NRC NEWS

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Remarks As Prepared for NRC Chairman Dale E. Klein

Global 2007: Advanced Fuel Cycles and Systems

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It is a great honor to be here today. This is my first ANS Global meeting.

Before I begin my remarks, I want to mention that this is a somewhat somber time for us at the Nuclear Regulatory Commission. As you may know, Commissioner Ed McGaffigan died on September 2, after a long battle with cancer. He was a dedicated public servant and believed deeply in the mission of the NRC. His integrity, his forthrightness, and his experience as the longest-serving commissioner in our agency's history, will be greatly missed. But while it is appropriate to grieve the loss of our friend and colleague, Ed himself would have told us that we need to get back to work.

On that note let me mention that I had the opportunity to review the conference program and I am amazed at the broad range of topics that will be discussed, and the many international participants who are here. This is an excellent opportunity for industry, regulators, and policy-makers to explore a variety of global policy perspectives on all aspects of the fuel cycle. I hope that all of us involved in these issues will continue to participate in conferences such as this—to address the myriad technical, political, and regulatory challenges of advanced nuclear facilities. I especially want to recognize the efforts of the American Nuclear Society in the planning and execution of this conference.

Given this meeting's focus on future technology, I am not going to address the tremendous challenges the NRC is confronting with regard to the review, licensing, and inspection of new light water reactors in the United States. Instead, I would like to share my perspectives on some of the challenges associated with the renewed global interest in advanced nuclear technology and what some would call "closing the fuel cycle."

Over the last year, I have had several opportunities to represent the agency and our nation at international conferences and meetings. Such visits have impressed upon me the extent to which nuclear energy is a global enterprise, with countless contributions from a very wide range of

countries. At the same time, such visits are a stark reminder that, while the United States originated much of the nuclear technology in use around the world, there are many situations in which the most modern applications of these technologies are now abroad.

So one challenge that we all face is creating a framework or structure for greater international cooperation.

There are some good efforts already under way, such as the Multinational Design Evaluation Program, which seeks to encourage greater convergence in new reactor designs, codes and standards. But we still have a great deal to learn from each other in areas ranging from construction techniques to reactor safety experiments, to reprocessing and recycling technologies, and to technologies applicable to new plants. The inescapable truth is that we have much to gain from interactions with each other in terms of improving the safety and security of our power reactors as well as nuclear materials. We would all benefit, therefore, from more formal mechanisms for overseeing the nuclear fuel cycle in a way that enhances safer operations around the world.

Another challenge that many of us face involves the disposition of separated plutonium, whether from reprocessing or surplus plutonium from weapons. As many of you know, spent fuel is currently being reprocessed internationally but not in the United States. The United States had a reprocessing program but ceased activities subsequent to President Carter's 1977 decision to defer indefinitely the commercial reprocessing and recycling of plutonium produced in our nuclear power programs due to the proliferation risk. Although President Reagan subsequently lifted this indefinite ban, further commercial reprocessing was not pursued, primarily due to cost considerations. As a result, the United States has limited experience with commercial reprocessing and recycling.

A third challenge, at least here in the United States, concerns the expanding volume of spent nuclear fuel and the need to find adequate storage solutions for high level waste. Currently, the 104 commercial nuclear reactors in the United States produce more than 2,000 metric tons of spent nuclear fuel per year. Under the Nuclear Waste Policy Act of 1982, the Yucca Mountain repository, for which the NRC awaits a license application, is currently limited to 70,000 metric tons of spent nuclear fuel and DOE defense-related wastes. By DOE's own estimate, Yucca Mountain, if approved, would be full almost as soon as it is opened.

One proposal for addressing all of these challenges is the Global Nuclear Energy Partnership, or GNEP. GNEP is intended to develop the systems, technologies, and policy regimes to allow recycling of used light water reactor fuel. It seeks to eliminate, to a large extent, the actinides in fast-burner reactors in a way that enhances proliferation resistance. The resulting waste streams are envisioned to have characteristics that would lessen the volume and thermal challenges for a geologic repository.

