UNITED STATES NUCLEAR REGULATORY COMMISSION

BRIEFING ON RISK-INFORMED, PERFORMANCE-BASED REGULATION

+ + + +

WEDNESDAY

February 4, 2009

+ + + + +

The Commission convened at 1:30 p.m., the Honorable Dale E. Klein, Chairman presiding.

NUCLEAR REGULATORY COMMISSION

DALE E. KLEIN, CHAIRMAN

GREGORY B. JACZKO, COMMISSIONER

PETER B. LYONS, COMMISSIONER

KRISTINE L. SVINICKI, COMMISSIONER

PANEL 1: INDUSTRY REPRESENTATIVES

TONY PIETRANGELO, Nuclear Energy Institute (NEI)

KEN CANAVAN, Senior Program Manager, Electric Power Research Institute (EPRI)

EDWIN S. LYMAN, Senior Staff Scientist, Union of Concerned Scientists

BRYAN ERLER, Vice President, ASME Nuclear Codes & Standards

N. PRASAD KADAMBI, Chair, ANS Standards Board

PANEL 2: NRC STAFF

BRUCE MALLETT, Deputy Executive Director for Reactor and Preparedness Programs, OEDO

JOHN MONNINGER, Deputy Director, Division of Risk Analysis, Office of Nuclear Regulatory Research (RES)

MARK CUNNINGHAM, Director, Division of Risk Assessment, Office of Nuclear Reactor Regulation (NRR)

CHARLES ADER, Director, Division of Safety Systems and Risk Assessment, Office of New Reactors (NRO)

GEORGE PANGBURN, Deputy Director, Office of Federal and State Materials and Environmental Management Programs (FSME)

CATHERINE HANEY, Deputy Director, Office of Nuclear Material Safety and Safeguards (NMSS)

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

CHAIRMAN KLEIN: Good afternoon. We will hear today from various stakeholders, the industry and public groups and then later we'll have a panel from our staff on our risk informed activities. I think our last meeting on this subject was in August of '07. I think we've made a lot of progress in the interim and so we're looking forward to hearing from everyone.

Obviously, those of us that looked at who should have been here -- Bill Levis was supposed to be here and unfortunately had a death in the family. So, our best wishes and condolences go out to Bill and his family.

Any comments from my fellow Commissioners before we start? Tony, would you like to begin?

MR. PIETRANGELO: Mr. Chairman, Commissioners, good afternoon. We appreciate the Commission's continuing interest in risk informed regulation.

Chairman, thank you for noting Bill's absence. I hope we'll have the opportunity to bring him back here and hear a more plant perspective on risk informed regulation. Let's go to slide 2.

Just as an overview we want to provide you a little history. It's always good to put some context in all the remarks we're going to provide. There have been a number of successes with risk informed regulation. Unfortunately, more of them are in the past than in the current or present day and we'll talk a little bit about that.

There are some significant challenges we face going forward. As we did in

August of 2007 we'll talk about what the industry priorities are and then go back in time a little bit to the NRC's PRA policy statement that was issued in 1995 and try and look at that in the current-day context and then offer some conclusions. Next slide, please.

This agency has been a world leader in risk informed regulation. When I compare you to the French and the Japanese and some of the others regulators there is no comparison. You're clearly out in front and have been the world leader and we'd like you to maintain that position.

Several documents, I think, were very foundational in making you the leader in risk informed regulation. Certainly, the safety goal policy statement and the PRA policy statement were fundamental documents that enabled the agency, stakeholders and the industry to move forward with applications of this technology that have led to improvements. I'll have some slides that try to put some of those improvements in context.

From the plant perspective -- and I wish Bill was here to share his insights on this -- risk has really been ingrained into the culture at the plants. We use it every day. You'll see what the CDF is on the day you walk into the site at some plants, certainly through the maintenance rule and certainly through many of the other regulatory applications including the Reactor Oversight Process, risk is a day-to-day part of the culture. So, we use those for both safety benefits and operational flexibility, and I think together that provides a very good story on risk informed regulation. Next slide.

There have been a number of successes. When we talk about outage risk management that was really the precursor to a lot of the online configuration risk management that we do for the maintenance rule. This actually started well before the maintenance rule implementation when we were having way too many shut down events. Outages were averaging 70, 80 days and through more effective risk management during outages we were able to both make them safer and make them shorter, to everyone's benefit. So, that was one of the first big successes.

One of the regulations that did change was Appendix J Option B containment lead rate testing intervals. I think every plant in the country has implemented that and I think we just got approved an extension to a one-time 15 year test interval based on risk insights and performance. So, that's another major success.

Certainly, the maintenance rule has been again just a seminal influence on risk informed regulation. This is kind of the other side of the sword, if you will. We had plant tech specs out there that are mainly deterministic and the maintenance rule imposed a configuration risk management on licensees in addition to the tech spec. So, this was really another layer of regulation on top of the plant tech specs.

Since then we've had a number of tech spec initiatives to try to close that gap between the deterministic and risk informed pieces. And it has been successful. I think a lot of the lessons we learned on planning outages better we've applied to doing work online and I think the results speak for themselves.

Risk informed In-service Inspection was another, I think, tremendous success that, I think, all plants in the country have implemented. We're focusing on the right things to inspect as well as reducing the dose to the workers out there in the plant. So, this is a win/win.

Reactor Oversight Process: the significance determination part of that; how the inspection process has been risk informed. I will note here, however, that while the Reactor Oversight Process is risk informed mainly on the tail end through the Significance Determination Process the underlying regulations themselves are still pretty much deterministic. So, it's the SDP that really kind of corrects that gap, if you will between a Part 50 that's very deterministic and the outcomes.

The Mitigating Systems Performance Index is another effort where I think we work together with the staff to try to come up with a better performance indicator that looked at both reliability and availability instead of just one. I think that's been very successful.

I'll talk a little bit about tech spec reform. There have been seven different risk informed tech spec initiatives. Some of them have been implemented by all plants. The latest ones on surveillance test intervals and online risk management a few plants have implemented, but we expect the agency to receive a number of more amendment requests to implement those two initiatives in the future.

Combustible gas control rulemaking. That was kind of one of the first test cases, if you will, of changing a regulation to incorporate risk insights. It was supposed to be a relatively easy one to do and it ended up taking four or five

years. So, there was really no low-hanging fruit in any of the regulations trying to make them risk informed.

This next graph superimposes, I think, a chart we showed you at the last briefing. The CDF graph, if you will, is right out of an EPRI report that's been initially done in 2001 that we updated in 2005. It basically shows the changes -- industry average CDF relative to what it was in 1992 to 2005.

What we did is superimpose on that chart when the IPEs were completed, the Individual Plant Examinations around the 1992 timeframe and when the PRA policy statement was issued in 1995. I think you see there a very nice trend of the average CDFs coming down.

One thing that's not shown on this chart is that steep decline when the IPEs were completed through '92 to '94. That was mainly from fixing the vulnerabilities, which was the purpose of the individual plant examination program. The licensees made changes to their plants and through modifications, changes and procedures that had a pretty significant effect on dropping the average core damage frequency.

The rest of these changes are more applications through either required regulations or voluntary applications that has continued that trend down. Now, I'm not going to say that all the reduction in CDF that we've seen from '92 to 2005 is solely due to risk informed regulatory initiatives. It also has to do a lot with the men and women who run these plants every day and getting better and smarter and using operating experience and taking those lessons learned to improve

operation. But certainly the use of risk technologies has facilitated improving the safety at the plants. Next slide, please.

Challenges: There are still some rulemakings that would look at risk informing Part 50. We think they're essential to achieving that risk informed regulatory framework that we still need to work on.

There's also, I think, a lot of expectations for the PRA scope and pedigree that's really outpacing how fast the industry infrastructure can handle it.

And a third, I think, and Ken will speak on this in more detail in his presentation, how we're trying to use risk insights to complement the deterministic regulations and sometimes we see the opposite where we're trying to design-basis some of the risk informed analysis, which kind of was inconsistent with what we thought risk informed regulation was about.

Additionally, on the next slide, this is both a priority and challenge. The industry is working very, very hard on NFPA 805 transition. This is something we all want to see succeed. We want to make sure it's implemented in a sound manner. This is a very complex risk application. It's where our state of knowledge is not what it was for the Level I internal events that power PRAs.

The fire PRA technology is maturing quickly. We've got an awful lot of our best people working on this, but we're moving as fast as we can. The other part is that these are expensive models to develop so it's important that we do it right the first time so we don't have a lot of rework in the future trying to reincorporate things we learn as we go from the pilots. So, this is a big challenge and priority for

us. Next slide.

In terms of the industry priorities most of the industry we believe now has substantially met the Reg Guide 1.200 Revision 1 standard for internal events at power PRAs. The next priority is developing these realistic fire PRAs that's suitable for not only NFPA 805, but to support other risk applications. We have not given up on trying to risk inform Part 50, in particular the large break LOCA 50.46(a) rulemaking as well as getting implementation of 50.69 on special treatment requirements.

And on that one, it's a pretty simple, I think, discussion we're having on why this isn't moving forward. We had our guidance that was endorsed in a Reg Guide that basically lays out a performance-based approach for treatment of what we call RISC 3 structure systems and components; those that are safety related but not safety significant.

Again, our guideline lays out a performance-based approach to monitoring those components that was endorsed in a Regulatory Guide. Part of the disagreement we have now -- and you'll see it in the staff slides later on -- is that they say we need agreement on RISC 3 treatment. We already have agreement on RISC 3 treatment through a Reg Guide that endorsed our document.

If someone wants to reopen that then they should propose a new Reg Guide, but the Commission has already agreed on RISC 3 treatment and we don't know why we're going back to that issue. That issue did get particular Commission attention at the time. Next slide, please.

There's a lot of baseline activities we do in risk informed regulation. We mention a couple of them here. That also is kind of the normal load for the PRA community that works at the plants and around the industry. And maintaining those models, using them in the significance determination process to support MSPI, to support all the maintenance rule A4 configuration risk management assessments.

That's a pretty good load already and we're trying to develop more PRA infrastructure not only to support the base load, but also to develop the Fire PRA models as well as participate in the industry PRA peer reviews of those models.

Ken's going to talk about the extensive program that EPRI has for training new PRA people coming into the field. I think we've already put something like 40 or 50 new people through that and he'll be able to update you on that.

And then again there's a suite -- I went through those -- of available voluntary applications like the tech spec improvements that we want to see people continue to take advantage of because they're win/wins in terms of safety and operational flexibility. Next slide.

Going back to the policy statement that was issued in 1995. We've bolded some of the statements that are in that policy statement that we think are particularly important and that should not be forgotten in today's context to try to increase the use of PRA; that complements as another layer over the deterministic traditional engineering approaches; to both reduce unnecessary conservatism and be as realistic as you can in the base model; and that consider uncertainties not in

the base model but kind of in bounding analysis to show how good your result is.

We think this needs to continue to be applied and emphasized today. Again, what we see in some instances is the base models are getting conservatisms in them that skew the results of things we know are not consistent with reality and that's just doing it wrong. So, we've got to continue to focus on the things that are in the PRA statement.

Finally, in conclusion, again, I don't think we're done. Until those two rulemakings on 50.46(a) and 50.69 are implemented, we can say we have risk informed regulation, but if you don't risk inform Part 50 itself we don't think you've achieved the intent of what the Commission's policy statement was about.

Your leadership is going to be essential, I think, to making those rulemakings go forward and be implemented across the industry. Thank you very much.

CHAIRMAN KLEIN: Thank you. Ken?

MR. CANAVAN: Good afternoon. I'm Ken Canavan and I'm with the Risk and Safety Management Program. I'm the Program Manager at the Electric Power Research Institute or EPRI.

First, I'd like to thank you for the opportunity to speak. Technical folks like me and other risk folks don't speak up often enough, I don't think. And that's one of the reasons for the topic of my discussion today. It's one of the reasons why it's an important topic.

As a second note some of you may have seen an earlier version of the

slides that used a different word in the title. So, socialization, while it was our first choice was not our second, but was our third choice. I received a lot of comments about that and I think it was because socialization has a broad meaning. By the end of the talk I hope to bring us back to what we mean by it in this context today. Next slide, please.

Risk technology is a tool, like safety analysis or other types of engineering analysis. And since the last time I was here I did an analogy and it went so well, I thought I'd try another. If we think of risk technology as a wrench we can think of it as there's lots of different types of wrenches and we can think about risk analysis as there are lots of different types of hazards.

Also, there's different sizes of wrenches and so when we look at different sizes of wrenches we can think of a very course risk analysis versus a very detailed risk analysis. But when we're out there doing a job, whether it's a job using wrenches or it's a job using risk analysis we're going to use a variety of wrenches and a variety of sizes depending on the job at hand.

Keeping that in mind we need to keep our tool in mind. Risk technology is a powerful tool and best used to augment safety analysis and identify the gaps in those approaches, specifically where traditional safety analysis doesn't address all the aspects of the problem at hand or is not tenable or where the burden of doing a safety analysis isn't really commensurate with the benefit of doing that analysis. Next slide, please.

