

STATEMENT SUBMITTED  
BY THE  
UNITED STATES NUCLEAR REGULATORY COMMISSION  
TO THE  
SUBCOMMITTEE ON ENERGY  
OF THE  
COMMITTEE ON ENERGY AND NATURAL RESOURCES  
UNITED STATES SENATE

CONCERNING  
NEW NUCLEAR POWER GENERATION  
IN THE UNITED STATES

PRESENTED BY  
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## **Introduction**

Good afternoon, Mr. Chairman and members of the Subcommittee. It is a pleasure to appear before you as you consider "New Nuclear Power Generation in the United States." Because, as you are aware, the role of the Nuclear Regulatory Commission as prescribed by the Congress is regulatory – and not promotional, my discussion will focus first on actions the Commission has taken and is taking to ensure the continued safe application of nuclear technology; to strengthen regulatory predictability; and to facilitate public access to our information and participation in our process. We believe that the achievement of all three of those goals will enable others to determine how to use the nuclear energy option.

## **License Renewal**

The focus of the Commission's review of license renewal applications is on maintaining plant safety, with the primary concern directed at the effects of aging on important systems, structures, and components. The review of a renewal application proceeds along two paths -- one for the review of safety issues and the other to assess potential environmental impacts. Applicants must demonstrate that they have identified and can manage the effects of aging and can continue to maintain an acceptable level of safety during the period of extended operation. The applicant must also address the impacts on the environment from extended operation.

With the improved economic conditions for operating nuclear power plants, the Commission has seen sustained strong interest in license renewal which allows plants to operate up to 20 years beyond their original 40-year operating license. The original 40-year term was

established in the Atomic Energy Act and was based on financial and antitrust considerations, not technical limitations.

The decision to seek license renewal is voluntary and rests entirely with nuclear power plant owners. The decision is typically based on the plant's economic viability and whether it can continue to meet the Commission's requirements. To date, renewed licenses have been issued for 12 sites, totaling 23 units. The reviews of these applications were completed on or ahead of schedule, which is indicative of the care exercised by licensees in preparing their applications and the Commission's emphasis on planning and completing the reviews on schedule.

Applications to renew the licenses for an additional 11 sites (totaling 19 units) are currently under review, which includes the application to renew the licenses for Browns Ferry Units 1, 2, and 3. If all of the applications currently under review are approved, approximately 40 percent of the plants in the U.S. will have had their operating licenses renewed. Based on industry statements, the Commission expects essentially all sites to apply for license renewal.

The Commission has established a license renewal process that can be completed in a reasonable period of time with clear requirements to assure safe plant operation for up to an additional 20 years of plant life. To help achieve consistency in the preparation and review of renewal applications, the Commission has issued guidance documents that assist plant owners in preparing license renewal applications and that guide the NRC's review of the applications. Lessons learned from ongoing reviews are documented as they are identified and made publicly available for use by future applicants. These guidance documents provide the framework for an effective, efficient, and technically sound review of renewal applications and help maintain the stability and predictability of the license renewal process.

Public participation is an important part of the license renewal process. There are several opportunities for members of the public to question how aging will be managed during the period of extended operation. Concerns may be litigated in an adjudicatory hearing if an adversely affected party appropriately requests a hearing. A license renewal web site is also available that contains key documents associated with license renewal applications as well as information on the license renewal process, regulations, and guidance documents.

Although the license renewal program has been highly successful, the Commission continues to seek further improvements in the process. Using lessons learned from past reviews, the Commission is pursuing revisions to the renewal process that should provide additional efficiencies. These efficiencies will help the Commission better accommodate the increasing number of renewal applications being submitted.

The Commission recognizes the importance of license renewal to the owners of nuclear power plants and to the future energy needs of the country. The Commission remains committed to providing continued high-priority attention to this effort, while assuring plant safety and maintaining public health and safety.

