



# NRC NEWS

**U.S. NUCLEAR REGULATORY COMMISSION**

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## **Prepared Remarks for**

**The Honorable Gregory B. Jaczko  
Commissioner  
U.S. Nuclear Regulatory Commission**

**at the  
NRC Regulatory Information Conference  
March 11, 2009**

### **“Learning the Right Lessons”**

This is my fifth opportunity to address our Regulatory Information Conference. Each year I use this talk as an opportunity to address big themes and how they apply to the specific challenges of nuclear safety regulation.

This year I would like to focus on the most important lessons we need to learn from past success to meet our mission of providing an adequate assurance of public health and safety. I would like to begin with an example of how we use information, and as Cambridge, Massachusetts, is a center of reason and thought, I will begin there today, even though that is hard for me to acknowledge as a graduate of an Ivy League institution located in a different city.

I am not sure how many of you listen to that unique source of wisdom known as the NPR’s Car Talk radio show, but yes, it is produced in Cambridge. Each week the show features a thought experiment known as the ‘puzzler.’ Last month’s logic puzzle was set during wartime and went something like this:

An air force flight operations chief begins a debriefing by asking airmen who just returned from a costly mission in which many planes were lost, “From what direction were you attacked?” Without hesitation, the reply was, “From above and behind.” The flight operations chief hastily scribbles the information on the back of top secret maps, and hands it to a junior officer with the instructions, “Get this information to the departing air crews. It may save their lives!” As the officer turns to leave, a more senior officer from the back of the room booms out: “Hold that order. The information you’re about to give may not save any lives at all.”

What did the senior officer know that the flight operations chief didn't? The surviving airmen answered that they were attacked from above and behind. But they survived. They were taking evidence of past success – the pilots who got home safely – and trying to predict future success. Why doesn't this approach work? Because the pilots who made it back successfully dealt with the attack on them. Those weren't the fatal attacks. The fatal attacks were from some other direction, and those pilots didn't have any advice to offer because they did not make it back.

The point of this story is that evidence of past success should not necessarily be used as a basis for predicting future performance. The successful pilots thought they had all the information they needed to help their colleagues be successful, when in fact they did not. The result of this type of thinking – using evidence of past success to try to predict future success – is a type of complacency that can be found throughout the history of nuclear power, from Three Mile Island to Davis Besse.

I think it is important to set the stage for today's discussion by looking at the status of the NRC. So before further elaborating on this theme of complacency, let me talk about the NRC's best weapon against it – the NRC staff. There has been dramatic change at the agency during the last four years, including a ramp-up in staff, budget, and office space. I mentioned some of these statistics in a speech last month but I think it is important to revisit them for this audience.

When I first joined the Commission four years ago, the NRC had a smaller staff, a much smaller budget, and headquarters consisted of two buildings. Since then, we have seen a dramatic twenty-five percent growth in the number of employees, the size of our budget has grown by fifty percent, and we have created two new offices. We have also been forced to rent space in four new interim buildings around Montgomery County. Even more dramatic, almost half of our workforce has been at the agency for five years or less.

Why is that significant? In concrete terms it means that most of our staff joined the agency after September 11, 2001. Most were not at the NRC when the Davis Besse vessel head cavity was discovered in 2002, let alone during the Three Mile Island accident in 1979. This makes knowledge management tremendously important.

Now, I do not want anyone to get the wrong impression. We have excellent and dedicated staff. The people who come to the NRC have top-notch educations and diverse and impressive professional backgrounds in industry, government, and science.

Take one small branch in our security office that assesses threat information for the agency as an example. These seven folks have well over one hundred years of combined experience in military, intelligence, and law enforcement fields. They have worked at the U.S. Secret Service, the Army, the Defense Intelligence Agency, the U.S. Coast Guard, the CIA, and the newest member of the office served in Iraq. Such staff is selected and hired for the expertise they bring to help the agency ensure nuclear materials are adequately secured. Similar levels of expertise are repeated in offices around the NRC by staff with both agency and external experience.