While it's true that risk analysis is newer than safety analysis, elements of

risk were used over 40 years ago in the design of the existing plants to estimate equipment and safety system reliabilities, as well as -- interestingly enough -- to establish some of the early tech spec AOT intervals.

Today, some of the areas where we're using risk -- some of the risk tools are more mature while others continue to evolve. You've heard us speak about some of those areas before. But in order for risk to become widely used it must become widely understood, especially by decision makers because those are the people who need to be comfortable and ultimately decide whether the technology is going to be used in a particular instance or not. And so, we need to be aware of the occasional but natural reversion back to our safety analysis which we're most familiar with.

So, in today's environment that translates into statements like "risk isn't used here because" {insert basis}. Insert basis are things like the state of the art might not be felt to be there or not sufficient to support an analysis when indeed in many of these cases the risk has some role and it does provide some benefit. But its utility and benefit is not well understood by those who are deciding the method and approaches.

In some cases we have misapplications such as cases of excessive conservatism and that can be the main contributor to not necessarily using risk. Next slide, please.

In general, risk calculations are adversely affected by the introduction of excessive conservatisms. These conservatisms can combine or compound and

produce erroneous results, skew resource allocations, reduce resources and in some cases degrade safety.

And in the simple example that's on the right of this slide we take a few numbers. In Case 1, A is 1.9, B is 1.9 and C is 5.8. In the conservative case we bound these by rounding them up and A times B times C is 24. In the realistic case, A times B times C is 20.9; actually quite close.

But if we look at Case 2 and we perform the analysis again assuming that A is 1.6 and B is 1.3 and C is 5.3. We perform the A times B times C again and in the conservative case we again reach 24 because we're bounding. But in the realistic case it's only 11 which is a factor of two larger.

In practice -- if we were doing this in practice and we were in the field we wouldn't actually know what the difference was. We wouldn't know what the margin was between the realistic and the conservative cases. We wouldn't quantify that. As a matter of fact risk is one of the few ways available to quantify that difference.

It's important to note that this is a real simplified illustration of round up error. Certainly, in the cases of assumptions or fundamental inputs those conservative impacts can become somewhat significant, sometimes orders of magnitude. Next slide, please.

In summary, this is sort of a summary slide of our problem, if you will; realism is both the power of the risk technology. It's also its greatest challenge. It's the hardest thing for us to get our arms around. One of EPRI's roles is to help

address the gaps in that technology to reduce or eliminate the conservatisms where we can do so.

Another one of our roles is to foster the understanding of the benefits gained from the technology so that decision makers will encourage the use of risk in all cases and areas where it's appropriate to use risk. Next slide, please.

This goes a little bit to what Tony was saying. While EPRI and others have developed detailed training courses to develop the next generation of risk professionals and whereas we put about 50 people heading through those courses. This is a relatively small segment of the population in nuclear. It also is to develop the next set of risk professionals who -- if we don't get out of their cubes and have them educating others -- will remain a small segment of the population.

And as such education is the key to our socialization of risk. We need to include the methods at least at a high level because I think when people understand the principles they'll more efficiently embrace the technology. But it also includes the uses and the benefits so that there can be a clear vision of what the goal is.

So here the concept is risk training and the risk training pyramid which generally provides overview training. And if we think of -- the training is provided in a computer-based format and the beauty of that is it's portable, accessible. You can do it at your own pace, self-paced.

And what you see here is the set of modules that run approximately an hour

apiece. They have self tests as well as knowledge checks throughout them. At least that's the concept.

And the level of detail increases as we go down the pyramid and if we start at the top and look at the first three levels those are mostly appealing to executives and senior managers where we discuss introduction to PRA, instruction to risk informed regulation and some PRA fundamentals.

If we look at the top four levels we're looking at a successive level of detail that might involve, for example, first line managers. And as we go down even further into more details on the lower right-hand side of the pyramid that appeals and is geared toward those who have a regulatory or licensing focus and while the lower left-hand side appeals to those who are appliers of the technology.

The first three modules are expected to be available by the end of 2009. We've already lined up some executives and senior managers to serve as trial people or guinea pigs. With that, that ends my remarks. Thank you.

CHAIRMAN KLEIN: Thanks. Ed?

MR. LYMAN: Thanks. On behalf of the Union of Concerned Scientists I'd like to express my appreciation for the opportunity to give our views today on risk informed regulation. Now, when I was in graduate school my adviser counseled me that you should always prepare twice as much material as you have time for and unfortunately I still stick to that. So, I may have to skip some of my slides, but I'll try not to. Next slide, please.

I just want to outline our position on risk informed regulation and talk about

some of the concerns we've had with the way it's been applied or misapplied in the past. I'll point to our current example where we have the opportunity to do what we think is the right thing and then to discuss some of the impacts of the way it's been used or should be used in the future with regard to uncertainty analysis. Next slide, please.

UCS isn't opposed to the concept of risk informed regulation principle. We think it is appropriate to focus on the highest risks, but we're not sure that the technologies and the way it's been used to date, actually reinforced that goal. We believe its application has to be consistent, appropriate and rooted in sound science and engineering and given the context of the incoming administration, the new administration and their focus on sound science in all aspects of Government Operations we'd expect that that attitude should be strengthened in all the regulatory agencies as well.

I would add in addition we think its application has to be clear and understandable not only to decision makers, but also to the public and the NRC should understand that there is an additional risk in risk informed regulation is that the more complex the methodology the greater the chance you have of losing the public's understanding and you have to assess whether the benefit in some cases is work that risk. Next slide, please.

We believe that at this point a prerequisite for using risk information regulation in any application including backfit rule, SAMAs and SAMDAs has to be a complete PRA that includes all the LPSD modes and external events including

seismic PRA treated in a comparable manner to other modes, especially that's true with regard to new reactor applications where core damage frequency of calculated may be far greater than the internal events CDF for those plants.

We think Level 3 analysis at this point is essential because in order to fully understand the risks to the public one has to propagate the event frequencies all the way through and understand the actual impacts on the public and the tools are there today to do that.

And finally, the uncertainty analysis has to be rigorous and it has to be done in a systematic way. There's still too many times when risk calculations appear in NRC documents without any kind of error bars. I think that's -- any scientist will tell you that they won't trust a number without an error bar. Next slide, please.

We do support the highest quality assurance standards for PRA, comprehensive peer reviews for a wider audience and a wider set of reviewers than just the industry, and PRAs need to be fully validated with experiment and operating experience.

I would caution that when new reactor applications are coming in we do not think it's appropriate to pursue risk informed or whether they are called risk management initiatives PRA based on paper model of a plant that's never operated anywhere. It's simply not comparable to the levels of experience you have with regard to the operating fleet.

I'd just like to point out I did see in a recent NRC paper that the actual significant precursors for this decade so far, something like 30% of those actually

were not modeled in SPAR models or PRAs or IPEs. And I think that indicates that even when you're talking operating plants for which we have a lot of experience there are still a lot of mysteries and that has to be taken into account. I think I'll skip the next slide, please. So, can we go two ahead?

Now, with regard to risk informed regulation, in the past we believe that it needs to be a double-edged sword. We don't think that the gods who wrote Part 50 knew in every instance and anticipated that that would be overly conservative.

There are cases where they're under conservative. So, if all the risk informed initiatives only go in one direction that is to reduce regulatory burden we think statistically that means something is wrong. On this score we think risk informed regulations failed.

First of all, industry is not going to voluntarily adopt any risk informed procedures that will increase their burden. On the other hand, there's a double standard in that it's a lot easier to use Reg Guide 1.174 to increase risk as opposed to having to use the backfit rule and cost benefit analysis there to increase safety. And that double standard, I think, is a problem.

My case in point -- next slide, please -- is the combustible gas control rulemaking. I don't agree that this was a successful application of risk informed regulation because from the very beginning the staff recognized that not only were there potential aspects of that rule that were over conservative, but in one very important aspect it did not appropriately treat the risk of containment failure in a station blackout at ice condenser plants in Mark III BWRs.

The history is outlined here in the slides. I'm not going to go through it, but the bottom line is it was originally intended and determined to be appropriate for enhanced requirement, that is providing backup power in the event of an SBO at these plants. The cost benefit analysis through the backfit rule showed it was appropriate working through GSI-189.

For that reason the Commission deferred actually including that enhanced requirement in the rule. And so, the rule as revised only led to reduction regulatory burden, yet -- can we go to the next slide, please?

So, the Commission had the opportunity to -- well, the staff characterized its demonstrating a balanced approach by deferring the rule change until GSI-189 was resolved, but the Commission chose the unbalanced approach of only going forward with the burden reduction aspects. Next slide, please.

To make a long story short, what we have today somewhere along the line the decision to actually increase or to add backup power during station blackouts, those plants disappeared. I traced it to a 2005 regulatory analysis which changed the ground rules of how the cost-benefit analysis was done in what I think was a misleading manner, and as a result it was converted again to a voluntary initiative on the part of the licensees. Next slide, please.

And so, today, what we have is a voluntary initiative which is still not fully implemented even though the problem was recognized more than 10 years ago. I've gotten gray following this and waiting for something to happen and because the measures are voluntary today -- next slide, please -- there's no requirement

that there be any official documentation that the backup power can actually be connected in time.

And that's because the licensees maintain it's a beyond design basis event that they don't need to provide that documentation. I think the outcome of this is what would have been a mandatory requirement pretty easily implemented way back when, it's been converted to just a voluntary retirement. Next slide, please.

Now, there is an opportunity here in risk informing 50.46(a) is we think if you take 50.46 as a whole maybe there was a good reason that there was conservatism built into that rule. It's because we know that 50.46(b) criteria for LOCA acceptance are not conservative for high burn up fuel and it could be that even if the overall rule had extra conservatism built into it, it did what it was supposed to do is that it provided additional protection to compensate for that uncertainty. And compensate for the fact that there's high burn up fuel in reactors today that may not actually meet the LOCA acceptance criteria for embrittlement.

And so, to have gone slow on that on 50.46(a) was appropriate and we do believe that we need to have the criteria fully understood and those uncertainties reduced before you start talking about risk informing that rule and going forward with that. Next slide, please.

Finally, with regard to Level 3 PRA which we believe is necessary but they are also greater and greater uncertainties associated with it and those have to be quantified and the uncertainties have to be understood. Level 3 PRA information is being used now in things like SAMAs and SAMDAs and backfits. Again, there

are uncertainties associated with the application and the positions the Commission has taken on using mean value parameters. Some of those analyses do not fully capture the range of uncertainties and possible reasonable sensitivities. It should be taken into account.

One example I have is that if you look at the meteorological variation and when you do a Level 3 analysis of a plume dispersal over the course of a year that if you look at, let's say, the 95th percentile meteorology you can have a factor of three or four greater consequences then if you use the mean value meteorology, which is the standard.

That overwhelms the factor of two that we heard about from Ken with regard to realistic versus conservative. There are much larger factors as well if you examine the variation of other parameters and we think a fuller exploration of those uncertainties needs to be done when major regulatory decisions are based on these calculations.

I think I'll stop there. Thank you.

CHAIRMAN KLEIN: Thank you. Brian?

MR. ERLER: On behalf on ANS and ASME I thank you for the opportunity to meet with you on risk informed and performance based standard development. This is a very important subject for both of our standard developing organizations.

I'm Brian Erler, the Vice President of ASME Nuclear Codes and Standards and the Chairman of the Board of Nuclear Codes and Prasad Kadambi is the

Chair of the ANS Standards Board. We also have brought with us the Chair of the Committee on Nuclear Risk Management, Rick Grantham and then we have Kevin Ennis, who is our Nuclear Codes and Standards Director at ASME.

We're presenting together in our 10 minutes because of the fact that we've worked so much for the last five years together between the organizations. This subject of risk is critical for both our developing and coordinated -- and not duplicating -- bringing together standards is very important to us. Next slide, then.

As we look forward we're going to cover briefly a presentation. We want to deal with the effort since 2004 the Nuclear Risk Management Coordinating Committee. We're going to give you some background primarily going back to the meeting we had 18 months ago and then we're going to go through some of our status of the standards that we have issued over the last 18 months. A lot of progress has been made going forward to support the regulations and having the standards in place that are needed.

In recent times we've expanded the scope of cooperation and we go beyond just PRA development. We're going into areas of training, non-light water reactor areas; areas we're looking for the future. Both organizations are looking long to the future because we need to have those standards in place to support what's going forward. We expand the scope of the work we do based on the input from the industry, based on the community and the feedback of where there is need going forward. So, we're going to cover those areas in this brief presentation.

The background: You take a look at the -- the stakeholders in the industry have felt that it would be beneficial to have all PRA standards in one document so you're not trying to cover inconsistent approaches. You want to get consistency and you want to get ease of use.

We did agree that we're going to pull this together and we have achieved it through our Nuclear Risk Management Coordinating Committee, which is a committee -- it's officially between ANS and ASME, but we have members from utilities. We have members from NEI, members from NRC to help provide this guidance we need going forward. We're going to report on the status and schedule of the commitments we made last time.

