NRC NEWS

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S-08-016

Remarks Prepared for NRC Chairman Dale E. Klein

Rensselaer Polytechnic Institute
April 23, 2008

I am always happy to speak before an academic audience, since I consider myself an academic at heart. As a professor, I'm trained to speak in 50-minute increments, but don't worry, I won't speak that long today.

I am on leave from the University of Texas and expect to go back there at some point. This transition between university life to the Nuclear Regulatory Commission, and back again, seems be a fairly common practice for NRC Chairmen, since it also the path taken by President Jackson. Where I work, everyone still refers to her as Chairman Jackson. I should mention that many of the significant changes that have made the NRC a better agency in recent years were things that Shirley introduced, including moving the agency toward a risk-informed and performance-based regulatory approach. The renewed interest in nuclear power that we are witnessing today would not be possible if the NRC did not have a reputation as an effective and responsive regulator. So I am happy to say that I am enjoying the benefits of the changes that she first introduced!

Now, making the NRC a more modern and efficient regulator is one of the responsibilities of the agency's chairman. But that is not the same as being an advocate for the nuclear energy industry. I am not an advocate for or against commercial nuclear power. My job is the ensure the safety and security of United States nuclear power plants and materials. What I would like to do, then, is just share with you some observations, and allow you to draw your own conclusions about the current status of nuclear power in the United States.

The Energy Department's statistical office estimates that the global demand for electric power generation is expected to rise sharply over the next 20 years. In the United States, electricity demand is expected to increase by 50 percent in the next thirty years. If nuclear power were to maintain its current share of the electricity supply in this country, the industry would need a fleet of about 150 nuclear power plants, with an average output of 1,000 megawatts each. This would entail going from the 104 commercial reactors that are currently operating to a little over 150 nuclear power plants.

It is interesting to note that this would generally be consistent with the original projections that were made in the 1970s, during the first wave of construction, when the industry's plans were for about 160 plants. Sites were actually laid out and designed with that number in mind. But only two-thirds of those were built for a variety of reasons.

As you may know, that first construction boom ground to halt during the "stagflation" of the late 1970s, when the predicted demand for energy consumption leveled off. In addition, the NRC had only recently been created, and—frankly—was not a very efficient or predictable regulator, in my view. And the only problem people had with "carbon" was that the stuff rubbed off on your fingers when you made "carbon copies" in the typewriter. The prospects for nuclear power did not appear bright.

Today, of course, the situation is very different. Just within the last year, we have seen dramatic changes. A nuclear reactor in Alabama called Brown's Ferry Unit One that had been sitting idle for decades was finally restarted. Construction at the Watts Bar Unit II reactor in Tennessee is scheduled to resume, after sitting in mothballs since 1988. About half of the current operating reactors have received or are applying for license renewals. We also are expecting applications for several new uranium mining operations; and if the Department of Energy follows through on what it has said, we could be receiving an application for the spent nuclear fuel repository at Yucca Mountain this year. In addition, the first new reactor applications in decades have started coming in.

Now, as I said at the beginning of my remarks, I am not an advocate for or against commercial nuclear power. But from the perspective of ensuring that any expansion in nuclear power proceeds safely and securely, let me outline what I see as the most significant of the possible roadblocks to the so-called Nuclear Renaissance.

There are two main concerns that persistently capture my attention. The first is whether there is sufficient quality assurance and control over the myriad elements that go into building a modern nuclear reactor. Whether it be major components, minor parts supplied by sub-vendors, reactor designs, manpower, software, or other elements—a new reactor today depends on a supply chain that is truly global in scope. And the close scrutiny that regulatory agencies can bring to bear on major manufacturers to assure that quality components are produced does not always apply with the same intensity to the sub-vendors that supply parts and materials to the manufacturers.

According to data compiled by the American Society of Mechanical Engineers, the number of ASME Nuclear Certificates held worldwide fell from nearly 600 in 1980, to under 200 last year. More strikingly, the decline was due almost entirely to the loss of nuclear certificates among American companies. The number of certificates held by other nations has remained fairly steady—around 100—since 1980, but the number of American certificate holders today is one-fifth of what it was 27 years ago. Some of you may have read the recent article about this in the *Wall Street Journal*, which I am pleased to note quoted me accurately.

To address this, I have suggested in meetings with regulators from other nations that we establish more extensive channels of communication to share information about any component or equipment that may be substandard, counterfeit, inadequate or inappropriate to a nuclear

power plant. Regulatory agencies and industry would benefit from sharing this data under normal circumstances, but it seems to me even more critical during the current worldwide push to build new plants.

