

STATEMENT SUBMITTED  
BY THE  
UNITED STATES NUCLEAR REGULATORY COMMISSION  
TO THE  
SUBCOMMITTEE ON ENERGY AND AIR QUALITY  
OF THE  
COMMITTEE ON ENERGY AND COMMERCE  
U.S. HOUSE OF REPRESENTATIVES

CONCERNING  
THE U.S. NATIONAL ENERGY POLICY: NUCLEAR ENERGY

SUBMITTED BY  
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CHAIRMAN

Submitted: March 5, 2003

## **Introduction**

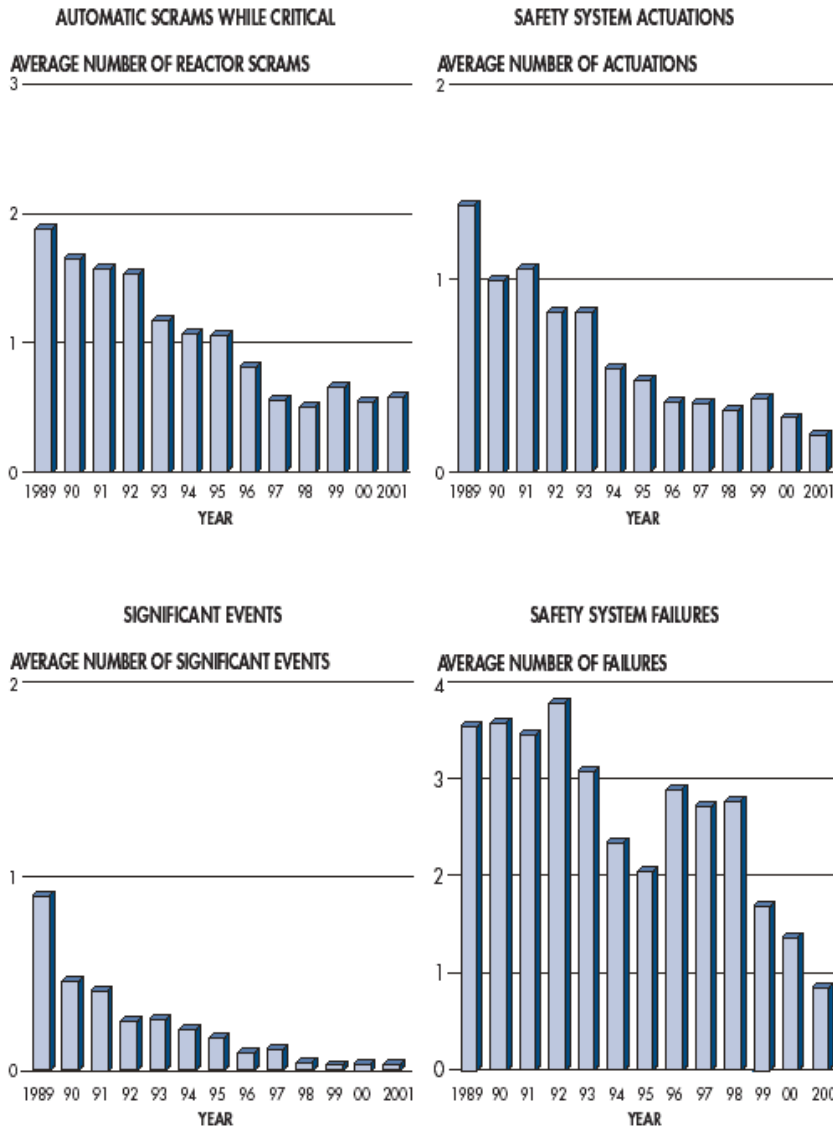
Mr. Chairman, members of the Subcommittee, I am pleased to submit this testimony on behalf of the U.S. Nuclear Regulatory Commission (NRC) regarding the NRC's perspective on how nuclear energy fits into the U.S. National Energy Policy. As the Subcommittee knows, the Commission's mission is to ensure the 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 does not have a promotional role - - the agency's role is to ensure the safe application of nuclear technology if society elects to pursue the nuclear energy option. The Commission recognizes, however, that its regulatory system should not establish inappropriate impediments to the application of nuclear technology. Many of the Commission's initiatives over the past several years have sought to maintain or enhance safety and security while simultaneously improving the efficiency and effectiveness of our regulatory system.