At the last Commissioner's briefing risk informed and performance based regulations made a commitment to issue the standards to support Reg Guide 1.200 for technical adequacy of PRA. We'll report today on the success of meeting those commitments. We'll also present how the organizations are building in this effort to ensure appropriate high-quality expansion of risk informed and performance based approaches are going to meet the needs of the nuclear industry.

We're continuing to work with the staff as the guidance evolves and participation from across the industry. The NRC staff participation and leadership is critical to make the standards application go forward. As the technical experts in our committee see opportunity to use as a foundation that have been accomplished thus far in risk informed performance based we undertake the

development of new standards as we see necessary going forward.

We have published the first combined standard last year as committed to for Level I PRA. The PRA also rules for external events and internal fire. In fact, since you didn't have enough paper when you came in, I have brought the copies of the published standards for each one of the Commissioners.

MR. PIETRANGELO: Make sure you charge them for that, Brian.

MR. ERLER: Absolutely! Actually we're on TV, so maybe we'll get some advertisement and sales will increase.

Anyway, what's important is the effort that the committee and ASME and American Nuclear Society had in getting this done. You don't realize the amount of effort it took to pull together two different organizations and a lot of expertise to get it issued. So, I really want to thank all the volunteers of what they've accomplished.

You'll notice that it's published under both logos, which is a major step in things that I think are important going forward for our industries. Not only did we get this issued in 2008, we have just completed approving Addenda A to that.

Based on documents, what this does -- the Addenda A addresses the stakeholder's and NRC issues that have been identified in Reg Guide 1.200 and it restructures for ease of use going forward. This is an important document. This is restructured. It dealt with a lot of issues. It's been approved by ASME now and it's in the publishing. It will be published in that format by end of March of this year, the first quarter of this year. So, a lot of work has been done by the

volunteers of both organizations.

This is available in time for them to use on their review for endorsement of Reg Guide 1.200 for Revision 2. That was really our objective to make sure that next document gets the latest of the standards we have going forward. With that, Mr. Kadambi will continue.

MR. KADAMBI: Thank you, Brian. ANS has the lead on the low power shutdown and the Level II and Level III standards that establish the technical adequacy for PRAs in these areas. We expect the balloting to be completed for low power shutdown by the end of 2009. The status of the Level II and Level III standards is that we expect to review and comment version by the end of 2009.

It has been difficult to make as much progress as we would like on these standards partly due to the complexities of the consensus process, but also because of resource constraints. However, we are using resources as available and input from users of our standards to pursue new standards.

One of the examples is standard on safety criteria for gas cooled reactors. This draft standard will propose a way to classify structured systems and components for special treatment using the risk informed and performance based approach.

Similarly, standards are being worked on that use probabilistic concepts to develop better design processes. An example is the work that ASME is doing for development of rules for risk informed piping design.

The real challenge that we see is to gain consensus among all our stakeholders to apply the risk informed performance based approaches to new plants. A key example is the application of 10 CFR 50.69 on risk informed categorization efficiently to the new plants. Current plants will also benefit from this effort. ASME and ANS stand ready to support in this effort. Next slide, please.

A high priority for us is to build on the progress achieved so far. We will try to apply the documents that have been produced to address some longstanding issues, such as technical specification improvements. Again, these activities are driven by expressions of need from our user community. We have found that progress can be held back if the user community is not adequately trained.

ASME and ANS continue to work together to develop and deliver technical material, training material. With federal initiatives, such as the Energy Policy Act of 2005 encouraging gas cooled technology, we also need to be ready to broaden the scope of applications to non LWRs.

Along these lines there has been some commercial interest expressed in liquid metal technology, such as the Toshiba 4S and initial steps are underway in both ANS and ASME to update some standards that were prepared some time ago.

Some technical areas require a much closer working relationship with the NRC. We recognize this especially in areas such as standards activities that we foresee at some point in the future on matters related to security.

There are some complex technical issues on which the processes associated with developing consensus standards are uniquely capable of finding common ground among differing perspectives of world-class experts. Examples of these are uncertainty and human reliability analysis. These are areas where consensus standards could be helpful. Next slide, please.

In summary, ASME and ANS are putting into practice lessons learned from years of working collaboratively to meet the user communities' needs. The Nuclear Risk Management Coordinating Committee is a prime example. We are working very hard to meet the needs of NRC and industry with respect to Reg Guide 1.200.

Although much progress has occurred we recognize that much remains to be done. The fact that our societies are willing to work together closely does increase the likelihood of realizing substantial benefits.

We need help from all our stakeholders as we seek to improve the environment in which current and future plants will benefit from consensus standards. We especially want to make sure that the volunteer communities that serve our societies have the opportunities to help address the broad range of issues that need to be tackled.

Our volunteers have shown themselves to be remarkably capable of rising to the challenges we face. Thank you very much.

CHAIRMAN KLEIN: Thank all of you for your presentations and I'd certainly like to thank ASME and ANS for their hard work on codes and standards.

I realize that you all have a lot of volunteers so I think what you all do is really good. So, thank you for your contributions.

Well, as you might expect we have our procedures for asking questions and I get to go first today. I usually start with my questions in the order that the presentations came. So, Tony, I'll begin with you.

You had talked about your industry priorities in a couple of your slides and in your concluding remarks it wasn't clear to me what your real priorities were. So, I guess if you could just sort of reiterate from your perspective in industry what are your top priorities? Is it 50.46 or is it others? How would you encourage us to prioritize our efforts?

MR. PIETRANGELO: They're in the order that I listed in the slide presentation. But I came back to one in particular in the conclusion and that's 50.46 because I think on the rest of our industry priorities we're pretty much aligned with the staff in terms of working on these things. Where I'm not sure we're aligned is on 50.46 and 50.69.

CHAIRMAN KLEIN: So, your priorities are pretty well listed in order in slides 8 and 9?

MR. PIETRANGELO: That's correct.

CHAIRMAN KLEIN: You also commented that the expectations of the scope and pedigree were outpacing the industry. Could you elaborate on that a little bit?

MR. PIETRANGELO: We're pretty saturated in terms of meeting

Revision 1 to Reg Guide 1.200 on internal events at power and developing the fire PRAs needed to transition to NFPA 805. Plus all that base load of activity on the current applications; some required, some voluntary.

All four of the standards development and recognize there to a certain degree reacting to the Commission's expectations and the standards they're developing. You can go develop low powered shutdown. That's been a very controversial standard in seismic. Things we know less and less about and are not sure even PRAs is the right way to go about looking at those.

But the reality is we're saturated with internal events in fire at this time. So, that's where I said the expectations are a little bit out of kilter in terms of what we can deliver and the timing we can deliver.

We went back and looked at our slides from August 2007. Our priorities haven't changed. It's still internal events and fire and that's what we're really focusing on right now.

CHAIRMAN KLEIN: Have you made progress from '07?

MR. PIETRANGELO: We have, indeed.

CHAIRMAN KLEIN: Just checking. Ken, I liked your analogies about using the right wrench for the right activity. I think we have probably all used kitchen knives for screwdrivers. You had commented on the fact that the risk informed could be misused. Could you give an example of anywhere you think we might have misused them in the nuclear industry in risk informed?

MR. CANAVAN: One that comes to mind right off the bat is some of

the fire PRA methods that were developed -- were shown in the pilots to be very conservative. If we were to push ahead without removing those conservatisms we may make modifications to a plant that later on after the methods are revised we find that those modifications weren't the prudent ones and in some cases they can even be adverse.

When you're dealing with fixed budgets at some of these plants for modifications and a long lead time to get modifications in the plant it's better to do the right modification first than to find out later that you didn't focus on the right things and get your biggest benefits.

CHAIRMAN KLEIN: Thanks. That's a good example. Ed, you had talked about that you didn't think PRA was good for new reactors. But I thought from some of our technical colleagues that they thought that the PRA could be used for some new reactors. Based on what you heard them say could you comment a little bit more on your view?

MR. LYMAN: To clarify, the use of PRA to, let's say, apply risk informed special treatment requirements to new reactors, I understand that it wasn't intended as an initial application, but there are applicants that have come in and requested those.

The standard Part 52 has for PRA is not as fully developed as the standard for operating reactors. So, to the extent -- how can you have confidence that you can increase the allowed outage time for an important component if you don't have a base of operating experience to support the numbers that you use? In some

cases you might, but depending on the reactor design and the application you might not.

How can you have the confidence to go that next step when you're talking about a reactor that hasn't even been built much less you have a fleet that have operated for some time and you've accumulated that experience?

So, all I'm saying is that when you go to that step we would think that you need more confidence and have a database that supports the use of PRA to that extent. The example I gave that even with the current reactors there are still significant precursors that are occurring that weren't even in the models. I think that's something to consider.

CHAIRMAN KLEIN: Thanks. We'll probably do a second round, but Commissioner Jaczko do you want to --?

COMMISSIONER JACZKO: I guess I would start -- perhaps, Ken, I have a question for you. You showed the nice period and I think the Chairman asked an interesting question about issues of where we're not using PRA information correctly and one that would come to mind is in the Digital I&C area. I think we continue to struggle to educate, I think, the user community that that's not an appropriate analysis tool for digital hardware and software faults.

It is not inherently a probabilistic problem and therefore you cannot apply probabilistic tools. I think AREVA is out right now running a long-term study of the reliability of their Digital I&C systems in order to back calculate some probabilities for failure. That's not an appropriate use of risk information and not something you

can plug into a PRA model and get some numbers that come out. Yet that seems to be the inclination that people want to do.

One of the things you talked about is your education program and training program. How do you communicate those kinds of things so that people understand when they're using a wrench when they should in fact be using a jackhammer or something else and that that's not the right tool? How are you communicating that to all the right levels of people?

MR. CANAVAN: Not very successfully at this time. The case of Digital I&C is a very difficult one. There are those who feel that for the software that it's very difficult to estimate a failure probability.

More holistically on a Digital I&C system considering beyond the software there's some debate that you can indeed use risk because you're not looking at the software, but you're looking more holistically at how the system works. So, looking at the failure modes of the software may be different, but the effects are the same. So, that's sort of the current state of thinking in that area. So, PRA and probabilistic techniques have a role, not in the software probability development, most likely.

How do we communicate that? We struggle, especially in the Digital I&C area due to the various players. We're hopeful that in the future some of the tools like computer-based training will allow us to discuss to a broader audience some of the better applications.

And actually, interestingly enough, not on the current pyramid but a level

below that we put electives. I didn't show those, but those electives are specific to activities. So, they're Digital I&C and risk informed tech specs. So, they're different risk informed initiatives and would describe what the state of knowledge is and the ability to address that.

COMMISSIONER JACZKO: Well, I appreciate that. I think we once had a -- maybe at an additional I&C meeting with one of the members of ACRS who commented maybe it would be nice if people read ACRS letters then they would learn these same kind of things. I counted that maybe if they read Commission votes they'd learn these kind of things, too.

Hopefully, you can continue to educate people because I think this is an area where I continue to see misapplication of risk tools. There is a place for these things, but I'm not sure sometimes that all of the practitioners fully understand what they're using.

An issue -- and I guess anyone could comment -- those who would like. I think, Ed, you touched on this just briefly in your first remarks about the issues of transparency. When I first came to the Commission I remember hearing from a resident inspector who was talking about Mitigating Systems Performance Indicator. A resident inspector commented that they don't really even know how that thing works and these are the people that are out there using it.

There was a licensee that didn't quite understand how MSPI worked and as a result wound up with a yellow finding when had they done MSPI differently they would have had a green finding. They made some choices and some decisions

about how they were going to apply different algorithms in that indicator.

The question -- this does get into a very difficult subject. At some point we may get to the point where the techniques and the tools are so complicated that we can't explain them to most of the people, not only members of the public who have nothing to do with the industry, but to most of the people in the industry who are using and relying on these tools. I'm not sure that that's the right approach from a safety standpoint. I don't know if people had comments on that.

MR. CANAVAN: May I?

COMMISSIONER JACZKO: Sure.

MR. CANAVAN: I'm one of those people who gets to work on both sides, the Program Manager of Risk and Safety. I find it interesting that I walk into a decision maker's office, maybe a senior manager or an executive and we're talking safety analysis and he is relaxed, reclined, his legs are crossed and he's comfortable.

Then I bring up risk. He sits up straight, folds his arms and let me call my risk guy in here and we'll talk. That's what socialization really is. It's getting people, especially decision makers, but the public in general as well to understand more of the fundamentals of what we're doing in risk as well as they understand the fundamentals of safety.

Just as the details of a thermal hydraulic analysis are not well understood by many the technology is still embraced and used. We need to get there with risk. We need to have the same sort of people know the barriers and the

boundaries of which it no longer applies.

COMMISSIONER JACZKO: I honestly don't think we're there. I don't think people know that and we use these tools right now and that does cause me some concern because I'm not sure that people do understand. We see it at this agency. I've said this before. We use probability as a surrogate for risk. That's not risk analysis. That is improper risk analysis.

Risk is the triplet or however you want to argue it or define it. We like to throw away high consequence events if they're low probability. That's not really risk analysis any more than throwing away or focusing only on low -- medium consequence events because they're high probability. It's looking at all of those things holistically as a set and yet we as an agency do that.