### **Power Uprate**

The NRC carefully reviews requests to raise the maximum power level at which a plant may be operated, which are called power uprates. Improvements of instrument accuracy and plant hardware modifications have allowed licensees to submit power uprate applications for NRC review and approval. The focus of NRC review of these applications has been and will continue

to be on safety. We continue to closely monitor operating experience to identify issues that may affect power uprate implementation.

Power uprates range from requests for small increases based on the recapture of power measurement uncertainty, to large requests in the 15 to 20 percent range that require substantial hardware modifications at the plants. In all instances, the NRC must be satisfied that safety margins are maintained. To date, the NRC has approved 100 power uprates which have added approximately 4140 megawatts electric to the nation's electric generating capacity - the equivalent of about four large nuclear power plants.

Currently, the NRC has five power uprate applications under review and expects to receive an additional 25 applications through calendar year 2005. This would add approximately 1760 megawatts electric to the nation's electric generating capacity.

In recognition of the increased interest in power uprates by licensees, NRC recently issued a Review Standard for Extended Power Uprates (i.e., uprates that increase the current power by seven percent or more). This document, which is available publicly, provides a "road map" that establishes standardized review guidance and acceptance criteria for both the NRC and licensees. The Review Standard enhances the NRC's focus on safety and improves consistency, predictability and efficiency of these reviews. The Review Standard will foster improved communications with our stakeholders and licensees.

The NRC is monitoring operating experience at plants that have implemented power uprates. Cases of steam dryer cracking and flow-induced vibration damage affecting components and

supports for the main steam and feedwater lines have been observed to occur at some of these plants. The NRC conducted inspections to identify the causes of several of these issues and evaluated many of the repairs performed by the licensees. Currently, we have determined that these issues do not pose an immediate safety concern. The Commission continues to monitor the industry's generic response to these issues and will consider additional regulatory action, as appropriate.

In summary, the focus of NRC review of power uprate applications continues to be on ensuring public health and safety.

### **Browns Ferry Unit 1 Restart**

I would now like to discuss the NRC's oversight of the recovery of Browns Ferry Unit 1. The Tennessee Valley Authority, or TVA, is the NRC-regulated licensee for the Browns Ferry Nuclear Power Plant located near Decatur, Alabama. The Browns Ferry site has three essentially identical boiling water reactors designed by General Electric. All three Browns Ferry units were voluntarily shut down by the Tennessee Valley Authority in March of 1985 to address performance and management issues. Following the shutdowns, TVA specified corrective actions which would be completed prior to restart and confirmed TVA's commitment not to restart any unit without NRC's concurrence. All three units retained their operating licenses during their respective long-term shutdown.

The restart efforts for Units 2 and 3 were both approximately five years in duration. Unit 2 was restarted in May 1991, and Unit 3 in November 1995, following Commission briefings and NRC Staff approval of restart. Prior to the restart of these units, the NRC completed significant inspections and monitoring to assure that TVA had adequately corrected the issues that caused

the shutdown of all three Browns Ferry Units. TVA has subsequently operated the Unit 2 and 3 reactors in a safe and effective manner.

On May 16, 2002, the TVA Board of Directors approved the return of Browns Ferry Unit 1 to service and authorized TVA Nuclear to request renewal of the existing 40-year operating licenses for all three units. In December 2002, TVA submitted its proposed regulatory framework for the Unit 1 restart. Following a public meeting and after TVA modified several areas, the NRC accepted TVA's proposed framework in August 2003. This presents a unique issue of performing a license extension review for a reactor unit that has not been operated for an extensive period of time. However, because license renewal focuses on programs to manage the effects of aging on long-lived components, NRC will be able to provide an effective review of this application. The premise of the application for Unit 1 is that its current license basis is essentially the same as that for Units 2 and 3. In the application, TVA identified differences between Unit 1 and Units 2 and 3 and stated that those differences will be eliminated by Unit 1 restart activities. Through the review of the renewal application, the NRC will identify those contingencies that would be applicable to Unit 1 renewal, such as items that would need to be completed by TVA and included in NRC restart verification activities.

