



# NRC NEWS

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## Challenges and Opportunities in a Risk-Informed Environment

The Honorable Jeffrey S. Merrifield  
Commissioner  
U.S. Nuclear Regulatory Commission

at the

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*This text contains Commissioner Merrifield's prepared remarks. Please note that the remarks were delivered by Mr. Jim Dyer, Regional Administrator, Region III, and should be used with the understanding that some material may have been added or deleted during actual delivery.*

### Introduction

Good Morning. Thank you very much for the opportunity to speak to you today. It is a pleasure to be here.

I would expect that the first question many of you may have this morning is, who on God's green earth came up with the brilliant idea of asking a lawyer to keynote a conference on probabilistic safety assessment. The short answer is George Apostolakis. Seriously, I am not here to engage you in a detailed technical discussion on aspects of PSA. However, there should be no doubt that I fully understand the policy and regulatory aspects associated with it.

Some of my peers in the legal field, especially those who are more renowned for their ambulance chasing skills see risk as a good thing and have become quite wealthy as a result of it. Others such as corporate or environmental attorneys, see risk as a bad thing and believe it is an issue that should be carefully managed and avoided. I hope to convince you that risk should be looked at from both

viewpoints - a thing that if managed well can reap financial rewards and if managed poorly can have devastating financial implications. I also hope to convince you that communicating our efforts to manage risks and risk-informed regulations needs to be conducted in an accurate and responsible manner.

So, today I would like to focus on three areas:

- 1.) First, I will discuss some of the recent NRC accomplishments in a few key risk-informed areas.
- 2.) Second, I will discuss my observations on integrating risk in nuclear plant daily operations.
- 3.) And third, I will share with you my perspective on the NRC and industry roles as communicators of our risk-informed initiatives.

### Accomplishments

First, I will turn to our accomplishments.

When the NRC embarked on creating the new Reactor Oversight Process (ROP) in the late 1990's, the safety performance of the nuclear industry was improving, but the method for gauging licensee performance - predominantly by measuring regulatory compliance, was outdated. We were finding that the process that had served us well for so many years was no longer up to the task. It was extremely subjective and it was too dependent on the judgement of our individual inspectors. In many cases, our inspectors were spending too much NRC and licensee time on non-risk significant issues and too little time on truly risk significant issues. This led some inspectors to drive licensee corrective action programs in a manner that was not risk-informed, and frankly, not necessarily in the best public interest.

Something was missing, and that something was a more objective, timely and predictable process for providing oversight of licensee performance which incorporated risk insights. The new Reactor Oversight Process that we implemented in 2000 was a significant improvement in our ability to identify significant performance issues and ensure that licensees took appropriate actions before plant performance became unacceptable. I believe that the integration and evaluation of performance indicator data with risk-informed inspection and assessment findings are a significant improvement to the overall program, and has enhanced our oversight.

One important challenge that I see facing us now is the improvements that must be made to the risk tools we provide to our inspectors at the plants. One of these tools is the risk informed phase 2 screening process outlined in the risk-informed inspection notebooks. These notebooks are integral to the significance determination process and incorporate plant specific risk information that helps our inspectors assess the safety significance of individual findings. Right now, this process is cumbersome and in many cases the results are untimely. We must continue to improve on the initial version of the notebooks by completing a benchmarking process for each operating plant. In addition, we must accelerate and benchmark our Standard Plant Analysis Risk (SPAR) models which are a more detailed analysis tool for performing independent evaluations of events and proposed plant changes. I believe that these improvements will help to resolve inconsistencies in the program and thus eliminate regulatory instability and unpredictability. Based on recent information I have been provided, I am confident the staff will complete benchmarking of the SDP notebooks and SPAR models by the end of 2003.