We have lots of approaches where we throw out and we define probability levels and then we ignore the consequences and we make assumptions like that. So, I'm not sure that anybody is really doing risk analysis yet.

Even Tony, I think, made a comment about the significance determination process which is a risk based approach, actually. It's not even a risk informed approach. It is a risk based approach, which in my view is probably inappropriate and, I think, gets us into trouble as an agency.

This is very complicated stuff and we use it all the time. We argue in the SDP determinations about -- I probably should stop here -- about the numbers when in fact the uncertainties are so large that it swamps any arguments we may have about these numbers.

I think that there's a lot out there. There's a lot of people using these things and a lot of things that we're not probably using them necessarily correctly all the time.

MR. PIETRANGELO: I think I agree with most of your comments and I think everyone's always know from the start that the bottom line numbers in the PRA are the weakest part of the PRA. And when risk informed regulation really was defined and took off it was about the insights you get from the PRA and not to get lost in the ten to the minus eight and nine and three significant digits and all of that stuff.

And I think we've gotten away from that. I think the pendulum has kind of swung towards quantification. Not that it's bad because it can actually measure some of the margins that you do have, but if you pay too much attention to it you start losing the insight that really is what you want to glean and apply. I think the pendulum needs to swing back a little bit towards the real insight you get from the analysis after you've done all the uncertainties and everything and apply the insight and not get as lost in the numbers as we are.

MR. CANAVAN: We also forget the second half often. It's risk informed, not risk based. The other part of that is performance monitoring. It's insights in performance monitoring that keeps us from using the technology outside of the bounds. So, applying the stepwise -- I agree that we're using it in a lot of spots, but if you apply in a stepwise fashion and you monitor carefully, you should -- and you consider uncertainty -- you should be well within an envelope of

safety.

MR. PIETRANGELO: Commissioner, just to give you another example. From MSPI we saw a plant do an analysis of their stations for MSPI to show which components were the most risk significant in the MSPI systems; how many failures it took to get to the thresholds; how much availability and margin they had. And then they actually started targeting improvements in those to improve their margin either through modifications or procedure changes.

We actually included that right up in the CNO book we put together for our Nuclear Strategic Issues Advisory Committee because it was done in two pages. It was very simple, but it was applying the insights from the PRA in a way that made sense to everybody, especially the people at the top of Ken's pyramid there. So, we can do a lot more of that, I think, and we're always looking for ways to make it more -- to socialize it better not only within the industry, but to the public.

COMMISSIONER JACZKO: Thanks.

CHAIRMAN KLEIN: Commissioner Lyons?

COMMISSIONER LYONS: Well, I do appreciate the presentations. It's a very complex, very interesting, very important subject. I was thinking of focusing on one particular point that Ed made, but before I do that a comment that Tony just made kind of reminded me of another point I wanted to make about don't get lost in the numbers, I think is what you said, Tony.

And Ken, I was going to just very gently perhaps chide the example you used of whether 1.6 gets rounded to 2 or not. That kind of gets close, to me, of

the point that Tony was making. I'm certainly no expert in PRA, but I've tended to find that it's more useful done in a relative way comparing different similar systems and it just worried me that we were coming awfully close to getting lost in the numbers if we're going to make a distinction between 1.6 or 1.8 and 2. That wasn't the main point I wanted to get into in questions.

I did want to go to Ed's comment about a single-edged sword, which would really concerned me. As I understand the point you're making, Ed, that your feeling is that the risk informed approaches have been used by industry only in one direction to decrease the burden on industry. But I really wonder if that's the case.

I'd be curious if other members of the panel would like to comment on that. As I visited any number of plants I've tried to ask questions on why they have made particular improvements and frequently they are improvements based on risk insights, not necessarily that we required. It seemed to me that the chart that Tony, you showed, I think it was your slide 5, showing the more or less -- certainly, the slope is always in the same direction for decreasing the CDFs also tends to argue that it's not always a single-edged sword.

I'd be curious both to have Ed expand on that and have some of you also jump in with your comments in that area. I don't know who wants to jump in first -- Ed, if you do.

MR. LYMAN: Just briefly. I certainly haven't done a comprehensive review, but the major initiatives and the priorities that we heard from Tony most of

those do reflect the desire to relieve regulatory burden. If you actually just look at his slides when he took the PRA policy statement and the things he bolded, he bolded reduce unnecessary conservatism, but not to support proposals for additional regulatory requirements. It's only natural.

But if you look at special treatment requirements, if you look at 50.46, if you looked at the example of 50.44 that I brought up these are the major initiatives which are their priorities which would ultimately reduce burden. You do have to apply it fairly and let the chips fall where they may.

When you brought up the 50.44 example, and it may be, there may not be that many other cases that are clear-cut. But in the one case where there was an enhancement that was clearly appropriate somehow it fell through the cracks as the evolution of the issue proceeded.

I would just urge the Commission not to let that happen again. That the credibility of at least risk informing the rules would have been strengthened if the decision had been made at that point to include the enhanced backup power for ice condensers and Mark IIIs at that time. So, that was a missed opportunity. That's what I have to say.

COMMISSIONER LYONS: Tony, maybe you can give us examples on the other side.

MR. PIETRANGELO: I'd love to. If you go back to like the mid-1980's the generic letter that drove the individual plant examination activity that led to the development of the base PRAs. The purpose of that program was

to identify plant specific vulnerabilities and accident management insights that plants could use.

That steep decline in the curve I showed you was largely due to closing out some of those vulnerabilities and improving the severe accident management program insights. We took from there what the Commission did was the policy statement, the safety goal policy statement, and started applying it to other places.

The maintenance rule was clearly an additional activity to monitor components as well as to do configuration risk management. That was on top of the already deterministic tech specs.

I would argue that there was also a need to try to risk inform the design basis because we know there's certain instances that are so conservative and the one that comes to mind to me is GSI-191 where we know the containment spray system, the way it works per the design basis, doesn't contribute in a positive way to resolving that issue. In fact, it exacerbates that issue all due to the deterministic design basis.

So, I think we can use -- that's why 50.46(a) is important. I think it opens the door. It doesn't do anything by itself, but it's an enabling rule that would allow people to think outside of the box a little bit. You can't change anything without an amendment that's related to 50.46. So, there would be prior NRC review and approval that I think would open the door to substantial safety benefits. But the whole single-edged sword -- I think that the evidence suggests otherwise.

COMMISSIONER LYONS: If I could just add one comment from my

experience of yesterday. I was at Oconee spending considerable time on their NFPA 805 work as one of the pilots. Certainly, I believe there is significant support for NFPA 805 in industry. But NFPA 805 is, as was demonstrated to me yesterday, a very, very expensive proposition also with significant risk improvements and I'm very happy to see that, but I certainly didn't think that the single-edged sword analogy really was appropriate in that case.

Does anybody else want to comment? I'm well over my time.

MR. CANAVAN: I just was going to mention that right after -- in the '80s around the IPE timeframe there were several rules that were all risk based: station blackout rule, ATWAS rule, the containment vent, all PRA and all risk based all to drive risk down. And then all the IPE and PRA modifications made right after that that were plant specific were all designed to reduce risk. As Tony points out, that effort still continues at a variety of plants both in response to NFPA 805 and fire and MSPI for additional margin.

COMMISSIONER LYONS: I should stop.

CHAIRMAN KLEIN: Commissioner Svinicki?

COMMISSIONER SVINICKI: Thank you. I appreciate all the presentations as my colleagues have mentioned. It's interesting when I first read the topic of the upcoming Commission meeting of risk informed regulation I thought with a topic this large I wasn't sure what really was the objective here. And you've shared your various perspectives on working on this topic.

It's tough work, I think, to bring a whole body of regulations up and make

them risk informed and performance based. Let's not kid ourselves. This is harder and it requires a much more nuanced approach than a deterministic approach.

Mr. Pietrangelo mentioned the 1995 policy statement. That's a good place to start, but we're 14 years out from that. So, what I'm sitting here today and I'm kind of reflecting on hearing people's perspectives about where we are in this process. One of the first papers to come up after the '95 policy statement was in '98 and it was on options for the Commission to consider in risk informing Part 50.

And included in that was an interesting thing that I noticed. It was -- I'll call it a vision statement -- but it said, "When completed and fully risk informed staff envisions Part 50 would have certain characteristics" and they go on to list what those are.

It's interesting to me to look this many years later and think about what kind of progress we're making, but that's some of what you all have discussed and the staff will discuss in a following panel. Some of these -- it's at a very high level that they articulated this, but they said this is part of their vision, “Part 50 would provide a clear, consistent and coherent set of requirements. It would facilitate consistency and treatment among the assessment inspection and enforcement programs.”

Tony, you talked a little bit about that. Commissioner Jaczko was mentioning that as well. I know we're not really getting into some of those aspects of inspection and enforcement so much today, but it would be performance based

to the extent practical and it would be practical to implement for both licensees and the NRC.

I appreciate Mr. Lyman and others' comments about understandable to the public is not mentioned there. That would be another important element.

Mr. Canavan, you used an analogy, so you've kind of thrown down the gauntlet. As I listen to this kind of status update of where we are and where the most challenging aspects are we've heard a lot about wrenches. I'm reflecting on one of the -- this will be a totally different angle -- but I'm reflecting on one of the important lessons coming out of the Civil War, which was that the technology got way ahead of the military tactics and that's why battlefield casualties were so high.

In this case our technology is a tool that we have and our tactics is the application of that tool. I think again -- and I appreciate Mr. Lyman's commentary -- is that the measured and thoughtful application tool is really key here. Ken, you talked about that as well.

Our ability to train people. It's interesting, the Commission's 95 policy statement talks about the need to have the resources in terms of a regulatory staff that would understand this approach well enough. I think we do hear it in digital and the Digital I&C meeting and we heard it in NFPA 805 about the need to get a body of experts in both the licensee community and the regulator and be able to communicate that to the public as well.

I've kind of grazed through a number of topics in the presentations and obviously the code work is so important. I am keenly aware of how hard it is to

marshal a volunteer work of contributors. So, tremendous strides are being made there and I thank both ANS and ASME.

Do I get a discount? I'm an ANS member, so when I take that I should get a member discounts on mine. I'll just note that for the record. Just some comments, but if anyone would like to just react to that.

MR. PIETRANGELO: Just a comment about the agency PRA resources. That's largely been evened out by hiring some of the best PRA people in the industry to work for the NRC.

COMMISSIONER SVINICKI: Okay. Thank you, Mr. Chairman.

CHAIRMAN KLEIN: I've got a question for the volunteers from ASME and ANS's perspective. I guess, first of all, from my perspective I think risk informed is the correct way to go. I think were a better agency because of it and I think it gives us greater insight. Again, it's not the bottom line number that we're looking for, but it's the process that lets us get there that gives a lot of insight. I think risk informed is really a good technique and we should strive to do it more and better.

But from your perspective from ASME and ANS where should we be devoting resources that we might not be? Do you have any insight as to what we should be doing to push the frontiers?

MR. ERLER: Let me try first because we probably have separate visions of where we should be going. But from the ASME perspective we have under the board a task group on risk management and that really takes us looking

ahead of where our needs are. Some of the key drivers we have right now are developing PRA rules for new reactors, both the light water reactors as well as for the advanced reactors because we need to have those initiatives in place to support the new reactors going forward.

Certainly, there's a challenge, but PRA is a tool; a tool that has to be used and we need standards that reflect on the new reactors and then we'll get the database from the equipment and from the operation of the system. That's probably the key area that we've been really focusing on going forward.

What we try to look at is across all of the applications, is probably the next step that we want to make sure that we're supporting. We try to support the training, try to support the applications of various initiatives, like ISI and IST initiatives at plants. As they get into it more we need more standards to help them implement it. And so, that's probably our biggest driver from the ASME perspective.

MR. KADAMBI: Mr. Chairman, from my point of view after the work as I have observed it within ANS the difficulty arises because of a disconnect in the way this whole process has worked out for the new generation of plants, as it were.

We had a set of standards that were based on the deterministic framework for a long time. It started early '70s and up to about the mid-90s that's the way everybody did things. Then there was over the horizon the vision of a new way of doing things, risk informed and performance based approaches.

When we started to go in that direction what we found is that even though there was the promise of applying these improvements for the new plants when the new plants came in for the licensing, the licensing process itself really just reverted to the old system essentially.

There was a standard. A specific example is ANS-5814, which is on classification of systems. There was an early attempt to say, well, 5814 needs to be changed to a new way of looking at things, risk informed and performance based. But then the basic regulatory guidance for the new plants is exactly the way it was for the previous generation of plants.

So, there's no incentive for the user community to really devote the resources unless there is an incentive. I think starting with leadership from the NRC that we -- in fact, there is some benefit to be gained by applying what has been done so far, the progress that has been made and the understanding of risk on the ways of applying performance based approaches of all these and actually applying them in real cases; new reactors as well as existing fleet of reactors.

CHAIRMAN KLEIN: And if we look ahead to something that we haven't done a lot of would be recycling. If we looked at a recycling plant -- I think we know a lot about reactors, so if we take what we know about reactors and we try to move it to another type activity like recycling will it work there?