The Commission's primary focus is on safety. The Commission nonetheless recognizes that the quality, predictability, and timeliness of its regulatory actions bear on licensee decisions related to construction and operation of nuclear power plants.

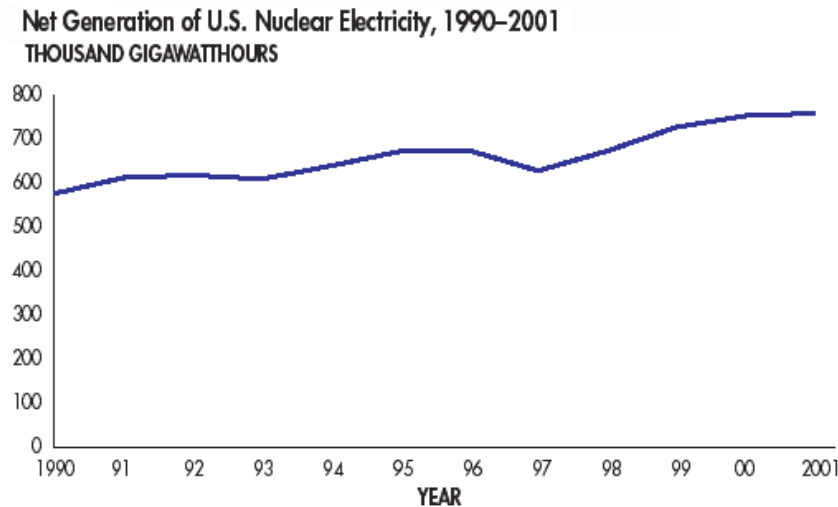
## **Background**

Currently there are 104 nuclear power plants licensed by the Commission to operate in the United States in 31 different states. As a group, they are operating at high levels of safety and reliability. Indeed, the trends over the past decade are very favorable.

**NRC Performance Indicators; Annual Industry Averages, 1989–2001**



These plants have produced approximately 20% of our nation's electricity for the past several years and are operated by about 35 different companies. In 2001, these nuclear power plants produced about 750-thousand gigawatt-hours of electricity.



#### Improved Licensee Efficiencies (Increased Capacity Factors)

The nation's nuclear electricity generators have worked for over ten years to improve nuclear power plant performance, reliability, and efficiency. According to the Nuclear Energy Institute, the improved performance of the U.S. nuclear power plants since 1990 is equivalent to placing 23 new 1000-MWe power plants on line. The average capacity factor for U.S. light water reactors was 90 percent in 2001, up from 71 percent just 10 years earlier. The Commission has focused on ensuring that safety has not been compromised as a result of these industry efforts.

## U.S. Commercial Nuclear Power Reactor Average Capacity Factor and Net Generation

Year	Number of Operating Reactors	Average Annual Capacity Factor (Percent)	Net Generation of Electricity	
			Thousands of Gigawatthours	Percent of Total U.S.
1990	111	68	577	19.1
1991	111	71	613	20.0
1992	110	71	619	20.1
1993	109	73	610	19.1
1994	109	75	640	19.7
1995	109	79	673	20.1
1996	110	77	675	19.6
1997	104	74	629	18.0
1998	104	78	674	18.6
1999	104	86	728	19.6
2000	104	88	754	19.8
2001	104	90	767	20.0

### Initiatives in the Area of Current Reactor Regulation

#### License Renewals

Because of the improved economic performance of the plants, the Commission has seen a significant increase in the number of requests for approval of license renewal that would allow plants to operate beyond their original 40-year term. That term, which was established in the Atomic Energy Act, did not reflect a limitation that was determined by engineering or scientific considerations, but rather was based on financial and antitrust concerns.

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. Applicants must demonstrate that they have identified and can manage the effects of aging so as to maintain an acceptable level of safety during the period of extended operation.

