NRC NEWS

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Remarks of Commissioner Kristine L. Svinicki
U.S. Nuclear Regulatory Commission
to the French Institute for International Relations

"The Nuclear Renaissance in America"

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Good afternoon. It is a pleasure to be here. I would like to thank the French Institute for International Relations for providing me with the opportunity to address you.

In the United States – and globally -- there has been much discussion in recent years of a so-called "Nuclear Renaissance." Generally speaking, this phrase describes a renewed interest by government and industry in nuclear power as a solution to a number of the world's most daunting problems, including energy shortages and clean air goals. If it comes to fruition in the United States, such a renaissance could result in the construction of the first new nuclear power plants in years, and is already leading to the creation of new, more-standardized, and potentially safer nuclear reactor designs.

I plan to speak to you about what has been and is being done in the United States today in anticipation of the nuclear renaissance. It is the responsibility of my agency – the U.S. Nuclear Regulatory Commission – to license and regulate any such new facilities, and we are taking the issue very seriously. As I will discuss later, the NRC has made significant changes and improvements to our regulatory processes and personnel staffing to ensure that such a renaissance would result in the continued safe use of nuclear power, but would not impose unreasonable regulatory burdens that would stifle such efforts.

Though numerous reasons for this renewed interest are cited, energy demand is undeniably chief among them. The U.S. Department of Energy's Energy Information Administration estimates that electricity demand in the United States will increase by 50 percent in the next 30 years. Although these estimates predate the recent economic downturn, under these projections, if nuclear power were to maintain its current share of the electricity supply in the United States, the industry would need a fleet of about 150 nuclear power plants, with an average output of 1,000 megawatts each.

To reach that level, it would be necessary to build and bring on line nearly 50 additional large, commercial nuclear power reactors to add to the 104 that are currently operating in the United States. And although I noted the EIA demand forecasts did not take into account the current economic slump, they also do not reflect possible carbon-control legislation being considered by the U.S. Congress, which would, if enacted, certainly impact supply-side planning and decisions by U.S. utilities.

Before I continue, though, I should note here that I speak from the perspective of a nuclear regulator, not an advocate of nuclear energy. In the United States – by law – the Department of Energy is responsible for promoting the use of nuclear technology and materials, and the Nuclear Regulatory Commission is responsible for regulating the safe and secure civilian use of nuclear technology and materials. I should also note that my remarks today are my own personal views, and that they may not represent the collective view of the Commission.

It is from my perspective as a nuclear regulator, therefore, that I provide my comments about the impact that this renewed interest in domestic nuclear energy has had on the Nuclear Regulatory Commission. Predictably, it has created challenges for the agency. To date, the NRC has received 17 license applications for 26 new nuclear power reactors. These are the first licensing applications to be submitted to the NRC for new reactors since the late 1970's. In addition to new reactor applications, the NRC has also experienced a significant increase in licensing activities related to uranium recovery and fuel-processing facilities.

As you can imagine, the institutional knowledge accrued during those original reviews is on the decline because of the loss of employees due to retirement. Just to give you a sense of what we're facing, the U.S. Office of Personnel Management projects that, over the next five years, more than half a million federal employees – one-third of the entire workforce – are eligible to retire from government service. At the NRC, retirement numbers are consistent with these projections, and I would add that approximately 15 percent of our workforce is currently retirement eligible. The obvious point here is that many of the NRC staff involved in those original licensing reviews have retired or are rapidly approaching retirement.

The NRC has taken a number of significant steps to address these challenges, and I would like to start with licensing. The licensing and environmental reviews of applications for nuclear reactors involve significant time and resources for both the applicants and the regulator. Over the last several decades, however, the NRC has undertaken substantial efforts to improve and streamline our licensing process.

The most significant change to licensing has been the creation of the so-called "one-step" licensing process. All of the current fleet of 104 nuclear power reactors were licensed under a "two-step" licensing process described in Part 50 of the NRC's regulations. Under that two-step process, applicants were first required to submit an application for a construction permit for NRC approval. For the construction permit, the applicant was not required to submit a complete design; approval was based on the NRC's evaluation of preliminary safety and design information. The construction permit process also required a mandatory adjudicatory hearing

before a panel of NRC licensing judges on both the safety and environmental issues raised by the application. This hearing provides opportunities for public involvement in the licensing process.