MR. KADAMBI: Well, I mean, the consensus standards process certainly works. I think there were standards produced for reprocessing at one time and I think there has been some revival of that kind of thinking in the

standards community.

There are people who have been long retired who suddenly see they can do something useful again. There is a possibility of getting people to start doing things, but again, I think the initiative that comes from the federal agencies will be key to establishing the motivation for generating at least the standards because the standards get into a level of detail that may not be addressed by the kinds of policy direction set by the regulators or by DOE depending on what people want to do with recycling.

MR. ERLER: I think I'll make a comment with regard to that. The tool definitely is applicable and it should be used. I think the challenge is you still have to make decisions when you apply reasonable application of risk informed and performance based. It's only a tool.

And you've got to decide what are the risks and what are the consequences and what are those surrogates. What we have in place because of years of applying PRA to operating reactors focusing on core damage frequency and low early release, we've got those targets. Other facilities and new plants, gas cooled reactors and liquid metal reactors, still need to establish some of those tools and need to establish those limits as you apply the tool.

CHAIRMAN KLEIN: Great. Thanks. Commissioner Jaczko?

COMMISSIONER JACZKO: I think just to follow up on that, too. The Commission's policy, safety goal policy statement outlines, I think, really what the risk goals are. It's not CDF and LERF, but that's become, I think as you said,

the surrogates. The CDF has become the surrogate largely for the individual risk and the LERF has become the surrogate for the collective risk or the group risk, I guess, in that regard. So, in many ways we have a framework that's applicable to what class of facilities, that's irrespective of that type of facility.

I wanted to turn to a couple of brief questions. Again, this is for anyone on the panel. We've danced around this question, single-edged sword, double-edged sword, safety benefit, non-safety benefit. One of the things that always strikes me is all of these rules that we're talking about are voluntary rules. This is the right way to go and everybody says risk informed performance based regulations are the right way to go.

Why do we have voluntary rules? Why is 50.48(c) not a replacement for 50.48? Why is 50.46(b) -- that would be voluntary as well. Not one that I support, but all of 50.69 is a voluntary rule. If this is the right way to regulate why is it not the regulatory requirement? I don't know if anybody wants to comment on that?

MR. PIETRANGELO: I think it's a recognition that there's enhancements that could be made, but if you had to try to do a backfit analysis to say "everybody do it" I don't think you'd be able to get through the regulatory analysis. So, I think that's the main thing.

On maintenance rule, that is a requirement that everybody does. Station blackout was one that everybody does. They passed the backfit analysis. So, I think it's as simple as applying your own reg process.

COMMISSIONER JACZKO: Doesn't that mean the sword is not

double-edged? I mean, isn't that the point? If we can make a safety argument and a safety enhancement, but we can't make an argument on the cost side it becomes a voluntary rule and then it doesn't get done.

MR. PIETRANGELO: Well, a lot of them do get done, Commissioner. The ROP and what we do in the ROP is not required by regulation, but it's been very effective. I think Appendix J Option B has been very effective. I think risk informed ISI has been very effective. They weren't mandated because you couldn't pass a regulatory analysis, but still a lot of people have implemented them.

COMMISSIONER JACZKO: But what I'm saying is what if we had made them requirements? The ROP isn't a requirement. We could go through and do a regulation to implement the ROP from a regulatory perspective.

MR. PIETRANGELO: You could try to do a regulation. I'm thinking that you probably wouldn't pass the regulatory analysis. You could try.

MR. CANAVAN: I'm going to weigh in from the technology perspective, not the regulatory perspective. It's very often difficult to show a benefit prior to it being implemented, which is one of the reasons why performance based works so well.

In other words, if I tell you I'm going to reduce the testing on some valve calculationally you show that the reliability goes down. It gets worse. But intuitively you may realize because of the way it's operating and the way you've collected data that the performance will get better if you test it less. So, you can't

show calculationally that it will get better, but you can demonstrate and that's one of the cases where some of these rules work better.

In other words, you achieve the safety benefit and then you realize, well, if you knew there was that much benefit maybe you could have done a regulatory analysis to support it. But you don't know that till you collect the data of the implementation which is why performance based is such an important part for both of us, for both the industry and the regulator.

MR. LYMAN: I guess I'd just like to reiterate that I think there's something inherent -- a double standard in the fact that if you look at the Regulatory Guide 1.174 criteria where you can make small changes that increase risk as long as they're small compared to -- well, whichever region you're in, it varies. But if you -- an increased regulatory requirement that's large has to also meet the backfit rule.

It just always seemed to us that not having cost-benefit analysis in both directions leads to this asymmetry. And so you can imagine somehow correcting that by saying if someone wants to increase the risk then you can evaluate what would the cost be. Do the cost-benefit analysis by reimposing that requirement. If it meets the cost-benefit test then why should you allow them to do it in the first place?

The difference is, though, that those are always small risks that you increase while the backfit rule you have to have a significant decrease in risk. That is some way to try to think about restoring some symmetry is if someone

wants to increase the risk, well, why would that be intrinsically different by reimposing -- by taking that requirement and putting it back? If it's cost beneficial then why let them increase the risk? That's my thought.

COMMISSIONER JACZKO: Thanks. I appreciate your comments. As I said, I think these are challenging issues and not always crystal clear. Part of it is the limitations on the technology and the limitations on the numbers that we're getting.

If I can ask just the indulgence of one really brief question. When are we going to full Level III PRAs for every operating facility in this country?

MR. KADAMBI: I don't know.

COMMISSIONER JACZKO: Nobody knows? I don't know.

CHAIRMAN KLEIN: Commissioner Lyons?

COMMISSIONER LYONS: Prasad, I was particularly interested in -- I guess it's your next-to-the-last slide on future planned work. I think you listed a number of important areas both for certainly the standards organizations to think about, but also for us to think about.

I was interested that on that you highlight the need for additional training and that came up in both Ken's and Tony's comments. I think many of the comments today do support the need for additional folks with training in this area.

By way of a specific question you noted the need for moving ahead in human reliability analysis from a probabilistic standpoint. That's something that I've been very interested in in the time I've been here, but I've also been somewhat

dismayed by what at least I perceive to be a lack of solid data in that area. I know there are some initiatives underway to try to gain more information in that area, but I was curious if you or any of your colleagues, particularly Ken, through EPRI just because it always seemed to me that EPRI was a very appropriate place to try to gather more information on the HRA aspects.

I'm just curious, Prasad, if you or anyone could comment on where do you see the data coming from that would support additional work in the PRA treatment of human reliability?

MR. KADAMBI: Commissioner, the best I can do at this point is at least think of your question in terms of the standards process itself, which tries to bring in the best minds in the field who will be the source of knowledge on where the data is to be obtained. So that if we do develop a standard it will be based on the best available information.

I think the standards cannot lead the process. There has to be a body of work with some set of best practices that already exist and the consensus process will then draw all this together and develop one document that people can then, in practical terms, use to say we can use this across the field and usefully solve problems.

COMMISSIONER LYONS: Any comments from Ken or Tony from an industry perspective?

MR. CANAVAN: Commissioner, there currently is a project ongoing that EPRI is involved in as well as members of the staff and the international

community in collecting human reliability data for a nuclear power plant simulator test. I'm at a loss for what country and what's the project status at this time, but I am aware they are collecting a significant amount of data and meeting in the next few months to discuss what they've collected thus far.

COMMISSIONER LYONS: I'll try to raise this question with staff, too. If it's the Halden work that you're referring to I've at least raised the concern on a number of occasions that while I have tremendous respect for what's going on at Halden that work is not using American trained crews. It is not intuitively obvious to me that crews in Scandinavia will necessarily behave in the same ways that a U.S. trained or a Japanese trained -- its seems to me that there could well be cultural or training differences in how crews in different parts of the world respond.

I'm still very supportive of the Halden work and very supportive of these sorts of international databases, but I worry whether we're getting enough data specific to U.S. crews. I'll raise it with the staff, too. They've heard that question before.

MR. CANAVAN: Well, it's interesting you ask this question now. Last week I met with my counterpart at EDF and we've agreed to compare some of our accident response procedures to see how our responses may be different. And interestingly enough the first comment that was made was, "Shouldn't we have done this first?"

So, we are aware that it has a significant impact on the Halden work and

we're going to look at how this will affect the data and whether or not the data is applicable to U.S. response. Thank you.

COMMISSIONER LYONS: I'll raise that again with staff. This has been a longstanding interest of mine, but thank you.

CHAIRMAN KLEIN: Well, thank all of you for your comments and presentation today. We learned a lot about wrenches and swords. We appreciate your activities and certainly thank you for your technical societies for their voluntary work. It's very important. Thank all of you for your presentations. Now, we'll move to our second panel.

PANEL 2

CHAIRMAN KLEIN: Well, I think we're now ready for our second panel. Any comments from my fellow Commissioners before we start? Bruce, would you like to begin?

MR. MALLETT: Sure would. Good afternoon, Chairman and Commissioners. Thank you for the opportunity to discuss today the status and path forward we see in our NRC activities that make our regulatory actions and regulations more risk informed and performance based.

Chairman, as you and the first panel indicated and several of the Commissioners we have made significant progress since we last talked to you in August of 2007. I would highlight we made that progress in the use of risk

informed and performance based concepts to change not only our regulations, but in our actions to address identified safety issues at nuclear plants and in our actions to make our decisions on what actions we should take next to improve safety and security at our nuclear facilities that would regulate.

We plan to highlight some of these areas in the form of our accomplishments as the speakers talk further in this presentation. We will also discuss our long-term and short-term areas of focus we see looking forward in this area of risk informing our regulations. I emphasize again the concept of risk informing our day-to-day activities as we regulate.

As we discuss this topic I would ask you to focus and keep your mind on three items. One is the use of these concepts of risk informed and performance based have become much of an integral part of our day-to-day activities in the agency. I think that's much of an improvement since the last time we talked to you in 2007.

The second point is that we have a strong system in place we believe now to integrate our activities in this area across all parts of the agency and I think you'll see that because our speakers are going to talk about not only the reactors, but also the nuclear materials, fuel facilities and waste areas.

These first two areas I mentioned are becoming an integral part of our day-to-day activities and integrating these activities in large part is due to the staff and some of the leaders and the presenters you see at this table here today.

The third area and probably in my mind the most important is that both the

NRC and the industry I believe have to commit resources to those activities we see in this arena that are most important to safety and improving the safety and make a contribution to that.

This is such a broad area that we can tend to focus on things that are nice to do and they may take us away from focus on the right priority items. So, I think we need to keep that in mind as we go forward.

Before I turn it over to the other speakers I want to make a comment on a comment that was made in the first panel. I believe in contrast as some of those comments, I believe we've made significant accomplishments in this area in not only risk informing our regulations, but also improving safety at our nuclear facilities in this country because of the use of risk and the analysis that we've done.

I think as you hear some of the speakers here you will hear some of that. We haven't been doing it just to reduce the regulatory burden.

Our first speaker will be John Monninger and he's going to give you of a little treatise or history on how we got here today. We though that would be a good place to start. John?

MR. MONNINGER: Good afternoon, Chairman Klein and fellow Commissioners. I'm John Monninger. I'm the Deputy Director for the Division of Risk Analysis in NRC's Office of Nuclear Regulatory Research. It's my pleasure to be here today to brief you on the history, the progress we've made in risk informed and performance based regulation and currently where we are and how we use

those tools to improve safety decision making. If I could actually have slide 5.

The history of risk informed and performance based regulation actually dates back to more than 30 years with NRC's issuance in 1975 of the Reactor Safety Study, which showed the benefits of probabilistic assessments of safety.

Progress in PRA development by both the NRC and the nuclear industry in the early 1980's led the agency to the recognition that it was feasible to use quantitative safety objectives to ensure nuclear safety. This notion is embodied in the NRC's Safety Goal Policy Statement that was issued in the mid-1980's which broadly defines an acceptable level of risk from nuclear power plant operations.

To further advance the use of risk information in nuclear safety the NRC issued in 1995 the PRA Policy Statement so that the many potential applications of PRA technology could be used in a consistent and predictable manner across all NRC regulated activities.

Today, the NRC's strategic plan directs the continued pursuit of risk informed and performance based activities across all our regulatory activities.

Over the years the staff has implemented the Commission's direction through originally the PRA Implementation Plan. It was subsequently revised and updated for the risk informed and performance based plan and most recently it is the risk informed and performance based plan.

The original risk assessment technology developments that occurred in the 1980's resulted in improvements, safety improvements to the NRC requirements, as was mentioned the station blackout rule. Another example would be the

maintenance rule.

And it also resulted in vulnerability assessments being performed at the operating nuclear power plants in the 1980's. Today, risk assessment tools are used by the NRC staff in the nuclear industry on a daily basis. If I could have the next slide, please.

The NRC has developed and maintains robust technical infrastructure to support our risk informed and performance based regulatory activities. Over the past 30 years we have issued hundreds of technical reports documenting risk assessment methods, models, tools, databases and special studies. This information base provides the foundation for us to use risk informed and performance based approaches today.

In a similar manner, the development of guidance documents, standards and staff training has evolved over the years. We have issued Reg Guides to provide guidance to licensees in implementing our policies. The staff has issued Standard Review Plans to help guide them in the review of applicant's PRAs.