I know that GNEP will be discussed in much greater detail by others at this conference. Let me take this occasion to outline some of the regulatory challenges that the NRC will need to address if and when GNEP moves forward.

The first involves the physical facilities that GNEP envisions, which could involve several interconnected (and possibly co-located) facilities: (1) a Consolidated Fuel Treatment Center; (2) an Advanced Burner Reactor; and (3) an Advanced Fuel Cycle Facility. As currently envisioned, NRC would probably be the regulator for the Consolidated Fuel Treatment Center and the Advanced

Burner Reactor, as these would be commercial enterprises. The NRC would also need to be knowledgeable about the development and operations of DOE's research facilities, such as the Advanced Fuel Cycle Facility.

In addition, the interdependence of the facilities, that is, defining how each facility affects the safety, safeguards, quality, effectiveness, and efficiency of the others, will require involvement of multiple NRC program offices. We must ensure that a stable and reliable regulatory infrastructure is in place well before an application is submitted. Our challenge will be to (1) develop a regulatory framework for commercial GNEP facilities, (2) provide guidance to applicants, (3) develop qualified NRC staff to support a timely NRC licensing review, and (4) maintain an effective inspection program. All this, while at the same time, maintaining constant vigil on the operating units.

We also face a monumental task in the review of a license application for a potential Yucca Mountain waste repository. Nevertheless, we stand ready to initiate this review when DOE submits its license application. Low-level waste issues may also present challenges in the future. Without adequate low-level waste disposal sites, the NRC would be faced, in all probability, with assuring that the absence of disposal capacity for such wastes does not translate into unsafe storage of such wastes by generating organizations.

There are also issues involving what might be called the "front end" of the fuel cycle. When the price of uranium fell in the early 1980s, conventional uranium mining production in the United States dropped precipitously. Many conventional mills ceased operations or closed permanently and began decommissioning and reclamation. There is currently one NRC-licensed conventional mill and two mills that have ceased operation but expect to resume operation in the future. There are six in-situ leach facilities that are operating or are licensed to operate. Based on discussion with the industry, the NRC expects a considerable increase in licensing activity, as many as 12 new applications, for both types of uranium recovery facilities in the foreseeable future.

Other challenges are more indirect. For instance, for the NRC to do the work I've described, we must have trained people capable of doing it. Human capital, therefore, is a significant issue for the future development, management and regulation of every facet of the fuel cycle.

NRC has experts in many of the core technical areas needed for licensing reviews of facilities for a spent fuel recycling program, but we need additional expertise in several specialty fields to review the advanced technologies used in a limited recycling facility. Specifically, the NRC needs additional chemical engineers (with a detailed knowledge of reprocessing), actinide chemists, plutonium chemists, and radio-chemists. In addition, nuclear engineers with expertise in transmutation would be required to review fuel recycling facilities. Further, the NRC must also rebuild regulatory capabilities and the underlying scientific base to accomplish a future role in licensure of the fast-burner reactors. We will need to draw on the regulatory experiences in similar facilities, such as La Hague, MELOX, Atalante, and Phenix in France and Rokkasho and Monju in Japan. Other countries have significant operational experience with facilities similar to those proposed for GNEP.

The topics I have discussed do not, of course, exhaust all the issues that may arise. GNEP is an ambitious plan, with ambitious goals. It will require solving a host of technical, political, strategic, and—as I have outlined, regulatory—challenges.

To accomplish that, the NRC will need to work with many partners – in industry, through groups such the Electric Power Research Institute; with other government agencies in the United States, especially DOE; and also internationally, with individual nations and through the NEA and IAEA.

If we act in timely way and a cooperative spirit, we have an unprecedented opportunity to influence the safety and security of new and innovative reactors and other fuel cycle facilities. By working together, we can provide invaluable guidance to the designers and architects of these new facilities on safety and security requirements, and help ensure that safety and security are fully integrated into all aspects of the facilities design and operational characteristics.

Thank you.