Another important accomplishment for the agency was the completion and issuance in 2001 of the South Texas Project request for exemptions from certain requirements in Parts 21, 50 and 100 termed special treatment requirements for structures, systems and components (SSCs). These special treatment requirements include specific inspection, testing and quality assurance programs that are intended to ensure the quality and reliability of SSCs that are safety-related or important to safety. South Texas Project went through a rigorous review process to determine which SSCs were of low safety significance and then submitted requests to exempt them from certain regulatory requirements. This review process involved categorizing or “binning” these SSCs and treating them differently consistent with their categorization. To accomplish this categorization, our staff and the staff at South Texas Project relied heavily on a comprehensive PRA combined with deterministic insights. This review confirmed the need for robust categorization and a sound PRA. Granting these exemptions represents a significant step forward for our Agency and demonstrates our commitment to risk informing our regulations.

In my view, the lessons learned from the South Texas Project effort have played a significant role in shaping the proposed rulemaking for what we call our Option 2 risk initiative. The purpose of Option 2 is to revise 10 CFR Part 50, to reduce the special treatment requirements of low risk-significant safety-related equipment at our plants. The proposed new rule, which will be contained in 10 CFR 50.69, would adopt an approach similar to the one at South Texas Project and would allow a licensee to undertake categorization of its SSCs using risk insights and adjust treatment requirements based upon their resulting significance. Under this approach, a licensee would be allowed to reduce special treatment requirements for SSCs that are determined to be of low safety significance and would enhance the requirements for SSCs that are found to be safety significant.

Unfortunately, this is a lot easier said than done, and because the proposed rule and supporting guidance must accommodate all licensing bases and all current or future designs, this has been a slow and difficult rulemaking process.

It is important to note that this rulemaking effort, while intended to ensure that the scope of special treatment requirements imposed on SSCs is risk-informed, it is not intended to allow for the elimination of SSC functional requirements, or to allow equipment that is required by the deterministic design basis to be removed from the facility. Instead, by restructuring the regulations to allow an alternative risk-informed approach to special treatment, this rulemaking should enable our licensees and our staff to focus their resources on SSCs that make a significant contribution to plant safety.

Another significant risk initiative underway at the NRC is referred to as Option 3 which is our effort to risk-inform the technical requirements of 10 CFR Part 50. As part of our Option 3 efforts we first went about revising 10 CFR 50.44 which defines requirements for combustible gas control, principally hydrogen, during certain postulated accidents. As many of you are aware, the staff published a proposed rule change to 50.44 in August of this year. The proposed rule change would eliminate the requirements for hydrogen recombiners and hydrogen purge systems and relax the requirements for hydrogen and oxygen monitoring equipment to harmonize the treatment with their safety significance.

50.44 was expected to be the “low hanging fruit” of this effort. As the staff and industry have subsequently found, this fruit is difficult to pick. Nevertheless, I believe we are moving in the right direction. I believe the revised rule will accomplish the objectives of making the Combustible Gas Rule risk-informed and performance-based.

In addition to our efforts on 50.44, the staff is working to risk-inform 10 CFR 50.46; the acceptance criteria for the emergency core cooling systems (ECCS). It is our most challenging risk-informed rulemaking to date. After all, 50.46 is the backbone of our ECCS regulations for loss-of-coolant accidents. It was based on the conservative assumptions and limited data during its original creation and the past 20 years of operating experience.

The changes being considered focus on providing alternatives to (1) the prescriptive ECCS acceptance criteria that is more performance based, (2) the decay heat requirement based on the 1994 ANS standard, rather than the 1991 ANS standard, (3) the ECCS reliability requirements that are more in line with the frequency of challenges to the system's safety function, and (4) a redefinition of the spectrum of pipe break sizes. I clearly support the research that is being conducted in these areas and I encourage our staff to proceed expeditiously.