As was discussed earlier we actively participate in the activities of the American Nuclear Society and ASME in the development of consensus standards.

The NRC also has a very robust PRA training program. There are over 20 different training courses that are offered and conducted for our staff. The training courses vary. We have training courses that are designed for staff that are not focused practitioners within PRA and that are also provided for supervisors and managers.

We also have much more advanced detailed courses for those staff members that are involved in the development and modeling of risk on a daily basis.

In addition to that we have a qualification program within the NRC for our senior reactor analysts that they go through. We have also supported staff in their pursuit of advanced degrees in applying risk assessment methodologies.

In summary, the NRC's risk informed and performance based technical infrastructure is well-developed and continues to support our safety decision making. May I have the next slide, please?

Risk informed and performance based approaches are used throughout the agency in numerous applications. I've tried to list six of them up here. These applications are not only used within the reactor arena, but they're used within the materials and waste arenas also.

Examples include rulemakings. We have used risk technologies to pursue rulemakings that increase safety. Other rulemakings have resulted in improved regulatory effectiveness and other rulemaking have decreased unnecessary regulatory burden.

We use risk assessment to support the generic issues programs and we use risk assessments in our regulatory analysis. What was also mentioned in the previous panel the use of risk assessment approaches in the Reactor Oversight Process. The inspectors use risk tools to guide them in their inspections and we also use it to evaluate the significance of findings.

Risk assessment is also used in the review of new applicants that are submitted to the NRC. If I could have the next slide, please?

Overall, the NRC conducts research to address areas of high uncertainty and to prepare the agency for the future. In doing so, we routinely collaborate with agencies and organizations, both internationally and domestically, to advance the use of risk informed and performance based approaches for nuclear safety.

Just last month the NRC's Office of Research signed a Memorandum of Understanding with NASA to work jointly with NASA on collaborative research and risk reliability analysis. Examples of collaborative research under consideration include advanced reliability analysis techniques, software reliability analysis, modeling of human performance and fire risk analysis.

We also collaborate internationally through organizations such as the OECD and NEA to share information and improve our risk assessment tools. Examples of ongoing projects include the modeling of Digital I&C systems, the evaluation of low power and shut down operations, and also the assessment of human reliability analysis methods at the Halden research reactor.

We also benefit from the research at universities through the issuance of grants and cooperative agreements and we're pursuing such work such as fire risk analysis, uncertainty assessment and human reliability analysis.

In summary, we continue to collaborate with other organizations to advance the use of risk informed and performance based regulation at the NRC. If I could have the next slide, please?

For more than 20 years the NRC has developed and applied risk informed and performance based approaches to nuclear safety. There have been significant and substantial accomplishments across the NRC. Today, risk informed and performance based regulation is an integral piece of our regulatory framework and it supports safety decision making.

This concludes my remarks on the evolution and status of risk informed regulation at the NRC and I'll turn it over to Mark Cunningham from the Office of Nuclear Reactor Regulation.

MR. CUNNINGHAM: Thanks, John. Can I have the next slide, please?

I'm going to spend most of my time today talking about what's termed on this slide "near-term focus areas". We look at these as opportunities over the next year or so to make some significant gains in risk informed regulation with respect to operating reactors. The three topics I'll talk about will be fire protection, technical specifications and special treatment requirements.

We can work on these near-term focus areas because we have a solid foundation in the operating reactor world of the uses of risk informed regulation. Other people have talked about this as well, but we have risk informed rule changes, including the combustible gas control, the special treatment requirements and the station blackout rule.

The use of risk analysis is an integral piece of our Reactor Oversight Process and we have numerous -- what I'll call -- routine uses of risk analysis in

the licensing process including risk informed in service inspection and other such things.

I should also note that we have some longer term opportunities for change or making greater use of risk information. We have a couple of rule changes that should be coming forward. One, the pressurized thermal shock rule should be coming to the Commission in the next few months as a proposed final rule. This rule combines deterministic and probabilistic information in a way that better balances what would be our regulatory requirements with respect to PTS with our understanding of the risk of PTS.

50.46(a) will be re-noticed for public comment in July of this year. This rule, like the PTS rule, is an opportunity to better balance our regulatory requirements with respect to ECCS systems with our understanding of the risk of different types of demands on those ECCS systems.

And finally, we have opportunities in the longer term for research. One example that I've put up here is with respect to digital systems. John and his folks in the Office of Nuclear Regulatory Research are working on the issues, such as on software reliability to give us perhaps a technical basis down the road to provide a more risk informed evaluation of such systems. Next slide, please.

By far the largest focus area that we have in NRR is with respect to implementation of 50.48(c), the alternative fire protection requirements. About eight months ago we received a license amendment request from Oconee and Harris as pilot plants. These are under active review. We've got a lot of staff very

involved in this. We're still on track right now to have the safety evaluations issued for those two pilot plants by September of this year.

While we're reviewing the two pilot plants we're trying to make sure that we have the right infrastructure in place to help out the large wave of applications that could be coming in in 2010. We have a draft standard review plan that has been developed. It's going to be published for public comment probably in the next week or so. We have a draft revision to our Regulatory Guide on NFPA 805 that should go out at the end of next month for comment.

We have inspection guidance -- we're working very closely with the Regions to improve our inspection guidance. We have inspection guidance in place for the plants that are in transition and we're working with the Regions to develop what we'll call "post transition inspections". So, after a plant has fully gotten through the licensing process the inspection processes and procedures will be there to take the next step.

We're also working to ensure that we have clear guidance for the associated fire risk analysis. Reg Guide 1.200 is a key piece of this and that should be coming out next month, I guess. Tied to that, of course, is the work that you heard about earlier with ASME and ANS to develop the fire PRA standards.

We're also dealing with some of the specific issues that have been identified and talked about in a variety of forums on NUREG/CR-6850, which is a key reference in the application of fire PRAs.

We recognize there were some technical issues that came up as a result of

the initial applications of 6850. We're working to resolve those issues.

And finally we're working just in a general sense to resolve technical issues as we proceed. We're going to be doing that in the context of the pilot plants through site audits and RAIs. That will be coming out over the next few months.

We're also using what we call a "Frequently Asked Question" process. What this is is a mechanism for us to identify issues that are coming up in the 805 process, communicate the issue and the resolution of that out so that all of the non-pilot plants will understand what this issue is and how they can address it.

We've had about 39 such issues come into the process. Seven or so were withdrawn because they were found not to be either necessary or they weren't really in the scope of the FAQ process. Twenty-one of the remaining are done, so we have 21 out of 39 basically done and 11 are open. Next slide, please.

The staff and the industry have been working for a long time on risk informing technical specifications. Over the next year we see an opportunity to make some progress on two specific ones. This is called implementing initiatives 4B and 5B. 4B is related to the risk informing allowed outage times of equipment and 5B is related to the surveillance frequencies.

We're getting indications now from the industry that they see now that they can -- they're starting to seriously consider applications coming into the staff. Our main interest is how many and when in a very basic way, so that we can prepare to get the right infrastructure in place for them as well; have the right review guidance, have the right skills in the right places. And very importantly to be able

to match the timing of those applications with the work that's going on in NFPA 805.

As I alluded to earlier there's a big set of work to be done in fiscal year 2010 and 2011 on the 805 reviews, so we need to work to match how we review the 5B and 4B initiatives around the 805 applications.

The other opportunity we have with respect to 50.69 was established in 2004 as a voluntary rule. Again, we're trying to achieve some balance here. You would balance the treatment required of a particular component with what we understand the risk of that component is. To date, no plant has implemented 50.69. South Texas has a program, a 50.69-like program, but it was accomplished via exemption before 50.69 was finalized.

We have two key elements of the rule's implementation. One is the categorization process that bins all the plant's equipment into four categories depending on whether or not it is safety related and its risk significance. The staff is about to issue a safety evaluation on a topical report that I think it will put into place a good description of how a categorization process can be used. I think we're in good shape with respect to the categorization issue.

I think we are not as close together as we could be on the treatment issue with respect to so-called RISC 3 components. These are components that are considered to be safety related by requirements, but we would see that a risk analysis would tell you that they are of low risk significance.

Basically, what we intend to do over the next six months or so is hold a

series of public meetings where we can try to get past that hurdle of having a clear understanding for all parties of what the special treatment should be for those RISC 3 components.

We're going to make use of available information from the South Texas exemption as well as I understand there's an ASME code case that's coming in on treatment for certain types of pumps and valves. Both of those could be valuable data points, if you will, for helping us understand how to get past the treatment issue.

That concludes my presentation. With that, I'll turn it over to Charlie Ader.

MR. ADER: I'm Charles Ader, Director of Safety Systems and Risk Assessment, Office of New Reactors. The first panel, there was a lot of discussion about the double-edged sword. In some ways -- and I don't want to overstate this, I would look at the framework for new reactors is that other edge of that sword. The Commission has put in place the Part 52 rules and we have the regulatory guidance and the SRPs that were issued, reissued two years ago, I believe.

A lot of the requirements for new reactors we have incorporated the insights from the previous risk studies from the years of severe accident research and from the operating experience. The Commission has put forward expectations that they expect the new reactors to be safer and incorporate a lot of those risk insights. So, again, I don't want to overstate, but I think we shouldn't lose sight of that.

The framework is in place to support the reviews of new reactors. We are actively in those reviews. The rules required the design specific, plant specific

PRAs be developed by the designers, by the applicants. We are reviewing those for both the DCs and the Combined Operating Licenses.

Part 52 also has a requirement for once the plants have a license to have a living PRA that will be updated to the standards that have been endorsed by the NRC one year prior to fuel load and then will be updated through the life of the plant. So, it is in part a good application of risk informed regulation for a lot of those features.

A lot of our review is really focusing on the assumptions in the PRAs to seeing if they're well supported. The key assumptions we're looking to see how those insights are used in other parts of the design and the applications, the other part of application in other programs. If I could have the next slide.

One of the other things we are doing beyond the review and one of the early efforts the staff undertook in the review of the PRA was try to extract the risk insights that we saw and then feed those to the other technical review branches so they could be better informed of those features, components that were identified as key risk contributors and as a way to focus their review.

From that communications we've gotten feedback to the PRA staff and they've worked to support issue resolution. We've used risk insights for long-term inspection programs and in the longer-term we do have an application for risk informed tech specs in house now. We expect applications for risk informed in service inspection and I would expect after COLs are issued a 50.69 application.

The reviews of those have raised some issues on implementation of how

the current guidance may be used in the implementation. I think in the interest of time I better turn it over to George Pangburn.

MR. PANGBURN: Thanks, Charlie. Good afternoon, Mr. Chairman, Commissioners. It's good to be here. John Monninger's opening remarks set the stage pretty nicely for what we've been doing in the risk area. I'll elaborate on that a little bit.

In the late 1990's/2000 timeframe NMSS embarked on a number of initiatives in the risk arena focusing on such things as a risk task group, a systematic evaluation of our exemptions, the Phase 2 review of the entire by-product material program.

And while those efforts were more qualitative than quantitative that reflects the fact that this is a broad, diverse nature of regulated activities. It doesn't lend itself necessarily to quantitative analysis. The results of those efforts have been incorporated into FSME's programs in the sense that this is now a mature activity. It's part of what we do. Our normal staff development of rules, guidance and procedures. In fact, it's just how we do business.

Some of the successful applications on the first slide I have there is the materials inspection frequency and approach with a direct result of the Phase 2 byproduct material review. As a result of that we risk informed not only how often we inspect people, but the approach we use in those inspections.

Materials licensing guidance: the NUREG-1556 series reflected both the complexity and the depth of reviews consistent with the regulations for a number

of license activities. On the one side you approach a panoramic irradiator differently than you do a portable gauge.

Our materials securities activities were developed taking into account risk insights that were part of development of the Code of Conduct and the framework document including the increased controls and additional security measures of a few years ago.

And our response to materials events. Again, we respond to events differently based on exactly what the nature of the event is and whether we need to have an inspector there the same day or whether it's something we can look at during the next scheduled inspection. If I could turn to the next slide, please.

Some of the longer term applications are current things that we have going on. The development of security rulemaking for materials licensees. That's going to use the information that we've gained from development, implementation and inspection of the increased controls and additional security measures to inform development of a new part that we'll be sending to you in the fall of this year.

An ongoing effort that we have under the WIR Program, the Waste Incidental to Reprocessing, calls for reviews of DOE's non high level waste determinations and performance assessments. And in that we use a number of performance assessment techniques in an effort to focus our review on the appropriate things.

Again, in the interest of time I'll curtail my discussion now and I'll turn it over to Cathy Haney.

MS. HANEY: Thank you. I'm Cathy Haney. I'm the Deputy Office Director in the Office of Nuclear Material Safety and Safeguards. Similar to George at FSME we have incorporated the concepts of risk informing performance basing activities into our day-to-day activities within NMSS. I'll touch on our successful applications, things we've brought to completion this far and then go on to mention some of the items that we have in process right now.

The first item to mention would be that in February 2008 just about a year ago we issued a revision to our risk informed decision making framework for nuclear material and waste applications. This is a very good document. It was begun back when FSME and NMSS were one organization, but it has applicability to both organizations.