The Commission has now renewed the licenses of plants at five sites for an additional 20 years: Calvert Cliffs in Maryland, and Oconee in South Carolina, Arkansas Nuclear One in Arkansas, Edwin I. Hatch in Georgia, and Turkey Point in Florida, comprising a total of ten units. The thorough reviews of these applications were completed on or ahead of schedule, which is indicative of the care exercised by licensees in the preparation of the applications and the planning and dedication of the Commission staff. Applications for twenty units from twelve additional sites are currently under review. As indicated by our licensees, many more applications for renewal are anticipated in the coming years.

Although the Commission has met the projected schedules for the first reviews, we seek further improvements. The extent to which the Commission is able to sustain or improve on our performance depends on the rate at which applications are actually received, the quality of the applications, and the ability to staff the review effort. The Commission recognizes the importance of license renewal and is committed to providing high-priority attention to this effort. As you know, the Commission encourages early notification by licensees, in advance of their intentions to seek renewals, in order to allow adequate planning so as not to create unmanageable demands on staff resources.

### Reactor Plant Power Uprates

In recent years, the Commission has approved numerous license amendments that permit its licensees to make power uprates. The Commission takes this step only after determining that safety margins can be maintained at the higher power. Collectively, these approved uprates supplied the electricity equivalent to that from three large power plants (approximately 3,000 MWe). In addition, some nuclear generators have requested Commission safety review of increasing fuel burnup, thereby extending the operating cycle between refueling outages and thus increasing nuclear plant capacity factors. Again, such approvals are granted only after a thorough evaluation by Commission staff to ensure that safe operation and shutdown can be achieved at the increased fuel burnup.

### Risk-Informing the Commission's Regulatory Framework

The Commission also is in a period of dynamic change as the agency continues to move from a prescriptive, deterministic approach towards a more risk-informed and performance-based regulatory paradigm. Improved probabilistic risk assessment techniques combined with over four decades of accumulated experience with operating nuclear power reactors have led the Commission to revise or eliminate certain requirements. On the other hand, the Commission is prepared to strengthen our regulatory system where risk considerations reveal the need.

Perhaps the most visible aspect of the Commission's efforts to risk-inform its regulatory framework is the new reactor oversight process. The process was initiated on a pilot basis in 1999 and fully implemented in April 2000. The new process was developed to focus inspection

effort on those areas involving greater risk to the plant and thus to workers and the public, while simultaneously providing a more objective and transparent process.

### Nuclear Security Enhancements

Over the past 17 months, the Commission has undertaken a comprehensive review of safeguards and security programs, in close consultation with the Department of Homeland Security and other Federal agencies, and with significant involvement by State agencies. Out of that review has come a series of interim compensatory measures to strengthen nuclear security at power reactors, Category I fuel cycle facilities, decommissioning reactors, research and test reactors, independent spent fuel storage facilities, the two gaseous diffusion plants, and the conversion facility, as well as in the transportation of spent fuel. Last August we put in place a five-tier threat advisory system compatible with the Homeland Security Advisory System, and we have used that system twice to improve security measures at our licensed facilities. We have issued Orders to strengthen programs to control access at power reactors. We have drafted proposed Orders to strengthen guard training and address guard fatigue. We have provided revised design basis threats for comment to other Federal agencies, the States and cleared industry personnel. We have been conducting enhanced table-top security exercises at our reactor facilities and have just resumed the conduct of enhanced force-on-force exercises at these facilities. We plan to conduct force-on-force exercises on a three-year cycle and have requested the resources to do this in our fiscal year 2004 budget. We have defined the actions that we need to take to ensure better control of high risk radioactive sources containing radioactive isotopes of the most concern for potential use in a radiological dispersal device.



## **Future Activities**

### Scheduling and Organizational Assumptions Associated with New Reactor Designs

While improved performance of operating nuclear power plants has resulted in significant increases in electrical output, significant increased demands for electricity will need to be addressed by construction of new generating capacity of some type. As a result, industry interest in new construction of nuclear power plants in the U.S. has recently emerged. 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, Westinghouse's AP-600 and Combustion Engineering's System 80+.