TVA has applied many lessons learned from the restart of the other two units in its recovery plan for Unit 1. One TVA objective for Unit 1 restart is to have all three units "operationally identical" at the completion of the project and to use as many of their current plant processes and procedures as possible. It is important to note that Unit 1 has been maintained by TVA in a "de-fueled lay-up" condition since 1985. Since 1985, the NRC has conducted periodic lay-up inspections to confirm the conditions of key plant components.

In anticipation of the TVA Board's decision to restart Unit 1, the NRC initiated efforts to establish a methodology and plan for oversight of this third Browns Ferry unit recovery and to establish the needed resources. After an extensive review of NRC lessons learned from TVA's recovery of the previous two units and a critical evaluation of differences in TVA's recovery plans for Unit 1, this detailed methodology was formally defined in an NRC Inspection Manual Chapter (MC 2509) issued in August 2003. NRC oversight inspections of the Unit 1 recovery are currently being implemented at the early stages of the recovery process and will be completed for all necessary activities including selected renovation activities, restart testing, and return to operational status.

Based on the TVA plan for restart of Browns Ferry Unit 1 and their use of existing processes which we have previously confirmed as acceptable, the Commission has committed adequate resources throughout the project to support the planned inspection activities. Two additional resident inspectors have already been stationed at the site to provide first-hand monitoring of the licensee's recovery activities. Other staff members have been assigned oversight and specialist inspection roles in our regional and headquarters offices. We have established an experienced team -- essentially all of the NRC staff associated with the Unit 1 recovery have been involved in the previous Browns Ferry units recovery efforts or other long-term recoveries. We are using this experience to maximize the effectiveness of our applied inspection resources to ensure the recovery efforts result in a plant that can be operated safely.

The Commission has been especially aware of the need to oversee this unique project with openness to the public as a priority. To facilitate this, a communications plan has been developed which provides for periodic public meetings conducted at a variety of locations. We plan to provide numerous opportunities for the public to better understand the recovery process, status of activities, and most importantly, the nature and depth of the NRC's safety oversight

activities at Browns Ferry Unit 1. To date, we have held three such meetings, one in Washington at NRC Headquarters, one in Atlanta at the NRC Regional Office, and one at the Browns Ferry site. In addition, we have developed an easy means for public access to Browns Ferry Unit 1 restart information on our public Web site. The Web site contains information that describes the recovery effort, allows access to our completed inspections, and provides the summaries of the public meetings previously mentioned.

In summary, the Browns Ferry Unit 1 Restart is progressing as planned by TVA, with dedicated NRC inspection, oversight and licensing resources from NRC headquarters and the NRC Region II Office in Atlanta, GA. The NRC has worked effectively with TVA to develop an effective roadmap for the recovery project to allow for effective and efficient use of both TVA and NRC resources while ensuring our primary safety mission is achieved. The Unit 1 restart effort benefits from the processes established for, and lessons-learned from, the restart of the other two Browns Ferry Units. The Commission has prepared for the increased oversight that a project of this scope warrants, and will continue to work closely with the licensee as the restart effort progresses.

### **New Reactor Licensing**

While improved performance of operating nuclear power plants has resulted in significant increases in electrical output, it is expected that any significant increased demands for electricity will need to be addressed by construction of new generating capacity. As a result, industry interest in new construction of nuclear power plants in the U.S. has recently emerged. The NRC is ready to accept applications for new nuclear power plants. New nuclear power plants will likely utilize 10 CFR Part 52 which provides a stable and predictable licensing

process. This process ensures that all safety and environmental issues, including emergency preparedness and security, are resolved prior to the construction of a new nuclear power plant. The design certification part of the process resolves the safety issues related to the plant design, while the early site permit process resolves safety and environmental issues related to a potential site. The issues resolved in these two parts can then be referenced in an application which would lead to a combined construction permit and operating license with conditions (combined license).