The demographic changes we have gone through present us with the challenge of taking advantage of the ability these new employees have to look at issues from a fresh perspective to make us even better, while making sure all our staff continues to understand the lessons that were learned from the past. This makes it crucial to have written documentation for use in our safety work – clear regulations and guidance documents. This is important not just for the public and for licensees to clearly understand the requirements, but also for the NRC staff who are asked to oversee and enforce them.

I would note the good work the staff has done over the last four years after the Commission directed them to update guidance documents and standard review plans. The staff has updated 248 sections in all 19 chapters of the Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants or NUREG-0800, with less than 20 sections left to go. We have also updated all of the agency's regulatory guides needed to support applicants' new reactor licensing efforts, but more than 200 other regulatory guides are not yet completed and the schedule to finish those has slipped. These updated tools are even more important now, and we need to prioritize the resources for that work.

So what should our staff be doing to stay focused on safety? Not be complacent. Not take false comfort in calculations. Not ignore seemingly unlikely events.

This is the real lesson of the puzzler I began with. This is also the real lesson of Davis Besse, which took the NRC and industry by surprise. The NRC and industry had previously recognized the potential for nozzles to experience some cracking but in spite of that knowledge, Davis Besse happened anyway. That is partially because we were resting on past evidence to tell us it could not be an immediate safety concern and we got complacent. Unforeseen events with potentially very bad consequences are always possible and could happen over time.

When we think about the lessons learned from Davis Besse, we think of incremental improvements to ensure we do a better job of inspecting and ensuring regulatory compliance. But the real lesson of Davis Besse or even TMI is that we must never get complacent. Neither event was thought to be probable, or significant, until the very moment when they happened. This reinforces the importance of doing our jobs, not relying on past evidence of success and always being on the lookout for new problems.

One specific area where we can make additional progress is the Reactor Oversight Process, which is a good oversight tool. We can do so by improving performance indicators. When we look at performance indicators and see more and more 'green' results, we can draw one of two conclusions: either everything is working well and there are no issues to be worried about, or, alternatively, that the usefulness of specific indicators is declining. I think we have a duty as regulators to consider both possibilities. We have an obligation to make sure performance is consistently high and not just that it is being tuned more finely to the indicator itself. If actual performance is being maintained, then a whole host of indicators should show that. To ensure that is the case, we should develop a new set of performance indicators. They should include a spectrum of indicators used on a rotating basis to give us a better understanding of actual plant performance.

An example of what I think we should do involves the Mitigating Systems Performance Index indicator, which went into effect in early 2006 as a new way to measure the availability of mitigating systems. This indicator has provided more than triple the greater than green findings in the two years after implementation, compared to the same cornerstone two years before – 68 vs. 20 findings. This indicator provides an example of the value of meaningful performance indicators to help make sure we aren't making the wrong conclusions about the successes of past performance.

A broader solution to the fight against complacency is to focus on safety culture and I am glad to see the Commission making progress. This is a topic I have been focused on for a long time. In fact, regular RIC attendees may note that it has featured prominently in all four of my RIC speeches, including the first one in 2005 when I called for the integration of security into the safety culture concept.

Referring back to the puzzler for a moment, the individual who expressed concern about the value of the information the returning pilots possessed demonstrated a healthy safety culture. The NRC has a number of initiatives underway to strengthen this type of culture. We have added attributes of safety culture to the ROP, and more broadly, we are now developing a policy statement that will lay out our expectations for a healthy safety and security culture at all NRC licensees. The staff has worked with a broad group of stakeholders on this, as well as on the internal NRC safety culture initiative I strongly believe in, and I am pleased with the progress so far. These safety culture exercises will come together to give us a definitive understanding of what the NRC should be doing in the area of safety culture oversight.

Of course, I could not give a RIC speech without talking about fire protection at nuclear power plants. In fire protection, we have an example of actual evidence of past problems back all the way to the Browns Ferry fire in 1975, that are still in need of a transparent solution.