However, my philosophy relative to 50.46 is - don't make changes without a well articulated basis because the public will get the impression that the proposed rule lacks a sound technical basis backed by solid research. Let's not short cut the system and try to accelerate the rulemaking as outlined in the petition to develop "enabling language" to redefine large break LOCA. While some may see this as a tempting target to quickly "reduce unnecessary regulatory burden," premature action without a well articulated technical basis implies that we know the answer before we complete the technical studies. Premature action also brings with it greater risks to our efforts to increase public confidence. While I believe we should allow our staff the needed time to resolve the technical issues, I am confident that we are on track to resolve this matter. If we cut corners now - we will potentially erode stakeholder confidence by eliminating the public's opportunity to comment on the final staff position.

The efforts associated with these risk-informed initiatives are very resource intensive for our Agency and I still see a mixed level of interest by the industry. I am optimistic that we can continue to improve many aspects of Part 50 through risk insights. However, I am not convinced that there is enough industry support to justify the cost of making these changes. Given the budgetary constraints we face, it would be foolish to blindly pursue this effort if at the end of the day it will not be met by widespread user support.

### Integrating PRA into your day-to-day operations

At this point, I would like to switch gears and talk about the role of PRA in day-to-day plant operations. As many of you know, during my first four years on the Commission, I had the opportunity to visit the site of all 103 operating nuclear power plants in the United States. During these visits I was surprised by the myriad of ways that our licensees are using PRA insights to manage and operate their facilities. Some licensees integrate risk information into their day-to-day operations for almost all activities, including their maintenance planning and configuration control. They have risk monitors that put risk insights in the hands of operators and work control analysts and they place placards throughout the plant to provide all employees with risk information about the current environment. They also have integrated risk insights into their equipment allowed outage times and surveillance test intervals for the plant technical specifications. At other plants, however, the use of risk insights is in its infancy and it is clear that these licensees do not intend to utilize these insights beyond what is necessary to satisfy regulatory requirements.

Based upon my discussions and observations, I was pleased that a majority of the plant managers believe that risk information improves plant safety and is a vital management tool. Many managers have expressed to me that risk insights have become an integral part of their culture and changed the

way they do business. For those managers, all safety impacts of proposed configuration changes or plant modifications are evaluated in an integrated manner as part of an overall risk management approach. Risk analysis is used to improve operational and engineering decisions broadly by identifying and taking advantage of opportunities to reduce risk. They use risk monitors to determine when systems or components are taken out of service for preventive maintenance or surveillance tests. In these cases, risk analyses complement traditional engineering approaches to support their overall decision-making process. Risk does not solely determine their decision, but it plays a greater role in informing that decision and in many cases it can have an overall positive financial impact. For them, increased use of risk analysis not only improves safe plant operations, but makes economic sense.

My message to those licensees that have fully integrated risk insights, never lose sight of the defense-in-depth principles of Regulatory Guide 1.174 and let risk numbers blind you. Continue to focus your efforts to improve in this area. After all, given the events of the last year, I would be curious to know what risk calculations would have shown for the probability of developing a hole in a reactor vessel head.

At other plants, it is not clear that they use risk information beyond satisfying the regulatory requirements, such as section (A)(4) in the maintenance rule or the Reactor Oversight Process. I think that is unfortunate. As history has shown, not only is this a missed opportunity to improve safe plant operations, but it may also miss potential economic benefits.

My message for these licensees who are not well versed on risk and have very limited use of risk insights - you better get on board. During a recent Commission meeting, Dr. Apostolakis intimated that if licensee's don't have a robust PRA, how can a regulator have confidence in them. He inferred that without a robust PRA, there is a high risk that the probability of reaping the benefits of risk-informed regulation approach zero. I couldn't agree more.

In my view, it is critical that licensees develop and implement best practices for using risk-informed approaches to assess the significance and priority of items in their daily work. Licensees need to develop the appropriate tools to assess the risk implications of their actions. Yet, as more emphasis is put on risk insights and on PRA results in managing the plants, it brings with it the need to have a more robust PRA. While I recognize that this does not come without cost, the scope, level of detail, and quality of PRAs has to be up to the tasks for which it is assigned. Based on my discussions with industry leaders it is clear that the future benefits, far outweigh the associated costs. For those of you who are on the sidelines monitoring our progress toward a more risk-informed environment, I urge you to recognize that the future of risk-informed regulation and risk-informed decision-making is here and now.