Construction commenced once the permit was issued. Usually in the middle of construction, the applicant would submit its application for an operating license – the "second step" of the two-step process. As part of the operating license application, the applicant had to provide the complete design bases and other information related to the safe operation of the plant, technical specifications for operation of the plant, and a description of operational programs. Also, a separate opportunity for an adjudicatory hearing was provided as part of the operating license review process.

Predictably, this process was subject to a number of criticisms. The process led to what was essentially a "design-as-you-go" approach to constructing a plant, which deferred resolution of important safety issues until construction was well underway. The deferral of design details until after authorization for construction allowed commercial reactors to be built with an unusual degree of variability and diversity – in effect, a set of custom-designed and custom-built plants.

Other criticisms included ever-changing regulatory requirements, since the latter review of the more comprehensive operating license application often led to a reexamination of issues that were thought to be decided during the construction permit phase. In addition, both the review and hearing processes were thought to be inefficient and duplicative.

To address these problems, in 1989, the NRC established a new combined construction permit and operating license – or "combined license" – application process which was further refined and updated with a rule-making that concluded in 2007. Though the combined licensing process – which is codified in NRC regulations known as "Part 52" – is often referred to as "one-step" licensing, it is actually envisioned as involving three steps: certifying a standardized plant design, obtaining an early site permit, and then submitting a combined license application pairing those first two.

Conceptually, the intent of the combined licensing process was that reactor vendors would first develop and finalize designs and get them certified by the NRC. At the same time, utilities would identify and analyze candidate sites, get them approved by the NRC, and bank them for future use. Utilities would then select a certified design, and apply to build at an already approved site. Once issued, the combined license would both authorize construction and provide conditional authority to operate the plant, subject to verification that the plant has been constructed in accordance with the license, design, and the Commission's regulations.

The main advantage of this one-step process is that it is designed to provide issue finality on a great number of design and siting issues that would not need to be revisited during the combined license application process. Further, it was thought that the variability and customization that resulted from two-step licensing would be greatly reduced. Since the NRC would already have reviewed and approved both the site and the plant design, and the staff would be dealing with, at most, a handful of fairly uniform designs, the combined license reviews would be reduced in scope and would also have the effect of reducing the scope of a post-licensing hearing.

If the Part 52 process is utilized to its maximum potential as I described, the NRC expects that it would typically take about 30 months to review a combined license application, plus an additional 12 months to complete hearings.

However, our experience has shown thus far that this process hasn't quite been allowed to realize its full potential. For instance, only one of the five designs currently being referenced in combined license applications – the Advanced Boiling Water Reactor – has completed the certification process. This design is referenced in only one application.

Further, though all of the applications currently before the NRC reference a design, all of these designs -- except for the ABWR -- have either not completed the certification process or are currently being amended by the vendor. Therefore, it has created a situation in which the NRC is concurrently reviewing the design and the combined license application. The problem with this, clearly, is that the finality that the process was designed to ensure is significantly reduced, increasing both the complexity of the review and the time it takes the NRC to complete that review.

In addition, we have found that the design certification applications and some combined license applications received have lacked information that the NRC staff needs to complete its review. Staff reviews have been further complicated because some applicants are revising submission dates or otherwise modifying their applications.

Finally, I mention briefly that none of the combined license applications received by the NRC reference both a certified design and an approved early site permit.

Nevertheless, the effort to gain efficiencies with the one-step licensing process has borne fruit to some extent. The NRC staff is making significant progress on review of the certified design applications and the combined license applications. In addition, 3 early site permits have been approved by the NRC, with a fourth currently under review.

In addition to the significant number of new reactor applications and associated licensing activities, one nuclear unit is currently under construction in the U.S., and that is Tennessee Valley Authority's Watts Bar Unit 2, which is a previously deferred unit now being completed. Both Watts Bar units received their construction permits in 1973. Unit 1 went into operation in 1996, but the construction of Unit 2 remained suspended since 1985. In late 2007, TVA decided to complete Unit 2 and construction resumed in 2008.

