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The Role of Risk Management in Regulation
(Where we are and where we should be going.)

International Topical Meeting on Probabilistic Safety Analysis
(PSA '05)
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Chairman, U.S. NRC

Good morning, it is a pleasure to be here among so many believers in Probabilistic Risk Assessment, and hopefully a few skeptics. Everybody is needed. I do appreciate the opportunity to reach out to a group of experts, surely with diverse views but with many common interests.

I want to start by thanking Dr. John Garrick, Bernard Fourest, and Professor Kondo, who are serving as the General Chairs of the meeting, for their invitation to speak here today. I also want to acknowledge all those who have worked to make this topical meeting possible. I am particularly pleased at the high-level of interest and participation in this meeting by the international nuclear community. My remarks today represent my personal views on the progress that has been made and a path that lies before us for broadening and accelerating the incorporation of risk analysis and risk insights into the regulation, design, operation, and maintenance of nuclear power reactors. This is why I used "Risk Management" as a marquee. The use of risk analysis and risk insights is already a common decision-making tool. I believe it has to go beyond and become an important management tool. I am confident in its worth for achieving safety and reliability as a day-to-day management tool; moreover, its full potential can be realized when it becomes a cornerstone of strategic management decisions.

Ten years ago, in 1995, the Nuclear Regulatory Commission issued a Policy Statement supporting the increased use of Probabilistic Risk Assessment (PRA), in the words of the policy statement, "in all regulatory matters." That was a significant milestone in the history of reactor regulation because the word "all" was added to the statement by the Commission. Since that time, much progress has been made and important steps have been taken, yet the vision of a broadly re-focused risk-informed regulatory program, permeating all the important safety issues for nuclear reactors, is yet to be achieved. I believe this is the right time to expand and accelerate the implementation of the 1995 Commission Policy. Therefore, I am proposing the full implementation of the Commission's Policy Statement; it should result in a predictable and timely regulatory approach,

one that integrates and optimizes reactor safety, security, and preparedness through risk management. It must use the best available information from operating experience and research, the best available techniques, including risk-informed and performance-based regulation; and it must resolve the relevant issues in the right progression and be realistic and implementable. And, I would expect a strong debate on how to implement and communicate the changes needed to achieve an effective risk-informed regulatory framework.

Let me state the obvious. I am sure no one wants, and I certainly do not want, to put resources in dispositioning risk-insignificant issues. We must use our resources in resolving and then managing the risk-significant issues. But the obvious needs to be driven by a commitment to achieve results.

If today's safety, security, and preparedness issues, a new triplet, are to be addressed in the most effective and efficient manner, the NRC must shift focus and resources in order to enable corresponding changes in our licensees. We cannot afford to remain captive to those out-dated issues and approaches that experience has proven to be unimportant or ineffective. There is a better path and it needs to be traveled.

I have spoken and acted on the use of realistic-conservatism for nuclear regulation: "conservative in the sense of preserving safety margins and realistic in the sense of being anchored in the real world of physics, engineering, and experience." I added: "I see realism and conservatism as enabling factors for safety and reliability," and I see the use of PRA enabling all of the above. I have been surprised by the wide-spread acceptance of the need to adopt realistic-conservatism as a mode of operations. It is a simple yet powerful approach to regulatory decisionmaking. There is no larger, or more obvious need for a realistically-conservative mode of operations, than a fully risk-informed regulatory framework. It would move us a long way toward achieving effective and efficient regulatory operations.

In fact, making use of this opportunity, let me ask some loaded questions:

Is a nuclear power plant using a state-of-the-art, full scope PRA safer and more capable of reliable operation?

What are the risks and operational safety limitations of not using a state-of-the-art PRA? What are the benefits?

I frequently hear opposition to a risk-informed framework because of the uncertainties in PRA. Granted, we need to work at it. But, what will the overall uncertainties be without it?

PRA/PSA is an integral technique to propagate safety and reliability. It can address safety, security and preparedness, and the issues and uncertainties in those areas, and it should.

Both the NRC and the industry have many decisions to make and make them in a dynamic environment, where change is expected and sound results are demanded. We must recognize and accept that we all will have to think long and hard about over where to draw the line between the important and the unimportant, between appropriate margins and wasteful margins, and between preserving defense-in-depth in a risk-significant domain, and abandoning it. In fact, PRA/PSA is the tool to provide balanced decision-making for all of the above.

I believe that there are compelling safety arguments for change. Forty years of operating experience; thirty years of probabilistic risk-assessment; recent electrical grid problems; challenging hurricanes; and terrorist threats present compelling arguments for change because they paint the same picture.