I am sometimes asked why the Commission cares about this issue, and my simple answer is 'because according to our analysis, fire is a significant contributor to the overall risk of core damage at a plant.' To stretch my opening analogy even further, fire protection is like the plane that got shot up very badly and barely limped back to base. It can actually teach us lessons about failure that can be useful, and fire protection has many of those lessons to share about challenges that need to be resolved.

We have made some progress on the fire barrier issues, we are working on a database of exemptions to be completed this year, and the staff has a fire protection closure plan in the works. We have even discovered what I believe is the ultimate solution but we have not yet given the order to implement it. Therefore, we need to all recognize the reality that NFPA-805 is the only way to finally resolve the fire protection issue. It is the only possible success path to fully resolve issues associated with operator manual actions and fire induced circuit failures. I am glad to see that many licensees have recognized this but unfortunately not all have.

In fact, I often hear about the industry's interest in more performance based, risk-informed regulations. Yet, NFPA-805 is a performance based, risk-informed rule and yet 56 out of 104 plants are not pursuing it. Part of the issue is that probabilistic risk assessment models for fire are not complete. This is one of the lessons of NFPA-805 – we must have the PRA tools in place first. I do not believe it is the most effective use of agency resources to focus on risk informing our regulations when there is more work to be done on that risk assessment infrastructure.

This brings me to a few items in the area of new reactors I would like to discuss. One tremendous success in this area is the Commission's recent decision to provide clear direction about how new plant designs have to deal with the threat of a commercial aircraft crash. With this new rule, I believe the Commission has resolved most concerns the aircraft threat poses for both the existing reactors, which had a focus on mitigation, and any new plants which will have to focus on design improvements. The Commission that was in place following September 11, 2001, especially Chairman Meserve and Chairman Diaz, deserves credit for ensuring the agency developed the technical information that made these policy decisions possible.

Finally, I'll touch on an area of new reactors in which I do not think we have fully learned the lessons of the past. The Commission made a strong effort to learn lessons from processes that did not work – so much so that we flipped the application process from 'build first and then license,' to 'license first and then build.' This greatly lessens the financial risk involved but unfortunately applicants have not used this process as intended.

At the heart of this change was that the key to success is having completed designs done early. But we are right back into a situation where we have incomplete designs and less than high quality applications submitted for review. The very first application we received was on hold for a year and a half during which time we could only do minimal work on it. In fact, the NRC had to withdraw the hearing opportunity because that applicant was not ready and the agency was only able to re-notice it last month. Even today, almost a fifth (3 of 17) of the COL applications we have received are on hold at the request of the applicants themselves. Vendors are revising four of the new plant designs.

The temptation is to plow on anyway and conclude that if plants got licensed in the 1960s and 1970s under less than ideal conditions, it won't be the end of the world if the current process begins to look more and more like that one. But everyone would be better served by focusing on the lesson of all those plants that never got built and concentrating on getting designs completed first. Of course, it is up to licensees to decide which process to follow. The Commission made it clear, however, that if licensees choose not to follow the new Part 52 process of referencing an early site permit and a certified design in their applications, they do so 'at their own risk.'

I challenge the industry to focus on those projects that are most likely to go forward and get their design and environmental work done, so that success can be used as a model for others to follow. And in that context, I would like to acknowledge our staff who have shown dedication and flexibility in responding to this rapidly changing new reactor environment.

The challenge I would issue for everyone in this room going forward is to continue to work to minimize risks, never rest on success, and always be on the lookout for new information and for the unexpected. Each of us should be focused on both the safety issues we know about today as well as the search for tomorrow's safety issues we have not yet discovered. What safety issues will we be talking about at next year's conference? Will it be something new in digital instrumentation and control? Materials degradation? BWR sump screens? We must think about these things now and not get complacent. We must not assume we know everything there is to know.

For the NRC, we should recognize that we will continue to have to make hard – and sometimes unpopular – decisions. When we deliberate about those decisions, we should do so by transparently engaging all members of the public. We must understand society's current level of acceptable risk to ensure our adherence to the agency's mission. Once we have done that, we have a responsibility to decisively implement and enforce safety standards.

Thank you, and I look forward to answering your questions.