What it does is provide a step by step procedure and some examples for staff if they were looking to decide if a certain activity we were undertaking could go through, we could use a risk informed approach for doing it.

It also helps our staff. It looks for consistency among how we treat our projects and also achieves some efficiencies in our programs.

The next item would be touch on Part 70. Back in 2000 we revised Part 70 to make it more risk informed performance based particularly focused in Subpart H, which has to do with requiring our fuel cycle licensees to submit integrated safety analysis, also to go through and submit to us the ISA summaries, as well as to list what we refer to as IROFS, which are Items that are Relied on for Safety. Our license reviewers within our organization have gone through and reviewed all

those ISAs that were submitted and we brought closure to that last September with looking at those particular items.

In March of 2007 Research in collaboration with NMSS completed a pilot PRA study. This PRA study was for the dry cask storage facility. And what this did was look at the overall system performance for postulated external events. It also helped create a general methodology for us in looking at PRA relative to our licensees. It sets the stage for us starting to be able to use this information in licensing and particularly looking at exemptions as well as looking at some operability reviews.

The last item I touch on is Part 63. Part 63 is the regulations pertaining to Yucca Mountain. In that particular area we believe Part 63 to be a risk informed performance based regulation. We have developed a Standard Review Plan that we are actually implementing right now as we're reviewing the application.

We're using this to ensure that our license reviewers are focusing on things that are important to safety during this particular review. Also, we have been able to review -- or step into creating Inspection Manual Chapter that also links us to focusing in on particular areas. Right now we're limited in what we're looking at in the inspection area, but things such as Part 21 as well as allegations. Turn to the next slide; 21 please.

These are just to touch on briefly applications that we have in process right now where we would be applying a risk informed approach. The first one would be a significant initiative to risk inform the fuel cycle oversight program. In addition

to risk informing it what we're looking at increasing the transparency, predictability, objectivity and consistency of our inspections in this particular area. We have been working with industry on this initiative. It's at its early stages right now.

One of the challenges we're facing are resources to move forward on this program, but we're also thinking creatively of options that we can employ to move forward because we do think we will gain a lot of benefit from this particular program.

We have been able, however, to use risk on specific inspection procedures within the fuel cycle program. One that I would focus on right now would be construction activities relative to two of the gas centrifuge facilities there.

In that case we use this information in getting ready for pre-operational readiness review inspections. We focus particularly on the IROFS, again the Items that are Relied on for Safety. We looked at the probability of a deficiency in that area in a particular IROFS and then the impact if that deficiency were not addressed.

I found those to be successful in what work we've done so far and as we move forward with the new fuel cycle facilities I think we'll find a greater benefit from that and be able to move into those other areas with that.

In the spent fuel area we have been working on Standard Review Plans. We have one that's a Standard Review Plan for dry cask storage systems particularly NUREG-1536 that we expect to go out in draft for comment in March of this particular year. This one considers the likelihood of failures and the potential

consequences of failures and also looking at defense in depth. Again, all focusing on the risk aspects and looking at performance based. Part of this is to focus our license reviewers on the most key important areas in that particular area.

As we gain comments on that particular Standard Review Plan depending upon what we see on that from the public comment stage we'll move into revising Standard Review Plan for the spent fuel dry storage facilities, which is NUREG-1567. So, it's a two-step process. We go forward one step, learn from it, and then we move on to increase our activities in other areas.

And then finally, we are using the risk informed approach in reviewing the Yucca Mountain licensing application. And here it helps focus our staff on the items that are important to safety. We are focusing on the repository performance and we're just insuring that we're effectively using staff by focusing on those particular areas.

Again, I would just close by saying we are incorporating all these activities, the risk informed performance based into our day-to-day processes. With that I'll turn it back to Bruce.

MR. MALLETT: Chairman and Commissioners, this concludes our remarks. At great risk, we went over by four minutes, so take it easy on us, please.

CHAIRMAN KLEIN: Thanks for a good insight. There has been a lot of, I think, progress made on risk informed performance based activities all across the area including areas that are a very important part of our activities is the

non-reactor side that is also very important.

I guess the first question for you, Bruce, is obviously, I think, from the global perspective risk informed performed based is clearly the way to go. Do you think there's good staff buy-in to that process?

MR. MALLETT: I believe I'll start out and if some others want to chime in they can. I believe there's excellent staff buy-in to that process where they see value added in using the risk informed and performance based. And by value added is where it increases the margins to safety.

And they also -- there's buy-in where they see that it will be used in industry. Where there's not as good a buy-in is where there's a question mark as to whether it will be used and the efforts that we spend on it or maybe there's not an adequate benefit in the margin to safety. John, do you want to comment?

MR. MONNINGER: This is John Monninger. I think there is good buy-in within the staff. I think some of the initial reluctance was during the transition to the Reactor Oversight Process where you heard some skepticism from the staff in the late '90s which is to be expected in any type of change management program.

But I think the inspectors, the staff is very much interested in risk informed performance based regulation. They use it as tools in accomplishing their work.

CHAIRMAN KLEIN: Thanks. Mark, I guess I've got a question for you. In looking at your slide 11 that talked about your near-term, long-term activities. Tony had a list of the industry's priorities. I didn't overlay those to see if

they're consistent, but maybe you could tell me if Tony's list of the industry's priorities is consistent with those of the regulator.

MR. CUNNINGHAM: I think there's a couple of things on my list that he didn't mention like PTS. But by and large I think there is considerable overlap, if you will. Tony talked about 50.46(a) perhaps more than I did. Again, it's not that it's not an important thing to do its just the process is such that it's a year or two away from being done as a final rule.

We have other rules in place that we can implement now while 46(a) works its way through the system. Otherwise, I think we have a pretty good agreement.

CHAIRMAN KLEIN: Thanks. Charlie, there was a comment that I thought I heard from ASME and ANS in terms of when we did our new reactor licensing that we might have gone back to sort of the old way in terms of how we use deterministic rather than risk informed. Can you comment from your perspective?

MR. ADER: We do use the deterministic regulations that are out there for new reactors. Those need to be changed through the normal process. We're using the risk insights to help focus in certain areas, but the rules that are out there, the Part 50 rules, which is the fundamental rules that they're having to address and the standards that go with those. Many of those have not changed. We've not in the new reactor area or Part 52 imposed or revised those types. I wouldn't say it's reverted, but it's a fair statement.

MR. MALLETT: I would add, though, I believe there are areas where

we're looking to improve and use more risk informed and Research is helping us in some of those areas as well. So, I think the staff is energetic about doing that. It's just where you don't have a proven set of data or information out there, you fall back on the deterministic. Is that a fair comment?

MR. ADER: Well, the license is based pretty much on the deterministic rules that they have to meet. So, to the extent that those have not been changed that's what they are complying with. The risk insights do help enhance safety. From what we're seeing the Commission's expectations for enhanced safety on new reactors is clearly coming true, at least at this stage in the game.

CHAIRMAN KLEIN: Thanks. George and Catherine, in terms of your activity are your staff members pretty well trained on risk informed performance based activities?

MR. PANGBURN: I would say so, Chairman. Talking with someone this morning just before I came up here and was prepping for this and her reaction to this, we were talking about Part 31 exemptions. It was very clear that she embraced risk informed performance based and in fact getting back to the earlier question that buy-in was not a problem. I think the staff as a general matter is aware of the insights and has the insights.

CHAIRMAN KLEIN: Anything that the Commissioners should do to help you all in your area for risk informed performance based?

MR. PANGBURN: Great question. I don't have an answer at the

moment.

MS. HANEY: We're constrained somewhat by resources and moving forward that's helping us move toward -- I think helps with the buy-in of staff. Once they realize that we can use this to focus in on the key safety issues, which I think is why I feel very confident in saying our staff has bought into risk informing the regulations. I think right now just the support that you're giving us right now is fine.

CHAIRMAN KLEIN: Thanks. Commissioner Jaczko?

COMMISSIONER JACZKO: A couple questions perhaps on fire protection. Charlie, in regard to your comment about the regulations being deterministic. Ironically, for the new reactors, they see both of the options in front of them and have made choices and in some cases have gone with the deterministic rather than a performance based. I think fire protection would be one example.

I believe most plants have come in under the Appendix R type deterministic requirements, not under a 50.48(c) risk-informed performance based approach. There certainly are examples out there where in fact given the opportunity to go risk informed they have actually gone deterministic. So, it's sometimes somewhat of an unclear message about the utilities and some of these approaches.

On the issue on the fire protection we heard on the previous panel that ANS and ASME have accomplished a joint standard for at least the Level I internal events and I believe that incorporates the fire PRA standards as well.

Does the staff anticipate at this point being able to adopt or endorse that or will there be modifications in particular in the fire protection area?

MR. MONNINGER: We are all on schedule to endorse that standard and endorse it within Reg Guide 1.200 Rev. 2 by the end of March.

COMMISSIONER JACZKO: With modifications or as it is?

MR. MONNINGER: There are typically some clarifications. What we did is we released a public letter last summer talking about our potential issues with the standard. Subsequently, ANS and ASME worked to resolve as many of those.

COMMISSIONER JACZKO: And that's in the appendix that they discussed then?

MR. MONNINGER: Yes.

COMMISSIONER JACZKO: Or addendum, I guess; sorry. As far as the two applications that we have in front of us now for Oconee and Sharon Harris are we reviewing those PRAs to the Rev. 1 standard or the Rev. 2 standard? Or is that not the right way of --?

MR. CUNNINGHAM: I think it's a hybrid, actually. Because the ASME ANS fire PRA standard was not out, in effect we did more review of the fire PRA then we might have otherwise. It was Rev 1 Plus as the way I would characterize it.

COMMISSIONER JACZKO: Will the subsequent applications be expected to use Rev. 2 then?

MR. CUNNINGHAM: It's unstated, really, but yes, that's our expectation. Our resources and our estimates and things in terms of time to review and level of effort to review are based on an assumption that they have a ASME standard, ANS standard, fire PRA and the peer review completed. It makes our job much easier.

COMMISSIONER JACZKO: We also heard this morning -- earlier this afternoon; sorry -- that on the Level II and in particular the Level III ASME ANS standard that I think they were talking late '09 or 2010 for a standard in that regard. Do we have a plan comparably to follow up with an endorsement? I guess it would be another revision to Reg Guide 1.200 to begin to incorporate the Level III?

MR. MONNINGER: That is our plan. We are participating on both the Level II and the Level III standard and we would then expect to review it and if acceptable we would propose to endorse it in a subsequent revision.

COMMISSIONER JACZKO: Okay.

MR. MONNINGER: In addition to also the low power and shut down standard.

COMMISSIONER JACZKO: Okay. So, the low power shut down is a separate standard at this point? We would roll that into Reg Guide 1.200 then in some revision at some point?

MR. MONNINGER: Correct. The low power shut down standard ASME and ANS would roll that also into the integrated standard or the combined

standard.

COMMISSIONER JACZKO: Do they have a joint standard at this point or if there's just one standard at this point?

MR. MONNINGER: It's called a joint standard.

COMMISSIONER JACZKO: It is a joint standard? Okay.

MR. ADER: Commissioner, if I could. 805, which 50.48(c) references, is not applicable for new reactors. There's a separate 806 standard that's being developed. They don't really need to use it as much because of the enhanced fire protection requirements or the guidance the Commission put out back in the '90s. They'll have separate fire areas and they'll assume if you have a fire in that area everything is lost. No manual action. They have taken the risk insights and they have enhanced their design.

COMMISSIONER JACZKO: They've taken the risk insights, but it's the Appendix R 1979 risk insights. They've done essentially the '79 separation -- essentially the separation requirements of Appendix R. So, I appreciate what you're saying, but it is a deterministic basic. It is not -- yes, it has insights, but those are the insights from 1979.

MR. ADER: It's much greater separation then you would have in most of the existing or many of the existing plants. The requirements that they have to analyze would identify insights. They are doing fire methods. Some of them are doing close to fire -- the similar type of PRAs.

COMMISSIONER JACZKO: I appreciate that. We'll move onto

something else. One last question, then -- loop LOCA. Where do we stand on the BWRs for loop LOCA? Is that initiative moving forward or is that initiative not moving forward?

MR. CUNNINGHAM: The BWR owners group had a topical report submitted to separate the requirements and that topical was withdrawn.

COMMISSIONER JACZKO: Why was that withdrawn?

MR. CUNNINGHAM: The understanding we had was that they didn't see a success path. It was certain aspects of the staff's discussions and questions and things that they felt like was not going to get them effectively to where they wanted to be.

COMMISSIONER JACZKO: Was this a challenge from PRA infrastructure not having the ability to properly model this? No enhancements?

MR. CUNNINGHAM: It was a variety of things, but that topical challenge, the technical staff to balance out deterministic requirements and probabilistic requirements. From what I can understand the owners group felt like they weren't getting that balance to the point that they thought it was cost effective.

COMMISSIONER JACZKO: Okay.

MR. MALLETT: I think that's a perfect example of what I was saying earlier is is there value added pursuing that further if there's not going to be use on that particular part of 50.46(a).

