



# NRC NEWS

**U.S. NUCLEAR REGULATORY COMMISSION**

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**Prepared Remarks  
By Chairman Dale Klein**

**at the  
American Enterprise Institute Conference  
'Is Nuclear Power a Solution to Global Warming  
And Rising Energy Prices'  
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**October 6, 2006**

Good afternoon. I want to thank AEI for inviting me here, and also to thank the distinguished panelists we have heard thus far for their insights into this important topic.

My role as a regulator is necessarily very focused. As Chairman of the NRC, I do not take a position either for or against the future use of nuclear power. I must bend all my efforts toward ensuring that if new nuclear plants are to be built, the public's health and safety are protected.

In my role as Chairman I can, however, offer some opinions on issues related to the regulation of nuclear energy as it seeks to fulfill its promise for the future. The NRC's Strategic Objective is to enable the use and management of radioactive materials so as to protect public health and safety and the environment, promote security and take regulatory actions that are open, effective, efficient, realistic and timely.

I recently read an account of an American who was hiking through the jungle outside Bangalore in India. He saw a group of elephants tethered to stakes. He asked the trainer, "How can you keep such large elephants tied to such small stakes?" The trainer replied, "When the elephants are small, they try to pull out the stakes, and they fail. When they grow large, they never try to pull out the stakes again."

That story illustrates that removable stakes – surmountable obstacles – can thwart enormous strength – the vast potential of nuclear power. I'll leave it to the other speakers on this program, and the members of the audience, to enumerate the economic and political "stakes" now tethering the resurgent nuclear industry. I'm going to focus on just three that fall in part within my purview as a regulator.

One of those stakes is the sheer uncertainty that surrounds the genesis of a new industry – and despite its operating history of more than 40 years, the U.S. nuclear industry is to a large extent new, by virtue of the long hiatus since the last nuclear orders and construction. Some of the uncertainty concerns the regulatory treatment of the initial plant orders, and I am making it a priority of my chairmanship to reduce unnecessary uncertainty insofar as it relates to the clarity of regulatory requirements and the timeliness of NRC review.

The other two stakes I would like to discuss are logistical – the infrastructure necessary to fabricate the materials and equipment needed to build new plants; and the personnel needed to run them safely and efficiently. Both of these obstacles are surmountable, with effort. However, I have concerns about the resources and commitment that have heretofore been directed toward resolving them. And my questions – more correctly the NRC’s questions – must be answered fully before new plants are allowed to operate.

First, the issue of uncertainty. In the unsettled atmosphere surrounding the rapid expansion of a technologically complex and capital-intensive industrial sector, the NRC must provide regulatory stability. Many factors can conspire to create reluctance on the part of industry and the financial community to commit billions of dollars to new nuclear energy projects. The Administration, through its support for nuclear energy, and the Congress, through provisions of the Energy Policy Act, have moved to reduce the uncertainty. However, doubts about the capability or the resolve of the regulator to perform its function in a timely manner might also give pause to those weighing a nuclear investment.

No one should harbor such doubts about the NRC in the discharge of our responsibilities. My vision is that the NRC needs to continue to be a strong regulator. We will hold our licensees accountable, will articulate our requirements clearly, we will be demanding and we will be responsive to their legitimate needs and concerns. All stakeholders – the nuclear industry, the financial community, and especially the public – must be made aware of the status and progress of issues of interest to them to the maximum extent we can provide the information.

Both the NRC and the nuclear industry have a lot of work ahead of us in gearing up for new nuclear construction in the U.S. The NRC is working to complete or update the design certifications on several advanced reactor designs. About half of the nation’s 104 nuclear reactors have either received or applied for 20-year extensions of their licenses, and we expect to get dozens more in the future. The number of announced potential applications for new reactors changes by the week – it will probably surpass 30 soon, with more undoubtedly to come.

Under our improved siting and licensing regulations – which may contribute significantly to the feasibility of new nuclear projects in the U.S. – the NRC expects to issue decisions within the next year on applications for early site permits “banking” sites for future reactors. In addition, there will be a tremendous amount of work involved in reviewing the license application for the Yucca Mountain waste repository, and reviewing licensing applications for a mixed oxide fuel facility and a new centrifuge uranium enrichment plant.

