAM

- IAEA Coordinated Research Project
- Develop guidance on the conduct of security assessments
- Case Studies
  - NPP
  - Irradiator Facility
  - Rad Material Transport
  - LEU Fuel Fabrication Facility
  - Spent Fuel Storage Facility

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Upcoming Workshops

- INMM Reducing Risk Workshop
- INMM/ANS Workshop on Safety/Security Risk
- INMMWorkshop on VA Tools

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INMM Reducing Risk Workshop

- March 2015 in Washington, DC
- Session on Cyber Security
- Focus on risk approaches that might apply to cyber security

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ANS/INMM Workshop on Safety/Security Risk

- April 2015 in Sun Valley, Idaho
- Engage safety and security risk professionals in a discussion of risk applied to their discipline

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INMM Workshop on VA Tools

- September 2015 in Boston
- Discussion of VA Tools
- Discussion of VV&A
- Discussion of modelling issues
- Discussion of data
- Demonstration by Vendors
- Discussion by users
- Panel Discussion

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Questions ?

Risk Informing Spent Fuel Dry Storage

Michel Call

Division of Spent Fuel Management

Office of Nuclear Materials Safety and Safeguards

Risk-Informing Effort

- Prompted by agency activities and stakeholder interactions
- Goal – framework to better enable risk-informed regulatory decisions
- Focus – initially on spent fuel dry storage
- Approach – 7 major steps

Defense-in-Depth Public Workshop

- Definition and application in dry storage, one major step
- Held public workshop Jan 15, 2015
- Well attended with good public and industry participation
- NRC and NEI presentations

Defense-in-Depth Approaches

- NRC
  - 3 layers (engineered, programmatic, and mitigating controls)
  - 3 safety functions (sub-criticality, radiation exposure, radioactive materials release)
  - 3 operations phases (loading/transfer, storage, unloading)
- NEI
  - Barriers, controls, etc. to prevent, contain, mitigate exposure to radioactive materials

Risk Informing in NMSS

Michel Call

Division of Spent Fuel Management

Office of Nuclear Materials Safety and Safeguards

Risk-Informed Decisionmaking (RIDM)

- Guidance document developed by NMSS Risk Task Group
- Current Revision (Rev 1) from February 2008 (ML080720238)
- Response to SRM-SECY-99-0100
- 4 objectives of the RIDM document
- Commission Approval in SRM-SECY-04-0182

Quantitative Health Guidelines (QHGs)

- 6 Guidelines

	Public	**Worker**
Acute fatality	≤ 5×10^{-7}/yr	≤ 1×10^{-6}/yr
Latent cancer fatality	≤ 2×10^{-6}/yr or 4 mrem/yr	≤ 1×10^{-5}/yr or 25 mrem/yr
Serious injury	≤ 1×10^{-6}/yr	≤ 5×10^{-6}/yr

- Not endorsed by Commission policy statement
- Guidelines vs. Goals

Use of RIDM & QHGs

- QHGs are not widely known or incorporated into risk-informing applications
- NMSS programs
  - Yucca Mountain – risk-informed regulation and guidance in place, pre-dates RIDM and QHGs
  - Dry Spent Fuel Storage – consideration in effort to risk-inform dry storage
  - Fuel Cycle – consideration/application in revised oversight program development
  - Materials and Decommissioning – have made use of various concepts from RIDM

Other NMSS Risk-Informing Efforts

- Variety of Activities past and present
- Current activities described on NRC's website
- Examples of Activities (past and present)
  - NUREG-1556 Series – Guidance about Materials Licenses
  - Part 61 rulemaking – Land disposal of radioactive waste
  - Fuel Cycle – Integrated Safety Assessment, Part 70 Subpart H
  - Yucca Mountain – Part 63, Performance Assessment
  - Spent Fuel Transportation – Fire Studies