Despite the challenges that have been presented by the new licensing process, as a regulator, the NRC's goal is to be prepared to make timely regulatory decisions that will result in a safe and secure fleet of reactors.

Whether or not the nuclear renaissance will come to fruition is also dependant in large part on the success or failure of the industrial infrastructure that provides the necessary parts and equipment for construction of a nuclear power plant. The decades-long absence of new nuclear plant construction in the U.S. led to significant attrition within the domestic infrastructure that

built the previous generation of nuclear plants. Many of the companies active in the field decades ago have closed down, reorganized, or otherwise exited from the industry, while many of those that remained survived, in part, by down-sizing to a fraction of their former size and capabilities.

One of the clearer examples of this involves nuclear plant reactor vessels. Of the current and previously operating U.S. plants, approximately 90% of the reactor vessels were manufactured in the United States. Following the 2001 Davis-Besse corrosion event, many U.S. utilities recently elected to replace the heads of those same reactor vessels. None of those replacement heads have been manufactured in the United States. The replacement vessel heads came from various international manufacturers; in other words, they came from elsewhere in the global economy that now supports the nuclear supply chain.

The declines in U.S. domestic capability were not limited to heavy forgings, however. According to data compiled by the American Society of Mechanical Engineers, the number of ASME Nuclear Certificates held by companies fell worldwide from nearly 600 in 1980, to under 200 in 2007. That decline was due almost entirely to the loss of American-held certificates, as the number of certificates held in other nations remained fairly steady at around 100.

Despite the numerous challenges that I have described, the NRC has been working hard to find solutions.

First, I believe that the NRC has established a strong regulatory foundation for the licensing of new plants. As I mentioned, the NRC has significantly revised its licensing process for nuclear power plants. Despite the challenges I mentioned earlier, if the NRC and applicants are able to gain more experience under these procedures, and if more standardized designs are certified, I believe that many of these challenges can be overcome, and in the long run, this process can achieve the objectives that it was designed to achieve.

In addition to the rule changes, the NRC has also completed a comprehensive revision to a document called the "Standard Review Process," which provides guidance to NRC's licensing staff on how to conduct the technical reviews of nuclear power reactor applications. The NRC has also issued updated regulatory guidance for use by potential applicants on standard format and content of new reactor combined license applications. Though these documents are guidance, and do not contain regulatory requirements, they do preserve much of the institutional knowledge with respect to the licensing process, as well as make the process easier to navigate by applicants and the NRC staff.

Other improvement efforts include substantially revised rules of practice intended to make the public hearing process more effective, and the introduction of an electronic filing regulation that is further increasing the efficiency of the hearing process.

Next, in addition to focusing on improvements to its licensing process, the NRC is working on the development and implementation of a new Construction and Vendor Inspection Program. The program is building upon prior experience, including lessons learned during the construction of the 104 reactors currently operating in the United States.

Numerous historical lessons provide insights related to quality and oversight issues during the previous period of construction in the United States and abroad. The most important of these lessons is that a commitment to quality, instilled early in a nuclear construction project, is vital to ensuring that the facility is constructed and will operate in conformance with its license and the regulations.

The NRC staff is also working with the nuclear industry to ensure that a strong commitment to quality is part of the foundation of every new reactor project in the United States. Many of the components that will be used in the construction of possible new reactors in the U.S. will be manufactured abroad, so NRC inspectors are also visiting manufacturing facilities and working with our regulatory counterparts in other countries to ensure the quality of the manufactured components.

Quality assurance inspections of engineering and site activities are contributing to effective and efficient reviews of design certifications, combined licenses, and early site permit applications. The agency has also sought stakeholder involvement in an effort to make construction and vendor inspection a timely, accurate, and transparent process.

Another program in which the NRC is working with its international partners is the Multinational Design Evaluation Program. The program is a multinational initiative to develop innovative approaches to leverage the resources and knowledge of the national regulatory authorities who will be reviewing new reactor power plant designs. For the United States, the program takes advantage of international experience in licensing and constructing two AREVA Evolutionary Power Reactor plants in Europe to assist the NRC in its review of AREVA's US EPR design certification application. The NRC also interacts with regulatory counterparts in China, Canada and the United Kingdom as part of the Multinational Design Evaluation Program to exchange information on the licensing review of proposed Westinghouse AP1000 reactors.