As you know, the Commission has already certified three new reactor designs, pursuant to 10 CFR Part 52, making them readily available for new plant orders. These designs include General Electric's Advanced Boiling Water Reactor and Westinghouse's AP-600 and System 80+ designs.

In addition to the three advanced reactor designs already certified, there are new nuclear power plant technologies which some believe can provide enhanced safety, improved efficiency, lower costs, as well as other benefits. The Commission is currently reviewing the Westinghouse AP1000 design certification application. The staff has met all scheduled milestones for the AP1000 design review and is on track to issue the final design approval recommendation to the Commission this fall, followed by the design certification rule in 2005. The NRC staff is also actively reviewing pre-application issues on two additional designs and has four other designs in various stages of pre-application review.

In September and October of last year, we received three early site permit applications for sites in Virginia, Illinois, and Mississippi where operating reactors already exist. Our review of these early site permits, if approved, would be the first time this portion of the licensing process in

10 CFR Part 52 has been implemented. The staff has established schedules to complete the safety reviews and environmental impact statements in approximately two years. The mandatory adjudicatory hearings associated with the early site permits will be concluded after completion of the NRC staff's technical review. As with the design certification rulemaking, issues resolved in the early site permit proceedings will not be revisited during a combined license proceeding absent new and compelling information.

To prepare for the potential application for a combined license, the Commission is discussing generic issues related to the preparation and review of a combined license application with industry and interested stakeholders. Included in this effort is updating the NRC's construction inspection program to address the combined license process and the expected use of extensive modular construction techniques.

### **Reactor Oversight Process**

One vital aspect of our regulatory oversight of commercial nuclear power plants is the direct inspection of equipment and activities at the power plant sites by NRC inspectors. NRC regional inspectors often specialize in areas and perform their specific inspections at the plants throughout the region in which they are assigned. Many of our inspection staff have a number of years experience, both within the NRC and in other parts of the industry, and all are well qualified for their duties. The inspections are conducted in accordance with an agency-wide inspection program. The program defines the frequency and scope of inspection activities and includes detailed inspection procedures, which cover a wide variety of topics, including operations, maintenance, refueling, engineering, radiation protection, emergency planning, and

physical security. Our inspection reports are also available to the public, with the exception of those containing sensitive security information.

In addition to our inspection program, the NRC maintains performance indicators to aid in trending the safety performance of the power plants. These performance indicators trend information such as unplanned shutdowns and power changes; the performance of important safety equipment; and control of radiation exposure. There is a baseline level of inspection that all plants receive, and there are increasing levels of additional inspection activities that may be performed if the performance at a given plant indicates it is warranted.

On an annual basis, we assess the performance at each power plant and issue a written summary of our conclusions, followed by a meeting with the operator of the plant and a meeting with members of the local public. The NRC also makes the performance indicators and the results of our inspections available to the public.

The inspection program is coordinated by our staff in the NRC headquarters office in Rockville, Maryland. This coordination ensures consistency in implementation of the inspection program between NRC's regional offices, and aids in the sharing of information within the agency.

### **Security**

Of course with the heightened nuclear security at U.S. commercial reactors, the NRC will ensure that all operating nuclear power plants will be in compliance with all current nuclear security regulatory requirements. In this regard the NRC will continue to coordinate with other federal agencies – including the Department of Homeland Security, Homeland Security Council,

Federal Bureau of Investigation, and the Intelligence Community – to ensure greater awareness of threats and to enhance the communication of threat information from all sources.

### **Summary**

The Commission has long been, and will continue to be, dedicated in its mission to ensure adequate protection of public health and safety, the common defense and security, and the environment in the application of nuclear technology for civilian use. The Commission is mindful of the need to: (1) enhance regulatory predictability and reduce regulatory burden when appropriate and justified, so as not to inappropriately inhibit any renewed interest in nuclear power; (2) maintain open communications with all its stakeholders; and (3) continue to encourage its highly qualified staff to strive for increased efficiency and effectiveness.

I appreciate the opportunity to appear before you today, and I welcome your comments and questions.