They show us that:

- Station Blackouts,
- Small Loss of Coolant Accidents,
- Feedwater Transients,
- Steam Generator Tube Ruptures,
- Fires and External Events <u>are important</u>

but:

- Large LOCAs,
- Locked Rotors,
- Rod Ejections,
- Steam Line Breaks and Loss of Flow, <u>are not</u>.

Experience and risk-assessment upon risk-assessment have shown the importance of:

- diesel generator and electrical bus reliability,
- common cause failure potential,
- reactor protection system reliability,
- turbine-driven systems, auxiliary feedwater, RCIC and HPCI,
- switch-over to ECCS recirculation,
- service water and other support systems,
- severe accident management capabilities,
- reactor coolant pump seal performance, and last but not least
- materials degradation.

Furthermore, PRA has a large role to play in resolving the safety and security interface. Since September 11, 2001, we have dedicated substantial effort and resources to studying terrorist threats, and we have taken many actions. I cannot provide the details of these studies and actions because they involve Safeguards and/or Classified Information that we do not want our adversaries to obtain. But I can repeat what I said in a speech last year:

> " ... security concerns, including terrorist threats, raise many of the same issues involved in avoiding and mitigating reactor accidents. Potential initiating events, safety functions, safety (and often non-safety) equipment and procedures, and design basis and severe accident management guidelines all converge to a simple postulate: shut down the reactor, cool the core, and maintain barrier integrity. These are things we know how to do well and should be able to do regardless of the initiating event." We know how to do them better because of the use of PRAs.

If fact, last Friday in response to Commission directions, the Secretary of the Commission issued an SRM, a Staff Requirements Memorandum, on the safety and security for new reactors, one aimed at bringing the design-related security issues to the forefront of the design phase. To be a little

more specific, optimizing safety with respect to reactor accidents, with emphasis on Station Blackouts, Small Loss of Coolant Accidents, Feedwater Transients, Fires and External Events will also optimize safety and security for addressing terrorist threats. The Commission-issued SRM on the safety and security interface for new reactors incorporates many of the lessons learned in this arena.

Each one of these insights provides a good basis for change but does not individually represent a compelling reason for change. The compelling reason for change emerges when the inter-relationships among the requirements, issues and safety needs are fully understood. Safety is well-served when the requirements and constraints on systems and components stem from realistic, safety-focused analyses, enabling resources to be applied to the most important and safety-focused areas.

Important milestones have been reached lately, with the 50.69 rulemaking and the proposed 50.46 rulemaking. In my view, these two are essential to day-to-day operational safety and to the progression of the NRC and the industry to a risk- and safety-focused regulatory framework. Moreover, the Commission has now endorsed risk-informing Part 50, in a progressive but comprehensive manner. Since I know I am preaching to the choir, I am going to ask you to sing and sing loudly for a sound and effective 50.46a and a risk-informed Part 50. It is a battle worth winning, for safety's sake.

Therefore, I support the issuance of an Advanced Notice of Proposed Rulemaking (ANPR) to develop a new risk-informed and performance-based Part 50. This will have special importance for the review of non-light water reactors, for which many of the existing elements of Part 50 are not applicable and for which many important issues may not be in Part 50 at all. An Advanced Notice of Proposed Rulemaking will establish a forum for discussing potential actions and opportunities that are beyond the scope of 50.69 and 50.46, and it will demonstrate the Commission's commitment to a broad application of risk-informed and performance-based regulation.

Let me now outline some of the actions involved in achieving an integrated and optimized approach to reactor safety, security and preparedness. In the near term, we do not need new programs, new policies or significant additional resources. We do need to "manage the risk," internally and externally, focusing on effective implementation and integration of on-going programs, namely, risk-informed rulemaking and exemptions (e.g. 50.46 ECCS requirements, 50.48 (the NFPA-805 alternative), and the GDC). These programs need to be managed to optimize safety, and not on minimizing changes. There is no doubt in my mind that we should take an aggressive approach to change, not a timid and minimalist approach where preservation of the status quo inhibits the enhancement of safety. Through an aggressive approach, we will seize this opportunity to set safety, via risk-management, in its proper place for every important issue.

To put the above in perspective, I will be very blunt. The TMI-2 failure was unacceptable and nothing comparable to it must be allowed to occur again. There is no doubt that the NRC (and its predecessor the AEC), with its preoccupation with Large Break LOCAs, contributed to the TMI-2 accident. We cannot allow the unrealistic conservatism of the past to constrain our ability to manage the real challenges of today and tomorrow. No, we cannot allow an event like the TMI-2 accident to go forward. There must be a healthy, rigorous, and constructive dialog about how to achieve improved safety, pragmatically and realistically, and then there must be a willingness to make the changes that implement it. That is what our responsibility to the American public demands.

Ladies and gentlemen of the probabilistic-risk and safety-assessment round table we know what to do. Let's do it!