As I mentioned earlier, the "Nuclear Renaissance" will still require new people and new infrastructure to replace both human and physical capital. With the median age in the nuclear industry in the United States close to 50, retirement attrition makes sustaining any increase in staffing especially challenging for both industry and the NRC.

However, there are some signs that both are being regained. To begin with, the nuclear engineering programs at U.S. universities are graduating many more engineers and scientists than their low graduation rates of the late 1980s and early 1990s. Several utility companies and architect engineering firms have begun supporting or even partnering with educational institutions, including local technical colleges, to help assure a steady source of trained personnel. The current count of such institutions, according to industry representatives testifying before the Commission, is 42 technical colleges, as well as another 19 state-based workforce development efforts.

The number of ASME certificates has also risen, from less than 200 to about 225 today. In the area of physical infrastructure development, industry officials have also announced investments. For example, Northrop Grumman and AREVA announced that they would partner to build a 300,000 square-foot manufacturing and engineering facility in Newport News, to

support what the owners hope will become a significant demand for AREVA's new reactor design – the EPR. If they stay on schedule, they would be breaking ground this year. An even larger facility has been announced by another joint partnership – Westinghouse and the Shaw Power Group – to be built in Louisiana to support the new Westinghouse reactor design – the AP-1000.

The NRC has also made huge strides with respect to ensuring that qualified and competent professionals are prepared for a nuclear renaissance. In 2006, the NRC established an entirely new office -- the Office of New Reactors – making this office responsible for the siting, licensing and construction oversight over all new reactor applications. Today, the Office of New Reactors has over 475 highly competent and qualified employees.

In addition to staffing the Office of New Reactors, the NRC has also increased its overall hiring. Historically, the NRC hired about 30-50 new employees per year. However, over the last three year period, we have been hiring a net of 200 people per year. With this increased staffing comes other challenges, namely finding workspace for our employees – you can imagine that our offices are getting a little cramped. As a result, we have had to locate some temporary office space, and have implemented long-term plans to reconsolidate the agency.

The NRC's success in meeting its staffing and recruitment goals is helped in part by a recent ranking of the NRC as the "best place to work" in the federal government.

Our objective is to be ready to fulfill our responsibilities as a regulator to review new license applications, and new construction and plant operations, when and if they move forward.

Before I conclude, I would like to stress one key point.

The resurgence in interest in new nuclear power plants has only been made possible by the sustained safe and reliable performance of the current fleet of operating reactors. The United States has 104 operating nuclear power reactors, and there are 332 other nuclear reactors operating beyond our borders. Nuclear power provides about 20% of electricity in the United States, but 16 nations depend on nuclear for a greater percentage of their power than we do, with France, as I'm sure you know, topping the list.

We must never lose sight of the fact that the reputation and credibility of the nuclear industry – and the future of new reactor construction -- is dependant upon the continued safe operation of every one of the current plants. The NRC considers the oversight of the current fleet to be an essential mission. The great majority of our resources – inspections, reviews, and oversight – remain focused on those facilities. We maintain resident inspector staffs at each operating reactor site, and vigorously monitor licensee performance. Just as a chain is only as strong as its weakest link, so, too, is the reputation and credibility of the nuclear industry dependent upon the continued safe operation of every one of its plants.

Recently, the NRC recognized the 30th anniversary of the accident at the Three Mile Island nuclear power plant. This anniversary was a timely reminder of the potential impact that one misstep can have on the entire industry. Although the Three Mile Island event resulted in no

injuries, loss of life, or loss of property, it remains a stark reminder of the need for strong performance, effective oversight, and unrelenting vigilance. It is appropriate to recognize the Three Mile Island accident -- and the many lessons that were learned as a result – as we stand on the cusp of a potential nuclear renaissance, so that those same mistakes are not repeated as we move forward.

We all – regulator and regulated alike – must remain vigilant and focused on safety. Our standards must consistently demand rigorous analyses, conservative designs, careful maintenance, thorough testing, robust construction, and safe operation. Without a dedication to these standards, any possibility for a nuclear renaissance will certainly be at risk.

Thank you.