Commissioner Stephen G. Burns Remarks
Advanced Reactors Technical Summit IV
February 8, 2017

Thank you for that introduction. It's a pleasure to be here today as part of this discussion of advanced reactor technologies, and the industry's interface with the federal government and in particular with the Nuclear Regulatory Commission.

This summit focuses on innovation in the nuclear sector: assessing the promise of advanced reactor technologies and the pathway to their deployment. Better, faster, easier, cheaper – those are goals long sought in technology and industry since the dawn of the Industrial Revolution and into this post-industrial age. In industries and products too numerous to mention.

But it does seems that at no other time in history has innovation been so accelerated, with such sweeping potential to simultaneously improve, imperil and fundamentally change society and the world. Or as Bill Gates said: "Never before in history has innovation offered promise of so much to so many in so short a time."

So what do we regulators have to do with innovation? Regulators, by design, work methodically, consider all aspects, are skeptical, challenge assumptions, question data. That is the NRC's job. Our job is to focus on "adequate protection" and "reasonable assurance" for nuclear material as we determine how much risk is acceptable to communities.

This balancing act – what I have called the regulatory craft, a term I appropriated from a book written by Professor Malcolm Sparrow – is vital for the NRC to master. That is particularly so in an age of innovation – as small modular and advanced reactor designs are possibly on the horizon. We can regulate appropriately without stopping progress. But we cannot abandon our mission and step aside.

The regulator must regulate for the protection of the communities around nuclear facilities, with a recognition that an accident anywhere is a blow to public confidence everywhere. We need only look to the accident at Three Mile Island to see this in action. Said Ed Frederick, once a reactor operator at TMI, during a 30th anniversary presentation: "You don't want to be standing in front of a group like this almost apologizing for the mistakes that you made 30 years ago and that are still affecting people in the community that was greatly injured even though no one died or no one was over exposed."

So while the NRC focuses on the safety of communities, our critics, of which there are many – even some in this room – often focus their unhappiness on two areas – time and money. As in – why does it take so long and why does it cost so much.

Let me address the topic of time first.

Our experience shows that the time to complete the review of a new design is dominated by the completeness of the application and the applicant's ability to address issues raised by the staff during the review. Too often, some technical staff believe, the NRC has accepted applications that were not sufficiently complete for us to conduct the full review, and that has brought significant delays. By contrast, in one ongoing review, where we insisted on a more complete application before beginning the review, we and the applicant are on track to complete the review in a bit less than four years.

Let me say here that past performance on some reviews has not be optimal, but as one example of improvement, we have become more disciplined in developing requests for additional information.

Ensuring the safe and secure use of nuclear material to generate electricity has been and will always be the first and foremost consideration in any of our reviews. We can't simply rely on bald assertions that a particular design or technological innovation is "safer" or "accident proof. However, novel and innovative designs may yet prove to be both, and we do encourage designers to bring us designs and features that can support our basic mission in even better ways. The agency technical experts have looked carefully at what we believe is the minimum time needed to conduct a review, and we believe that with a high quality application, where all policy issues are settled before entering into the review, the review and associated rulemaking could be completed in as short a time as 39 months.

We do know that reviews have taken longer, in some cases much longer, that 39 months. We have to understand why that might be so. Sometimes the applicant may ask for delay, or ask for a slower review. For example, in the case of the design certification review for the U.S. Advanced Pressurized Water Reactor or APWR, Mitsubishi Heavy Industries informed the NRC in late 2013, of its decision to implement a period of reduced support for the ongoing US-APWR design certification review in order to allow the company to focus its resources on supporting Japanese utilities in restarting Mitsubishi designed PWRs in Japan.

Now for cost. One number that gets bandied around and is particularly annoying to me personally is that it will cost an applicant $1 billion to get an advanced reactor licensed. The actual costs for the regulatory review of a new large light water reactor design have been on the order of $50 million to $80 million. The $1 billion figure includes all of the vendor's research and development, testing and design costs. We believe that in some cases policymakers may be have been intentionally misled on the funding issue.

We expect that for smaller, less complicated designs, the regulatory review costs will be less than $50 million, but that will be strongly influenced by the completeness of the application and the applicant's ability to respond in a timely manner to the staff's questions about the application.

All that said, does that mean the NRC can't continue to be faster and more efficient? No, of course not. We continue to look at our processes, to evaluate our effectiveness, to be flexible in our process when it's appropriate to do so.

