NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

Office of Public Affairs Telephone: 301/415-8200
Washington, D.C. 20555-0001
E-mail: opa.resource@nrc.gov
Site: http://www.nrc.gov

No. S-10-021

"Small Modular Reactors – Challenges and Opportunities"
Commissioner William C. Ostendorff
United States Nuclear Regulatory Commission
Keynote Address
Platts Small Modular Reactors Conference
June 28, 2010
Washington, DC

Introduction

Good afternoon. I am very pleased to be here today. Let me thank Platts for hosting this event and providing this opportunity to talk to you all. I am pleased to see the scope of the agenda and the expertise of the various presenters at this conference.

Today, we find ourselves facing increasing energy demands, concerns with the environment and climate change, and dependence on fossil fuels. These factors, in part, have contributed to this so-called "nuclear renaissance." While the concept of Small Modular Reactors or SMRs is not new, the development and potential deployment of commercial SMRs has captured the interest of the industry and lawmakers. For the industry, SMRs may be an alternative option for the high capital costs of larger commercial reactors and may provide better flexibility for certain electrical grid systems. For lawmakers, SMRs could offer another alternative to help meet our future energy needs in a balanced manner.

What I intend to do this afternoon is to provide a few perspectives on my regulatory philosophy, along with what I see as some of the challenges and opportunities for SMRs. I also want to listen to and respond to some of your questions and comments. It is appropriate that I point out now that my job as a Commissioner is that of a safety regulator. It is not my role to promote the use of nuclear technologies. Our society as a whole will decide whether new nuclear technologies will become reality. That said, I believe that a key aspect of my job is to ensure that the NRC's regulatory framework is clear, predictable and efficient, and does not unnecessarily impede what our society decides.

First Impressions About the Civilian Nuclear Industry

Let me start with some initial impressions I have about the civilian nuclear industry. I have been an NRC Commissioner for almost three months. I came to the NRC with no commercial

nuclear power plant experience. My nuclear experience is in three areas: as a career nuclear submarine officer, as staff director of a congressional subcommittee with defense nuclear oversight responsibilities, and as a former official at the National Nuclear Security Administration.

Since my arrival at the NRC, I have gone out in the field to learn about the regulated industry. I have been to all four NRC regions and to the Technical Training Center. I have visited several operating commercial power reactors, a reactor resuming construction, a research reactor, fuel cycle facilities and materials licensees.

I have been impressed with what I have seen so far – a strong focus on safety and security, technically competent staff and engaged management, and a commitment to continuous improvement. I think the nuclear industry should be proud of its significant improvements in safety in the decades following the Three Mile Island accident. The critical importance of a demanding safety culture to the health of the nuclear industry is highlighted by what can happen when there is a failure. The oil spill disaster in the Gulf of Mexico, a recent gas refinery explosion in Washington State, and the coal mine disaster in West Virginia earlier this year provide important reminders to us all. While the nuclear industry and the NRC should be proud of the excellent safety record, we can never be, and should never become, complacent.

Regulatory Philosophy and Principles of Good Regulation

My reason for getting out to these nuclear facilities is to understand better, with the benefit of on-scene experience, the regulatory issues that the NRC staff and licensees are addressing. Furthermore, the NRC staff briefings at Headquarters and in the regions have greatly contributed to my education on the current issues that I believe are of paramount importance to our Nation's nuclear infrastructure. Such issues include always maintaining our focus on the safety of operating reactors and facilities, the effective and efficient licensing of new reactors and technologies, and the long-term management of radioactive waste.

In my capacity as an NRC Commissioner, I intend to apply what I have learned in over 30 years of service in the military and federal government. Let me elaborate on this point. I am a believer in sensible, well-informed governance to look after our national interests. I am a believer in effective coordination, cooperation, and communication between the public and private sectors. And, I am a believer in taking a strategic approach in the formulation of policies that serve the broader interests of America.

In the period leading up to my confirmation by the Senate, I studied the NRC's principles of good regulation – independence, openness, efficiency, clarity, and reliability. These principles resonate with my own values and beliefs. On my first official day on the job, I issued a memorandum to my personal staff that set forth my expectations that they, both individually and collectively as a team, abide by these principles. Against this backdrop, let me now turn to some challenges and opportunities I see related to Small Modular Reactors.

Small Modular Reactors – Challenges and Opportunities

Back in 1953, Hyman Rickover, the "Father of the Nuclear Navy," wrote Congressional testimony related to the development of a small commercial power reactor by the US Atomic Energy Commission's Naval Reactors Branch. The approximately 60-megawatt pressurized-water reactor at Shippingport was eventually constructed and operated near Pittsburgh, Pa. In his testimony, Rickover made several observations about an "academic reactor" or a reactor that is

being designed on paper. Let me quote some of what he said. "An academic reactor … almost always has the following characteristics: (1) It is simple. (2) It is small. (3) It is cheap. (4) It is light. (5) It can be built very quickly. (6) It is very flexible in purpose. (7) Very little development is required. It will use mostly 'off-the-shelf' components. (8) The reactor is in the study phase. It is not being built now." Let me pause and check with the audience. Might his words in 1953 on the prospective Shippingport reactor have relevance today?