COMMISSIONER JACZKO: Thank you.

CHAIRMAN KLEIN: Commissioner Lyons?

COMMISSIONER LYONS: My thanks to all of you for good presentations. By way of a first question, Mark, you mentioned considerable industry interest in moving ahead with initiatives 4B and 5B. If I'm remembering correctly -- and I may not be -- there is of the order of eight initiatives that have been identified and I was just curious if you could speculate -- I think I'm right in saying that industry's interest in those eight has been relatively slow in coming. I'm curious why now the focus on those two that you mentioned, four and five.

MR. CUNNINGHAM: I'm by far not the expert on this, but of the eight some of them have -- in a sense have been established and are already in place and have been widely used through the industry. Two and three, I think, were widely accepted by the industry. Others have not been so much so.

I think the 5B and 4B interest, if you will, is both from a value added from the licensee standpoint of what they gained from that and the fact that now that they have the PRAs as Mr. Pietrangelo was saying they're getting past the peer reviews of the Reg Guide 1.200 Rev. 1 for the internal events and getting their fire PRAs in place, they have a much more technically strong basis to take that next step. Perhaps it's the incremental cost of going to 5B is very small now that they have a stronger PRA infrastructure.

COMMISSIONER LYONS: George, a question for you. On the state's perspective of risk informed performance based regulation I'm curious as you interact with the states and through the MPEP process to what extent do you see the states interested in and observing risk informed perspectives? Is this

anything we should be trying to further encourage in some way with the Agreement States?

MR. PANGBURN: I think it's fair to say because the states use in large measure the inspection guidance we have in 2800, Manual Chapter 2800, and the NUREG-1556 series that almost by default they have risk informed and performance based their program. They've used those insights in developing and implementing it.

States oftentimes go a little bit farther than we do. Frequently we've seen as in the Texas case, for example, on the two person rule where they differ slightly from us in how they implement that. I think it's fair to say that we've seen through the MPEP program that the states are risk informing. You might be hard-pressed to look formally and see is that a line item in their budget, but as a matter of how they carry out the business, I think it's there.

COMMISSIONER LYONS: I had a question that I'm not sure if it might go to Charlie or John or maybe someone else. On human reliability, I raised this with the last panel as well. It's an area I've been personally very interested in.

I'm just curious in comments that any of you can make in terms of how you see us building an applicable database in human reliability and progress that you see us making in the area of risk informing that particular and very important area.

MR. MALLETT: We all voted and determined John would take this question. [LAUGHTER]

MR. MONNINGER: Actually, human reliability analysis is one area

that I myself within Research have been very interested in. It's a very exciting project to be involved in.

Back in the early 2000 time frame when the staff presented to the Commission our phased approach to PRA quality that talks about development of the PRA quality standards and staff endorsement. There were other issues also in that. One of them was HRA, the notion to improve HRA methods; the notion to potentially develop a database such that there is a scientific basis for that.

There were some other topics within the phased approach dealing with the treatment of uncertainty, et cetera. But with regard to Halden in particular we're doing a bunch of work there. But with regard to HRA I would say we're predominately doing two things.

One is looking at the feasibility to populate a database. Originally it was proposed as an information base. The second project is a benchmarking of various HRA methods throughout the nuclear industry, throughout internationally there's probably 10, 15 -- I'm not sure how many -- HRA methods out there.

So, we have teams within the states, teams within the staff, teams within industry that are using the various HRA methods. There are international teams that are also using their HRA methods and they're trying to predict the performance of the crews -- do blind predictions of the crew's performance.

There are differences between U.S. nuclear power plants and the simulator at Halden and the crews. One thing I'll note and I think what we're trying to do here is balance our options that we have available to use.

It's not an optimal solution but we're trying to balance what we have out there. It is based on a Westinghouse design and they do use Westinghouse emergency operating procedures. So, that's with regard to the HRA benchmarking project.

The other is the data development project. Our project there is called the HERA project. We're trying to see what we can learn from that and populate the database with that. We're not stopping there. We're also looking at inspection reports from the U.S. We're looking at insights from augmented inspection teams and populating it with that data from U.S. performance.

We have also entered into an agreement with a licensee conglomerate within the U.S. and they are using it within their corrective actions program. The plans are for them to populate that with much more information from their corrective actions program.

We've also had discussions with the American Institute of Chemical Engineers or one of those societies out there to see what we could potentially learn from them in terms of human performance. We're also working with NASA. So, it's a very active area and we do recognize the importance of it.

COMMISSIONER LYONS: I really do appreciate that response. It has seemed to me -- and you don't have to comment on this if you don't want to -- but it has seemed to me that in addition to everything you described that it would be possible perhaps through EPRI's leadership or maybe some other way to take advantage of the extensive number of simulators in this country, the extensive

number of crews trained on those simulators and run some fairly carefully controlled experiments somewhat similar to what is done at Halden. And really try to gather some pretty concrete statistics on U.S. crew performance in stressful situations.

Maybe that's to some extent being done, but it at least seemed to me that it should be possible to do that in an organized way with enough diversity of crews that you'd have fairly convincing statistics.

MR. MONNINGER: We do agree with you and we have been trying to reach out to see if we could somehow work with industry or work through INPO, et cetera, to have that done. We've also considered the NRC has the TTC and the simulators down there, but we've dismissed the notion that we could use that. We have considered various options. We don't have much leverage in terms of the industry.

COMMISSIONER LYONS: That's why I keep thinking perhaps it's a good challenge for EPRI to take on. I think it would be very difficult to use the TTC. It doesn't do much good to test our crews. We're interested in testing industry's crews.

MR. MONNINGER: We were just looking at the options. With regard to the benchmarking project and some of these other efforts, EPRI is actively involved in it. They have established teams to use their HRA methods.

MR. MALLETT: We'll take this back and take a look because I think this also has applications in the existing operating reactors where we'll use this in

our significance determination process.

COMMISSIONER LYONS: Absolutely. Thank you.

CHAIRMAN KLEIN: Commissioner Svinicki?

COMMISSIONER SVINICKI: Thank you. I appreciate the presentations as well and I would start by acknowledging that I'm sure the time that we've given you collectively and individually is in no way -- it's not sufficient to do justice to all of the staff hours that you and your colleagues that you represent here are doing in this area. I appreciate it very much and I know all of you were very conscious of the time. So, I appreciate that.

Mr. Cunningham, I'm going to turn with some trepidation to a very specific topic with you. My trepidation is because I think it will become clear as we discuss this that I think I have imperfect situational awareness, but I'm going to try.

One of the things I'm trying to do is, of course, stitch together the presentations from the last panel with this panel. The specific topic is the Risk Informed Safety Class III is the agreed upon pronunciation of the acronym RISC even thought that's a "C" at the end? Okay.

So, what I thought I heard and there's not much on the slides and I try to take careful notes, but I thought that Mr. Pietrangelo had discussed. Your slide 13 has agreeing on RISC 3 treatment. And I thought that Mr. Pietrangelo had said that there was industry promulgated approach that was endorsed, I believe without exception, in a Reg Guide which is in place now.

As I understand it -- I asked my staff to pull the thread on this a little bit -- is

that it's not atypical for guidance that in the guidance that exists there is more than one approach outlined and the two approaches are couple by a word -- and I think it's "alternatively".

There's some discussion about what "alternatively" means. It sounds like I'm being facetious, but I'm not trying to -- typically would interpret that as an "or" statement so that there's two pathways there. It's an elective choice between the two.

I know you talked about holding a series of some meetings where, of course, open to the public where you'd be working to get agreement on this. I thought Mr. Pietrangelo seemed to have described it -- and I think the victim is still in the audience -- as a much more settled question. Could you help me understand that a little bit?

MR. CUNNINGHAM: Certainly. The Reg Guide in question is principally focused on the categorization process. There is a piece of it in there that gets exactly -- one of the complications or one of the confusing factors in this is just what you were alluding to which is when we get to the monitoring and treatment the word "alternatively" appears. And when I listen to the staff who are the experts in this what I get from them is that's not the right word to use. That the approach that was the alternative was in fact not an alternative from their standpoint.

The alternative was inconsistent with the intent of the rule and that sort of thing. There's an issue in there of clarity in the Reg Guide that has to be worked

out.

That being said, as I think I noted, we have a situation where we have a voluntary rule in place for four years. No one is applying for it. One of the things you hear is uncertainty about how the staff will implement or judge the acceptability of a treatment program.

That uncertainty, from what I can tell, is causing the licensees to pause as to whether they would implement the rule. So, leaving aside perhaps some of the specific words and things I think we and the industry have a common goal to get past that such that there is no uncertainty on how the staff will view the treatment and how we will inspect treatment programs in the plants.

COMMISSIONER SVINICKI: Okay. I noticed we have Mr. Pietrangelo at the microphone. The only admonishment I'm going to give is to tell both parties we can't solve this here. Again, the way we do this with the separate staff panel doesn't give me a chance to explore it, so I had to raise this. Tony, if you would just like to clarify out of fairness.

MR. PIETRANGELO: Thank you, Commissioner Svinicki. First, I agree completely with Mark on the last part of why the licensees are hesitant to try to adopt this rule. In fact, there was a Reg Guide that was very prescriptive about RISC 3 treatment that the Commission withdrew within a month of issuing it, reissued Revision 1 of that Reg Guide and endorsed a performance based approach. Or you could still do it prescriptively.

"Alternatively" was clearly the right word and we do put a performance

based approach in our guidance that was endorsed. And that's what we would like to do now.

On this other document that's a staff evaluation safety evaluation report on the passive categorization this issue has come up again. This was explicitly addressed by the Commission back then when the Regulatory Guide was issued. It's not like this was not out in the open. It was on the Commission's table at the time. I just wanted to clarify.

COMMISSIONER SVINICKI: I appreciate that and expect that since you've already talked, Mark, about further meetings on this. We will stay on top and stay informed about what you all are doing. I don't want to fall into the trap. I was going to turn to Mr. Pangburn and Ms. Haney and say that this isn't a Commission meeting on risk informing Part 50. This is on risk informing regulation.

So, you both were very conscious of the time and I feel like George stated it really well. He said, "The breadth of activities that applies to NMSS and FSME as well is that the regulated activities are so diverse."

To my mind, the second part of that statement is so the challenges of taking the appropriate application of risk informed performance based is that much more daunting because the diversity of activities means your challenges are more diverse.

I'll just ask briefly in the interest of time. Is there a cross fertilization with the Part 50 activities? Does staff kind of talk to staff? We talked on the last panel

about it's a tool, but you have to know how to use it right. Are you able to cross fertilize or are you kind of over in Material space, creating it from the start by yourselves?

MR. PANGBURN: There are certainly discussions that take place at the staff level on a number of things. Rulemaking prioritization is one, but there's also a lot of staff discussion that goes on with respect to specific things.

One area where we probably lost expertise over the years has been human factors within FSME. I can't speak for NMSS on that point. I expect that as we look at human factors analysis in our efforts we would turn to the other parts of the organization for that kind of expertise. Cathy?

MS. HANEY: I guess I would add to it it's not just -- we do have where we stay connected with what's going on in the Part 50 world and Part 52 also, but there's also very good ties between NMSS and FSME because while we are slightly different than Part 50 there's a lot of similarities between George's program and my program. We do have that link and make sure that we do it because we want to keep things as consistent as possible.

COMMISSIONER SVINICKI: Just quickly for you specifically. You mentioned receiving the ISAs and having been through a review on those now. Is there any outcomes of those reviews that helped inform kind of your prioritization on risk informed activities going forward? Were there any specific lessons learned out of that that would have helped you to say, "Hey, I think this would be a really productive area to risk inform?"

MS. HANEY: I think it has helped a lot especially with regards to review of the IROFS, the items important to safety. And in so much as the licensing, but also where we focus our inspection efforts and I think it will provide a tremendous amount of oversight once we do take major steps toward revising the fuel cycle oversight program. So, yes.

COMMISSIONER SVINICKI: Great. Thank you.

MR. MALLETT: I would also add, Commissioner, part of the cross fertilization is we have staff and leaders, managers in both those programs that have been -- I'm sorry; now in NMSS that have been in the reactor program and vice versa. Those that were in the Materials and NMSS they're now in the reactor program. So, I think that also helps at least the concept of cross fertilization.

COMMISSIONER SVINICKI: Good. Thank you.

CHAIRMAN KLEIN: Any additional questions?

COMMISSIONER LYONS: Can I just make one comment? I had said I was going to ask about double-edge/single-edged sword with you. I didn't because at least three of you referenced that in your remarks. I didn't forget it, but I think you've covered it.

CHAIRMAN KLEIN: I'd like to just comment on what Commissioner Svinicki said. The fact that we don't ask you all as many questions -- we know where you all live. So, we have ample opportunities to follow up a little easier with the staff.

Let me thank both panels for their very informative comments today. It was

very enlightening. It's clear a lot of progress has been made. It's also clear that there's more progress to be made and I would encourage good communication among all parties -- the industry, the public and the NRC staff so that we keep making progress and positive contributions to risk informed performance based activity.

With that, the meeting is adjourned. Thank you very much.

(Whereupon, the meeting was adjourned.)