In addition to the three already certified advanced reactor designs, there are new nuclear power plant technologies which some believe can provide enhanced safety, improved efficiency, lower costs, as well as other benefits. The NRC staff is currently reviewing the Westinghouse AP1000 design certification application and has six other designs in various stages of pre-application review. In addition, pre-application discussions are taking place in preparation for three early site permit applications expected in 2003.

The staff is also making infrastructure improvements to ensure that tools, information, and regulatory processes are in place for the efficient, effective, and realistic review of new site and reactor applications. For example, the NRC staff has developed proposed changes to 10 CFR Part 52 "Early Site Permits, Standard Design Certifications, and Combined Licenses for Nuclear

Power Plants” based on lessons learned during the previous design certification reviews and discussions with industry representatives on the licensing processes. Additionally, the NRC staff has initiated early site permit pre-application public meetings in the vicinity of expected sites to inform the public about the early site permit process and their opportunities for participation. It should also be noted that the NRC staff is developing options for the efficient review of security aspects of new reactor designs and early site permits.

In order to confirm the safety of new reactor designs and technology, the NRC believes that a strong nuclear research program should be maintained. The NRC staff is performing a research infrastructure assessment for advanced reactors. The assessment identifies technology gaps and the means to fill the gaps in the form of methods, tools, data and expertise. The Advisory Committee on Reactor Safeguards has been briefed and has provided comments and recommendations regarding the assessment findings. With the benefit of these insights, the Commission expects to undertake measures to strengthen our research program for new reactor designs over the coming months.

### **National Energy Policy Implications**

The Commission has a stake in the national energy policy and has identified areas where new legislation would be helpful to eliminate artificial restrictions and to reduce the uncertainty in the licensing process. These changes would maintain safety while increasing flexibility in decision-making. Although those changes would have little or no immediate impact on electrical supply, they would help establish the context for consideration of nuclear power by the private sector without any compromise of public health and safety or protection of the

environment. Additionally, the Commission has long sought additional authority in the nuclear security arena to enhance security for these facilities, the need for which has been magnified by the events of September 11, 2001.

Legislation will be needed to extend the Price-Anderson Act. The Act, which recently received a one-year extension until December 31, 2003, establishes a framework that provides assurance that adequate funds will be available to compensate the public in the event of a nuclear accident and sets out a process for considering nuclear liability claims. While our mission is not a promotional one, it is our understanding that without the framework provided by the Act, new private-sector participation in nuclear power would be discouraged. Moreover, the Commission believes it is important to assure that if an improbable accident should occur, the means are provided to care for the affected members of the public.

Over the years, the NRC has provided and continues to pursue legislative proposals to Congress detailing specific initiatives that would further enhance security of NRC-licensed activities. These proposals address a wide spectrum of activities. One provision would authorize guards at NRC-regulated facilities to use deadly force to protect property significant to the common defense and security. This would give guards protection from State criminal prosecution for actions taken during the performance of their official duties. Another provision would allow the Commission, in consultation with the Attorney General, to confer upon guards at NRC-designated facilities the authority to possess or use weapons that are comparable to those used by the Department of Energy's guard forces. Some State laws currently preclude private guard forces at NRC-regulated facilities from utilizing a wide range of weapons. Another provision would make it a Federal crime to bring unauthorized weapons and explosives into NRC-licensed facilities. The NRC would also make Federal prohibitions on sabotage

applicable to the operation and construction of certain nuclear facilities. The NRC hopes that these and other more recently developed legislative initiatives, such as in the area of access authorization, will be enacted early in the 108<sup>th</sup> Congress.

With the strong Congressional interest in examining energy policy, the Commission is optimistic that there will be a legislative vehicle for making these changes and thereby for updating the Atomic Energy Act. As you know, the Commission has expressed significant concerns about several provisions that were contained in H.R. 4 and H.R. 2938 from the last Congress. We would be pleased to work with the Committee in addressing those concerns.

### **Summary**

The Commission has long been, and will continue to be, active in ensuring the 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) reduce unnecessary burdens, 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 look forward to working with the Committee, and I welcome your comments and questions.