I think some of the SMR designs under consideration share some of these characteristics. The question before this audience is: what will be the practical reality of these SMRs? On the one hand, you have the industry and vendors seeking a high level of certainty and assurance from the federal government that related legislation and regulations will provide for a future return on their investment. On the other hand, you have the federal government looking to the industry and vendors for actions and signals that indicate the existence of a market for SMR technology so that it, and by "it," I refer primarily to Congress, the Department of Energy, and the Nuclear Regulatory Commission, can develop the necessary legislative and regulatory proposals to enable the further development and possible construction of SMRs. This seems a little bit like, which comes first, the chicken or the egg?

As far as challenges with Small Modular Reactors go, I think there are several. I think that you in the audience have been working hard to address many of these. The NRC staff described a number of open policy issues in its recent information paper in March of this year (SECY-10-0034). I found that to be a well-written and insightful paper relevant to both light-water and non-light water designs. Of the issues described in that paper, a few caught my attention as issues where not only the NRC can provide resolution, but also where industry can, and should, be providing input or proposed resolutions for the staff and Commission to consider. Let me offer three such examples.

The first example relates to control rooms. Some of the vendors are seeking changes in control room staffing levels, where one operator would handle up to three modules. While this may be a good business model, there are important technical and safety issues that need to be addressed before seeking to change the requirements in the regulations. We also need to see the control room design and the interface with human factors considerations. We need to understand the accident scenarios that would require operator action and the timing of those actions; and, we need to understand the level of automation in the safety systems. Changing licensing and regulatory policy in a rational, thoughtful manner requires grounding in sound science and engineering. That is something we will also look to the industry and other stakeholders to provide valuable insights.

The second example relates to security. I have been involved in the security of naval nuclear reactors and weapons since the 1970s. I found the idea that the NRC's existing security requirements might be met by changes in the designs for SMRs intriguing. "Substituting concrete for guns and guards" is a catchy phrase. Changes in this area may indeed be possible, but we have to get to the specifics in order for our security experts to consider any potential changes to policy and requirements.

The third example is that of the Emergency Planning Zone size for SMRs. While the existing regulations permit a case-by-case assessment for some designs, the NRC staff is reviewing the technical basis for the existing requirements. Technically justified proposals from industry will go a long way towards supporting the staff's review and any future Commission decisions in this area.

There were a number of other issues identified by the staff whose resolution will benefit by well-thought out proposals from the industry. Issues such as the licensing framework for multi-module facilities; application of defense-in-depth and probabilistic risk assessment (or PRA) in the design; and fee structure, insurance, and liability.

These policy issues raise many questions, in addition to the staffing, security, and emergency planning considerations previously mentioned. There are substantial differences between the proposed concepts for SMRs and the large, light water reactors that the NRC's regulations were based upon. How will prototype reactors be licensed? How will risk insights be used? How do SMRs fit into the Price-Anderson nuclear liability framework? Questions like these are not easy ones to answer. What I can say at this point is that the industry should not sit back and wait for the federal government to find the answers, and vice versa. There needs to be good cooperation, effective coordination, and clear communication between potential applicants and the NRC to identify options and proposals for these policy issues. In this regard, we all need to keep those principles of good regulation in mind as we continue to work together. We already have examples of good cooperation, coordination and communication leading to very effective regulatory programs in the areas of power uprates and license renewal for the operating power reactors.

With respect to the opportunities that I see in SMRs, I think there are several. I will note that these are strictly my own personal views. I think the development of an SMR market creates a healthy competition that will drive innovation, specifically in safety. Many of the designs being discussed are based on passive safety systems, which is a good approach. There is increasing emphasis on proliferation resistance, which is also positive. As these reactors move into other markets, such as markets in developing nations, the emphasis on safety and proliferation resistance will almost certainly increase and the most competitive designs will offer the best options in both areas.

This competition could also help strengthen the US position in the global market and reinvigorate our domestic manufacturing base for nuclear reactor plant components. I believe this aspect to be important so that the United States can continue to play a leadership role in promoting our values in nuclear safety. Lastly, I believe that it makes sense to have several options for meeting our growing energy needs. We are hearing discussion of using SMRs to replace older fossil plants, and of SMRs being attractive to rural electric cooperatives. Some of the advanced reactor designs are being touted as energy sources for process heat applications and to power remote operations, such as remote mining applications. I see SMRs as another option for our nation to consider. Again, society will decide what options are ultimately brought to market.

Conclusion

I have covered the main points that I wanted to share with you. In the interest of leaving time for questions, I will now close. I thank you for your attention and I thank Platts for hosting this timely conference.