A related concern is the tightness of the human supply chain. A report prepared by the nuclear power industry has estimated that roughly 35% of current utility personnel will be eligible for retirement within five years. The situation for government agencies such as NRC, the Department of Energy, and the National Labs is equally dramatic. What makes the situation a matter of long-term concern is that many of the professors who teach nuclear engineering are getting ready to retire—and that is a link in the chain that is difficult to replace quickly. To help address this, Congress has allocated $15 million for the NRC to support scholarships, fellowships, and faculty development at colleges, universities, and trade schools. This a new program for us, and we are looking forward to allocating these grants as effectively as possible.

On this point, let me devote the second half of my speech to something that I think will make President Jackson happy. Any time the head of a large organization comes to campus to give a recruiting pitch—which is what I am about to do—it usually makes the university president happy. So let me tell you a little more about what our agency does, exactly.

Resident Inspectors: In addition the licensing and regulatory activities that we perform at our headquarters in Washington D.C., we maintain a staff of Resident Inspectors, who are the front lines of the NRC's safety oversight—our boots on the ground, so to speak. These are highly trained staff who have learned the operations of power plants inside and out. They live in the community, work on-site at the reactors, and are on call 24 hours a day, 365 days a year for operational oversight and emergency response. Their entire job is to help make sure that the nuclear plants to which they are assigned operate safely. At present there are about 135 resident inspectors at 65 nuclear plant sites around the country.

The utilities will probably tell you that they don't always find the Resident Inspectors convenient, but at the end of the day, they are grateful for the independent judgment and expertise the Resident Inspectors provide. I should add that many of the most senior managers at the NRC served as Resident Inspectors.

Vendor Inspections: A modern nuclear power plant depends on the smooth operations of tens of thousands of parts: pumps, valves, motors, fans, pipes and many other components that may be produced by any number of companies—both private and state-owned—around the world. As I mentioned, these must be of consistently high quality—because even a sub-standard bolt can be a cause of concern. So we have a vendor inspection program that sends people out all over the world, working to ensure that there is consistent high quality in the supply chain. In addition, we have a team that pursues investigations, which can result in criminal sanctions, against people who traffic in fraudulent parts.

Materials: In addition to power plants, our agency licenses the nuclear materials that are used in medical applications. In fields ranging from cardiology, to neurology, oncology, radiology and many more "ologies" I probably don't even know about—radioactive isotopes are helping people all over the world live better, longer, healthier, and more comfortable lives. But

it's also possible for these materials to be misused, and people can get hurt or killed. Our agency will investigate, usually in cooperation with the authorities in state and local governments, if radioactive materials have been misused.

Similarly, nuclear materials that are used in construction and other industrial applications, to measure the density of soil or the integrity of piping and welds, are sometimes lost or stolen. We help identify and track them down to ensure they don't fall into the wrong hands, and remain under proper handling and care. Not everyone at the NRC is a desk jockey!

International Programs: When the 104 plants operating in the United States were built, there were really no standardized designs, unlike in France, where most reactors were built from the same blueprints. Today, however, the new plants that are being proposed will be much more standardized. In fact, there is a very concerted effort under way by regulators around the world to work together, share information, and harmonize—as much as possible—the codes and specifications for new plants. So some of our employees are dedicated entirely to maintaining and strengthening our international programs, and working with other regulators across the globe to improve nuclear safety and security. Let me mention that I just returned from a meeting of the Convention on Nuclear Safety in Vienna, Austria—where we delivered what I believe was a very highly-regarded report on nuclear safety standards in the United States

Research: The current crop of reactors in the United States are largely based on what is called "light-water" technology. But we know that the nuclear energy of the future will involve radical technological changes, and our agency needs to develop the expertise to license and regulate the advanced and innovative new reactors and fuel cycle facilities that we anticipate down the road. This will require advanced computer simulation and greater expertise in computer security and cyber threats. In addition, if the United States decides to join the other major nuclear powers of the world and embrace nuclear recycling, the NRC will need additional chemical engineers with a detailed knowledge of reprocessing, actinide chemists, plutonium chemists, and radio-chemists. And nuclear engineers with expertise in transmutation would be required to review fuel recycling facilities. Beyond that, I think that if any of you end up joining the NRC you could conceivably help establish an Office of Fusion Reactors in twenty years. So, in short, if technically complex issues fascinate you—there will hardly be a more interesting place to work over the next few decades than the NRC.

I could go on, but that should give you some idea of the many different things we do.

Let me conclude by saying that the high value we place on the education and technical skills of our employees goes the heart of something both Chairman Jackson and I have tried to achieve at the NRC—which is to make it an effective, credible, and technically serious organization.

Now, I would be happy to take some questions.