



NRC NEWS

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KEEP YOUR EYE ON THE GOAL

by

The Honorable Greta Joy Dicus
Commissioner
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at the

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Introduction

Good morning everyone.

I'm pleased to be given the opportunity to again participate in the Nuclear Safety Research Conference. To those of you who have been to previous Conferences, welcome back. To those of you here for the first time, I hope you find the Conference insightful and informative enough to see you again in coming years. Let me also extend a warm welcome to our foreign guests who have come from afar. Many of the issues faced by the nuclear industry and its regulators today, whether they be the need to improve security, extend or renew licenses, or develop and license advanced reactors, are multinational rather than national issues and this Conference presents a unique opportunity for us to share ideas and information.

In addition to the Conference, I hope you take the opportunity to enjoy the fine Fall weather in Washington, D.C., as it generally doesn't last long. Also, I'm sure many of you have recently reflected on the events of September 11th, so I hope you will have time to visit some of the monuments and museums in the city that commemorate the strength of the human spirit.

While I sincerely hope that you benefit from your attendance here, I must admit that we have selfish motives as well. As you all well know, the NRC continues to face regulatory challenges.

Effectively meeting these challenges requires a sound technical basis for our actions; and that requires meaningful research. One of the criteria the NRC uses for evaluating research projects is whether there has been “competition of ideas” in selecting the direction and approach for the research. This Conference provides a forum for such “competition of ideas,” and your active participation in this week’s discussions and the new ideas and information which you bring to the table will help shape the NRC’s research activities for the future.

The panel discussion later this morning addresses NRC’s risk informed initiatives, so I thought I’d use this time to talk about how research can help us keep our eye on the goal of becoming more risk informed. Specifically, I’ll talk about:

- How our use of risk information has evolved;
- The benefits we’ve seen from using risk information; and
- The role of research in our current and future risk-informed activities.

NRC’s Use of Risk Information

The NRC’s evolution to a more risk-informed regulatory approach is one of the most significant changes occurring at the NRC and it is a change which permeates many of our activities.

Let us take a brief walk through history.

When the NRC, then known as the Atomic Energy Commission, first started licensing nuclear facilities, we used a "deterministic" regulatory approach. This approach included:

- The identification of possible accidents, called maximum credible accidents or design basis accidents;
- An assessment of those accidents using conservative assumptions; and
- A comparison of the accident assessments to prescribed acceptance criteria.

Our role as a regulator was then, as it is now, to assure ourselves that these nuclear facilities could operate safely before issuing a license. Partially because of a lack of operating experience with these facilities, underlying our deterministic approach was a “what-if” mentality which caused us to ask such questions as: “What if this piping breaks?” and “What if this pump fails?” This exercise led to requirements for multiple barriers to control the release of radioactivity and to provide a redundant means for mitigating possible accidents. This came to be known as the defense-in-depth philosophy which remains a foundation for our regulatory system to this day.

I note that even at these early stages, risk was considered, albeit in a qualitative fashion. The concept of a maximum credible accident implicitly contains a probabilistic aspect, and the concept of redundancy provided a simple way to ensure that systems would have a high probability of working when called upon to do so, and to perform as designed and intended. I believe that this approach has served us well. Nonetheless, one would hope, and I believe, that we’ve gotten smarter since we licensed those first facilities. We now have over 40 years of operating experience from which to assess equipment reliability, and more than 25 years of experience in the development of probabilistic risk assessment (PRA), stemming from the Rasmussen Report of 1975. PRA can provide a quantifiable measure of safety and, as such, is directly related to the fundamental purpose of our regulatory system. As a result, in 1995 the NRC adopted a policy to promote the use of PRA to the extent practical to complement our deterministic approach.

I emphasize, however, that our aim is to use risk insights to complement, not replace, the existing deterministic approach. We have taken this direction in recognition of the uncertainties in PRA analysis and the reality that we cannot impose a wholly new regulatory system on the currently licensed facilities. This complementary aspect explains why the NRC refers to its activities as being "risk-informed" and not "risk-based." We do not intend to jettison the existing regulatory system, but instead use risk insights to make it more realistic, efficient, and effective.