In preparation, the NRC is increasing staff by a net of about 200 positions a year through 2008, and is making organizational changes to handle the increasing workload. We will also look at some

possible procedural changes in the review process in the future. I would like to see the review time required for early site permits and combined operating licenses reduced, with no compromise on safety. That is not an unrealistic goal, if industry does its job at the beginning of the process.

I have already made my expectations very clear to the U.S. nuclear industry. In my first meeting with a group of industry leaders, I told them – and this is a direct quote – “It's a plain fact that a quality submission – Combined Operating License, license renewal, design certification, or anything else – takes less time to review than a bad one. Show me quality and clarity and the NRC should show you timeliness.”

It is my belief that the NRC's continued commitment to excellence in specifying clear regulatory standards will have a positive impact on another surmountable but worrisome issue: the atrophy of the U.S. nuclear manufacturing base. The vast majority of the technology to accomplish those difficult tasks was developed in the United States after World War II. The planning, design and construction of the first generation of nuclear facilities was an effort that occupied industrial giants such as Westinghouse and GE for decades, at a total cost well up in the hundreds of billions in today's dollars.

In the three decades since the last nuclear plant order, and the two decades since the bulk of the nuclear plant construction was completed in the U.S., the nuclear design, manufacturing, and construction industry in the U.S. has withered on the vine. Many leading U.S. firms have either ceased operation, consolidated or become subsidiaries of non-U.S. parent companies. The companies that remain have survived on retrofits and maintenance of existing U.S. plants and plant construction outside the U.S., where new nuclear construction has continued to flourish.

Now, as we confront the prospect of a major expansion in new nuclear reactor projects within the next decade, the companies that will make those multi-billion-dollar orders must make critically important decisions as to where to buy their systems and components. Clearly, much of the technological capability to supply their needs now rests outside the United States.

It is not the job of the Nuclear Regulatory Commission to advise the builders of nuclear plants where to buy their equipment and materials. It is our job, however, to safeguard the American public, and there is a direct linkage between quality of manufacture and ensuring the safe construction and operation of facilities that we license.

This brings me to an issue of some concern: the global capacity for supplying high-quality components and materials. Quite simply, I believe the suppliers that are available are, in many cases, at capacity. As the global demand for new nuclear power plants grows, the existing supplier networks will be further stressed. I believe that NRC and industry must have and will have the rigorous inspection programs needed to ensure the quality and authenticity of the millions of components needed. It is important to see this same rigor applied to all plants, not just those in the U.S. I and my fellow regulators here and abroad fully understand that a failure at any nuclear facility has global ramifications. World-wide there are more than 140 nuclear power plants under construction or in planning, and the international regulatory community must pay increasing attention to quality control and the qualification of suppliers.

Reactor manufacturers also understand the relationship between suppliers and their ability to move through the licensing and construction process. Witness the recent agreement between French-based Areva and U.S. manufacturer BWX Technologies (BWXT) to make nuclear plant components as the U.S. industry plans to apply for licenses to construct and operate new reactors.

There is another factor that global reactor and equipment manufacturers are considering. They understand that regulators in other countries have always looked at U.S. quality standards, and will continue to do so. NRC approval of a reactor design, a system, procedure, or any of the other myriad aspects of a nuclear facility's construction and operation resonates with other regulatory regimes around the globe. The excellence of U.S. standards is well known around the world. Those planning to build new nuclear plants anywhere in the world want quality, and reactor systems and equipment built to U.S. standards provide assurance of that quality. I recently returned from meetings with my regulatory counterparts in other countries, where I strongly advocated the Multinational Design Evaluation Program, a major effort to standardize the design evaluation process for new nuclear construction throughout the world.

Reinvigorating the domestic supplier network needed to provide reactor systems and components would have advantages for the U.S. nuclear industry besides aiding NRC safety inspections. There will be competition for these materials: In particular, ambitious construction projects have been announced in China, India and Russia for further expansion in their nuclear power production capabilities.

Whatever this country does, it is clear that nuclear power is growing elsewhere in the world. The nation will be well served if our own energy needs provide a springboard to rebuild U.S. technology and manufacturing capabilities to something approaching the leadership the nation once enjoyed, contributing to foreign markets as well as supporting our own.