The confluence of regulatory standards, new technology, and the nuclear industry has always existed. The industry, unlike many, was born regulated, and from the very beginning, as the vision of the peaceful atom was realized, a strong regulator was deemed essential to ensuring public health and safety through rigorous licensing and oversight. However, beneficial nuclear technology may be, and the international paradigm for peaceful uses, as expressed in the Convention on Nuclear Safety emphasizes not only the operator's ultimate responsibility for safety but also the importance of an independent technically competent regulator. And the fact of the matter is that the push and pull over the efficacy and appropriateness of the licensing process and the focus of the safety review has been with us since the dawn of civilian nuclear energy licensing: from the PRDC case in the late 1950's, to the AEC's 1970s effort to improve the licensing process, to the creator of Part 52 in the late 1980s, to the dialogue we are having today.

So, is the NRC ready to regulate innovative approaches?

The NRC has consistently said, and I shall repeat it here, the NRC could begin reviewing a non-light water design tomorrow. However, we recognize there is a challenge ahead and we are working to address this. Our NRC Vision and Strategy: Safely Achieving Effective and Efficient Non-Light Water Reactor Mission Readiness, which came out in draft form late last year and was recently finalized, is very clear on the path we're taking. One critique is that is goes too slow - it assumes deployment in the 2030s, when some of you many suggest the impetus to deploy new technologies is 5-10 yrs. earlier. But the policy is adaptive, and we are prepared to consider what many came in the door sooner than we may have thought.

One of our key activities is a collaborative effort with DOE to develop Advanced Reactor Design Criteria, which are similar in concept to the General Design Criteria for light water reactors in our regulations.

DOE first prepared a report proposing design criteria and an NRC staff team reviewed the DOE report and developed the NRC's proposed Advanced Reactor Design Criteria. The staff's document was published on the NRC website for informal public comment in April of last year. We just published a Draft Regulatory Guide that for formal comment.

That document notes that both the NRC and our predecessor agency, the Atomic Energy Commission, have significant historical experience with non-light water designs dating back to the first experimental breeder reactor in the 1950s. Yes, that was a while ago, but we've reviewed a variety of conceptual designs at varying levels of detail throughout the decades --- including the Hanford Fast Flux Test Facility, the pebble bed modular reactor and the GE-Hitachi PRISM. The NRC has demonstrated its capability to consider and certify novel design features in both the AP1000 and the ESBWR new reactor designs.

More recently, we've reviewed and approved a construction permit for a new and innovative medical isotope production facility submitted by SHINE Medical Technologies. In all, the NRC and AEC reviewed 20 non-light water reactor projects between 1951 and 2010. We should not forget that three commercial non-LWRs have been built and operated in the U.S. Fermi 1, a sodium-cooled reactor in Michigan; Peach Bottom 1, a gas-cooled reactor in Pennsylvania and Fort St. Vrain near Denver, also a high temperature gas-cooled reactor.

The NRC staff includes many scientists and engineers with years of experience related nuclear technologies. Admittedly, our primary focus has been on light-water reactor technology – after all, that's what the industry has put on our plate. But as new technologies are presented to us, we have shown that we have the requisite technical capabilities, and we have access to the extensive capabilities at the DOE national laboratories. Through our on-staff expertise and our ability to tap resources at the national laboratories, technical expertise is simply not an issue, though we recognize enhancing our knowledge, skills and tools will improve the efficiency and effectiveness of our work.

As most of you no doubt know, there was $5 million in the NRC's anticipated but not approved FY 2017 budget earmarked for new reactor technologies groundwork. Even in the absence of that money, though, the NRC continues to march forward, within available resources, to work with industry stakeholders, communicate with DOE – via GAIN and other mechanisms – and improve technical readiness, regulatory readiness and communication with near-term, mid-term and long-term milestones. Dr. Baranwal will discuss the GAIN initiative later in the day. We were pleased to sign a Memorandum of Understanding with DOE on that initiative. The NRC stands

fully ready to support DOE's identified goal of having at least two non-LWR designs ready for construction by the early 2030s.

Innovations, novel designs, creative thinking, and new approaches to old problems – it's very exciting. The NRC's role is considerably less exciting. That is consistent with our mission and our authorizing legislation, and with principles underlying international law. Public health and safety remains paramount – and is no barrier to innovation but a bedrock from which it can and must proceed. We can and will stay our course. Our roles may be different, but I think we are headed in the same direction.

Thank you for your attention today.