By design, we incorporate risk insights into our regulatory system carefully and deliberately. Some would say too deliberately, but I disagree. As we have developed risk-informed regulations and regulatory practices, we have invited the public to comment so that we can benefit from a broad range of external views. As we consider new risk-informed improvements, we hold public workshops, meetings, and conferences such as this, with all of our stakeholders. And as we continue to evolve toward a more risk-informed regulatory system, we will continue to desire informed input from all stakeholders, both within the United States and internationally. Only in this way can we be sure that our decisions on the use of risk information are transparent, well informed, and fair.

The Benefits of Risk-informed Regulation

I believe that there are many benefits to incorporating risk insights into our regulatory system, the most important of which is that it focuses our attention on the areas of highest safety significance and results in more realistic regulatory decisions. As our primary mission is to ensure that nuclear facilities can operate safely, it is vital for us to best understand what is safety significant and what is not.

In addition, the use of risk insights supports the reduction of unnecessary regulatory requirements. For example, recent risk-informed initiatives concerning in-service inspection and testing have allowed licensees to focus their resources on highly risk-significant systems and components, while systems and components that are less risk-significant, although not ignored, receive a reduced focus.. Similarly, the improved standard technical specifications reduce the burden on both the licensee and the regulator without adverse risk impacts by generally allowing more appropriate surveillance testing and longer times to correct problems before requiring a plant to change modes. These allowances help to reduce the number of unnecessary scrams, power reductions, and plant shutdowns. Ultimately, these activities serve both to reduce needless cost and to increase safety. The value of these activities is demonstrated by the number of licensees who have chosen to implement these risk-informed initiatives. Of the 103 operating nuclear power plants in this country, risk-informed in-service inspection has been implemented at 43 units, risk-informed changes to technical specifications concerning allowed outage times have been implemented at 41 units, and standard technical specifications have been implemented at 63 units.

Lastly, but certainly just as important, a risk-informed regulatory approach improves communication among the NRC, the nuclear industry, and the public. The careful consideration of risk allows for a systematic and principled examination of the foundations for our regulatory actions. This can enhance public acceptance because the reasons for and benefits of regulatory change are more transparent.

These benefits have been realized for the risk-informed initiatives we have already taken, and they continue to be a motivator to seek additional ways in which to incorporate risk insights into our regulatory system.

The Role of Research

Now, the question remains, what is the role of research in all of this? Our regulatory research program goal is to improve the agency's knowledge where uncertainties exist, where safety margins are not well characterized, and where regulatory decisions need to be made regarding emerging challenges, whether they be safety issues at current facilities or licensing issues for new technologies. I maintain that each aspect of this goal contributes to our becoming more risk informed. If you take PRA, in its simplest form, to mean having a better understanding of possible consequences and the likelihood of those consequences, then it becomes clear that most research activities contribute to such better understanding. Thus, the meaningful research that we conduct, and the knowledge that we gain from it, is the foundation upon which we build any and all of our risk initiatives.

However, in a world of diminishing resources, I believe the true challenge for the research program is to keep its eye on the goal of becoming more risk informed. I believe a central component of this challenge is to determine how to best balance research activities between the broad categories of confirmatory or anticipatory research, or, if you'll allow me to put my spin on it with my assurance that these labels are not meant to be pejorative, I label confirmatory research reactive research, and anticipatory research proactive research.