I'm not promoting anything by suggesting that. I'm just looking ahead to what can be a natural outgrowth of having a strong, highly respected regulatory system.

That brings me to the third stake I want to discuss today -- the capital needed to operate nuclear plants -- not financial, but human capital. I have grave concerns about our ability to muster the workforce needed to operate nuclear plants -- not only those yet to be built but those currently in operation. In my view, this is a potentially enormous problem. I have asked industry groups these pointed questions: Where are we going to get the educated and skilled workers to run the nuclear plants of the future? What are their educational requirements? What is their training? As with the quality of materials, the NRC has the responsibility of asking these questions, and of determining the adequacy of the answers.

To some degree, the knowledge amassed by the industry in 40 years of operation is institutional, and is transferable to future operations. But to a large extent, the knowledge reposes in the minds of older workers. A nuclear industry survey shows that nearly half of current nuclear industry workers are more than 47 years old, and that nuclear energy companies could lose as many as 23,000 workers over the next five years -- about 40 percent of the total jobs in the sector. That is a

tremendous brain drain. How do we transfer the knowledge to their replacements who may form the cadre of workers as the next generation of plants starts up?

At the same time, the key suppliers to the industry – the architect/engineering firms, fuel suppliers and reactor manufacturers – anticipate that 32 percent of their workers will be eligible to retire within the next three years. They clearly must be replaced and their numbers augmented if the nation is to restore its manufacturing capability.

I might add that the government also will be competing for the same nuclear-related skills. Not only the NRC, but the U.S. Department of Energy, national laboratories, NASA and other government agencies will have personnel needs.

The Nuclear Energy Institute estimates that 90,000 entry-level workers will be needed to support industry operations through 2011. If that estimate is correct – and I have no reason to question it – one may then ask, how many more workers will be needed to supply the materials for the new plants, and to build the plants themselves, if even half of the expected new plant applications under discussion actually proceed to construction? And afterwards, how many additional workers will be needed to staff those new units?

The nuclear industry is working on many fronts to address this critical need: It has launched major programs to provide scholarships, training programs and recruitment drives, and so on. But I told the nuclear industry's executives that in my opinion this is a huge challenge that must be addressed by the highest levels of the industry.

I suggested to them that a major industry effort is necessary, and that it must address every level of education in the country, starting with a commitment to fostering the interest in science and engineering of elementary and middle school children. Rather than competing for a small number of candidates, the industry must work to increase the talent pool to bring the supply of talented young scientists and engineers into equilibrium with the escalating demand.

One area of focus must be on preserving and enhancing university nuclear engineering programs. While the industry was in its long decline, the number of four-year university nuclear engineering programs declined along with it, from 38 in the 1970s to 25 at present. Surveys now show that student interest in nuclear engineering is growing. That is not hard to understand, with the prospect of high-paying, fulfilling careers growing brighter each year. But the students must have enough venues to obtain their training. Increased private sector efforts to underwrite university engineering programs – through endowments, research funding or some other approach – will pay dividends in both the numbers and readiness of candidates to join the workforce.

I might add that unlike the issue of hardware and materials, we are unlikely to be able to call on other countries to help us solve our personnel problems. Quite apart from issues of national security, the established commercial nuclear programs around the world are also beginning to awake to the issue of potential worker shortages. Even assuming that it was feasible to import scientists and engineers, we can expect that their home countries would make strong efforts to retain them. The only solution is to grow our own, and we had better get planting.

I hope that I don't sound unduly alarmist or negative. Our glass is half full and not half empty. I have spent my career in the nuclear field, and I am personally excited by the possibilities ahead of us. I think the Nuclear Regulatory Commission has a very important and very positive role to play. The NRC is gearing up for a vastly increased workload, and I am convinced that we can discharge our obligation to provide rigorous regulatory scrutiny of the new reactor applications and associated duties without unnecessary delays. In fact, I believe that we will be able to reduce the lead times for regulatory reviews from their current duration while ensuring public health and safety.

I assure you that the NRC will do the hard work of creating the needed framework of regulatory stability. We, in turn, must be assured that the manufacturers, builders, owners and operators of the coming plants are prepared to meet their obligations to the public. If we all simply do our jobs, the confining stakes will disappear, and nuclear energy will be more enabled to play its role in our nation's energy future.

Thank you.

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