### Communication

Now I would like to turn to the third area I would like to discuss this morning and that is the issue of communications and enhancing public confidence. This is a significant ongoing challenge for the NRC, and it is one that I have mentioned in the past and will continue to raise because I see the need for the agency to continuously improve in this area. While I believe we have made improvements, most notably our efforts associated with the ROP and dissemination of information via the NRC web site to our external stakeholders, we have more to do. Overall, we remain reactive, rather than proactive in our public communications approach. This weakness limits our ability to communicate effectively to the public about risk and its implications.

I will repeat the main message of what I said at the 27<sup>th</sup> Water Reactor Safety Information Meeting in 1999, as I believe it is still relevant:

*“We can have the most advanced risk insights, the best science, the leading experts in the field, but if we do not have an effective communication plan, we will fail. The only way the NRC and the nuclear industry will succeed in their efforts to risk-inform our regulations and use risk insights to reduce unnecessary burden is by learning to effectively communicate with the public and our other stakeholders about risk and its consequences. For most of our stakeholders and even some of our staff, risk is an unknown, a black box. Like many issues in science and technology, uncertainty by the public breeds apprehension, and apprehension breeds fear. Other stakeholders including some public interest groups and some members of Congress view our efforts to risk-inform our regulations with skepticism. They see these risk initiatives as just another ploy by the industry and the NRC to reduce regulatory requirements. Nothing could be further from the truth.”*

One minor but relevant example of our communications shortcomings, involves the basis for the proposed rule on 50.44 that I mentioned earlier. In SECY-02-0080 the staff provided the Commission with draft Congressional letters and a draft press release associated with the proposed rule. When I read these documents I was troubled by the staff’s characterization of the reasons for the proposed changes. These documents would have suggested to Congress that the rationale for this rule was merely to reduce unnecessary regulatory burden on power reactor licensees by eliminating or relaxing requirements. However, what was missing, and what I think was vitally important to stress was how we came to our decision. The fact is that this proposed rule is supported by 20 years of research on combustible gas generation and the documented behavior of nuclear power reactors during accident conditions. Unfortunately we failed to adequately explain that we have hard scientific evidence that hydrogen releases stemming from a design-basis loss-of-coolant accident are not risk significant because they will not lead to containment failure. Therefore, relaxing these unnecessary requirements is perfectly appropriate and does not represent a compromise to safety. To me, communication gaffs like these are unacceptable.

It is imperative that the NRC and industry discuss risk in a manner that brings greater understanding and confidence to our community of stakeholders. We must demonstrate that risk-informed regulation in no way represents less of a commitment to safety. In fact, it represents an even greater commitment to safety because it allows the NRC and our licensees to focus our resources on the most risk significant issues. The cumulative effect is that minor communication issues can lead to a decrease in public confidence. The ball is in our court. If we are to reap the tremendous benefits of our improved risk expertise, we cannot take shortcuts in the area of communications.

### Conclusion

Theodore Roosevelt once said, “In any moment of decision the best thing you can do is the right thing, the next best thing is the wrong thing, and the worst thing you can do is nothing.” The success of our risk-informed initiatives is dependent upon the decisions we make today in support of these efforts. To those of you who are actively involved, I must say that over the past several years we have become more risk-informed, we have reduced unnecessary regulatory burden and we have brought greater objectivity to our regulatory processes, but more work remains to be done. The regulations can be strengthened and resources allocated to ensure that they are focused on the most risk-significant equipment and activities, and ensure a consistent and coherent framework for regulatory decision-

making. To those of you who have been waiting on the sidelines, I'll reiterate what I said earlier, "I urge you to recognize that the future of risk-informed regulation and risk-informed decision-making is here and now."

I want to thank you again for the opportunity to share my views with you this morning and I hope you all have a successful conference. I would be pleased to answer any questions you may have at this time.