Reactive Research

We all recognize from history that the issues which confront the nuclear industry, and us as its regulator, are not static. As old issues are resolved, new ones arise to take their place. The most striking example of this has been the recent reactor vessel head degradation found at Davis Besse. If this event tells me anything, it tells me that our regulatory process is still by most measures reactive and that, consequently, our research activities are reactive. This is not necessarily bad. The word reactive is not that far removed from the word responsive, and history also shows that our Office of Research and the NRC have responded successfully to address issues as they have arisen. Most recently, I believe that the research program has responded admirably to the event at Davis Besse, as well as to the challenges faced by the NRC from the events of September 11th. I also believe it has been appropriate to give these activities high priority and that increasing our knowledge of the likelihood of a loss-of-coolant-accident at Davis Besse, and increasing our knowledge of the possible consequences of commercial airliner impact on nuclear facilities are important and contribute to our goals of becoming more risk informed.

However, the challenge I issue to you is to know when to stop; to know when the resources being spent to increase our knowledge in these areas could be better spent increasing our knowledge in other areas, areas which we know little about. This challenge arises because it becomes comfortable and even desirable to work on these issues. The work is high profile; the benefits are tangible; and the feedback is positive. However, I liken it to children rushing to the soccer ball in a soccer game; the individual children feel good for the moment because they're close to the ball, but over time the team suffers because of it. The NRC is also a team, and while I believe in the importance of research involvement in these issues, I believe research can better support the team, and keep its eye on the goal of becoming more risk-informed, by stepping away from the ball and taking a look at the whole playing field.

Proactive Research

This look at the whole playing field allows us to have a well-informed plan of where we want to go and allows us to target research, proactive research, to get there. The Commission's policy statement promoted the use of PRA to the extent practical to complement the existing deterministic approach, so we've set the stage for where we want to go. Now, we just need the plan to get there.

I believe our Office of Research is uniquely qualified to take such a broad look, to develop the plan, and to identify the necessary research to implement the plan. The benefits of this are many. First and foremost, it allows us to better control our own destiny. While I applaud the industry's efforts at promoting risk-informed initiatives, I believe the NRC should strive to lead these activities to better ensure that we continue to move towards our desired goal, a more-risk-informed (versus risk-based) regulatory system. The event at Davis Besse tells me that this is the right goal and that our regulatory process must always value defense-in-depth and adequate safety margins.

Additionally, proactive research allows us the luxury of time to thoroughly identify issues, appropriately prioritize those issues, and creatively solve them in the most efficient and effective manner. This less frantic pace should also allow us to better coordinate with industry and international research efforts to ensure that we're getting the most for our available research dollars.

Finally, proactive research better prepares us for the future. By knowing where we want to go, knowing our plan to get there, and knowing that we're following that plan, we're better able to respond and adjust to the new issues that are sure to arise.

However, I recognize this is not easy to accomplish. As I previously mentioned, reactive research can be seductive because of its high profile and tangible benefits. Determining the best balance between reactive and proactive research activities requires constant vigilance and open ears, eyes, and mind. Your challenge is to continuously and objectively evaluate the benefits of both reactive and proactive research activities in light of our desired goal and determine which research projects are most beneficial to the agency and which research projects can be stopped or not undertaken at all. Only in this way can you keep the agency moving towards our desired goal. Failure to do this will result in unnecessarily drawn out reactive research activities and will slow our travel towards our desired goal.

Conclusions

To conclude, I want to reiterate that our regulatory system has served us well but can be improved through risk informing. I believe that our goal of risk-informed versus risk-based is the right goal and that our regulatory system must always value defense-in-depth and adequate safety margins. I believe that our previous research activities have provided us with the foundation for all of our current risk initiatives, and that our research activities will continue to play an important role. While this is true for both reactive and proactive research activities, I believe it is the proactive research activities which most effectively move us towards our goal of a risk-informed regulatory system. So, in our world of diminishing resources, I believe the true challenge for the research program is to balance proactive and reactive research activities to keep us moving towards the goal of becoming more risk informed

Using some Engineering 101-speak, research can either be the "forcing function" which drives us towards our goal, or the "limiting reaction" which slows us down. Keeping your eye on the goal will ensure that you're the former and not the latter.

Thank you for your attention and I would be pleased to answer any questions you might have at this time.