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NUCLEAR SAFETY AND PUBLIC ACCEPTANCE IN THE UNITED STATES

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Good morning. I am pleased to be able to participate in this session, and to provide my perspective as a regulator on the question of nuclear technology's role in supporting sustainable development. I will place particular emphasis on safety and public acceptance issues.

Introduction

Demographers estimate that the world's population will reach 9 billion in 2050 and will level off at 10 to 11 billion by the end of the century -- nearly double the current world population of 6 billion. Most of the growth is projected in Africa, Asia, and Latin American -- regions which are already stressed by the need to reduce hunger, disease, and poverty. Moreover, the percentage of people living in urban areas is expected to grow from 50 percent today to 80 percent in 2050. These figures imply, astonishingly, the creation of the equivalent of 400 new urban complexes, each of 10 million people, over the next 50 years.

Meeting the needs of a growing population will result in greater production and consumption of goods and services, intense pressures on the environment and on living resources, and increased demand for land, water, materials and energy. The challenge is made all the more difficult by the fact that we must meet these growing demands while somehow nurturing and restoring the planet's already overtaxed life-support systems.

The signs of serious strains are already apparent: the buildup of greenhouse gases in the atmosphere, the decline of marine fisheries, increasing regional shortfalls in the quality and quantity of fresh water, expanding tropical deforestation, the continuing loss of both species and sensitive ecosystems, and the emergence of serious infectious disease. Somehow we must reconcile mankind's developmental aspirations with the limitations imposed by nature. The challenge we confront -- indeed, the imperative we confront -- is to recognize the interdependence of societal demands and environmental limitations and to find a path to sustainable development.

The focus of this conference is energy -- an essential ingredient for the production of goods and services, enhanced life style, and improved environmental performance. I emphasize environmental performance both because of the adverse effects of production of energy on the environment through loadings of heat and pollutants, and because energy drives the technologies that allow improved use of land and water, the recycling of materials, and the minimization of environmental impacts. Thus, finding acceptable and sustainable sources of energy will literally prove to be the engine that drives the entire process. In this connection, I note that a recent study of sustainable development by the National Academy of Sciences recommended accelerated improvement in the use of energy as a priority, suggesting as a "reasonable goal" the doubling of historical rates of improvements in energy and materials use, including in particular the long-term reduction in the amount of carbon produced per unit energy.[1]

It is apparent in this connection that nuclear technologies offer promise as a means to achieve sustainable development. Generation of electricity by using nuclear fuels avoids emission of greenhouse gases, can minimize other effluents and wastes, and has the advantage of abundant fuel supply. Indeed, the increasingly urban nature of future populations reinforces the need for central-station power technologies that minimize adverse environmental impacts. The challenge is one of harnessing this technology in a manner that ensures safety -- a matter on which many in our society continue to have concerns. The NRC does not have a promotional role -- our mission is to protect public health and safety and the environment -- and thus I cannot advocate that society choose a nuclear path over other alternatives. Nonetheless, consistent with our mission, the NRC seeks to ensure that the regulatory system does not stand as an impediment to the role that nuclear energy could play in achieving sustainable development, so long as it does not unduly threaten public health and safety or the environment.

In this talk I will address some of the activities underway at the Commission that bear on our efforts to assure such protection. I will also discuss the key role of ensuring the public's confidence in the ability of both government and the industry to assure such protection. Before turning to these matters, however, it may be appropriate to take a moment to discuss the current status of nuclear power in the U.S.

Current Status

Nuclear power is today experiencing a quiet renaissance in the U.S., in large part as a result of electricity price deregulation. My fellow panelist, Corbin McNeill, will perhaps address this issue in more detail. A few years ago, prognosticators forecast the demise of the nuclear power industry. The accepted wisdom was that nuclear power plants were uneconomic, that many nuclear plants would be shut down even before their licenses had expired, and that our present reliance on nuclear power would diminish and die away.

Today, in contrast to these predictions, nuclear plants are being sold in auctions with many bidders and at prices that exceed $1 billion. Moreover, instead of premature termination of licenses and a turn to decommissioning activities, we see great interest in the renewal of licenses for extended operation. The original 40-year term of operational licenses, which was established in the Atomic Energy Act, did not reflect a limitation that was determined by engineering or scientific considerations,

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[1] National Research Council, "Our Common Journey: A Transition Toward Sustainability," National Academy Press (1999).

but rather was based on financial and antitrust concerns. We now have experience on which to base judgments on the effects of aging and the potential useful life and safe operation of facilities, and have been turning to the question of extensions beyond the original 40-year term.

The interest in license renewal has arisen because the existing nuclear fleet has proven to be a reliable and, once the capital cost is amortized, a low-cost source of electrical power. The NRC has renewed the licenses of two plants comprising five units and has renewal applications of three more plants in process. In fact, the NRC has been formally advised that licensees of about 40% of currently operating plants will seek license renewal, and we have been informed that the number could ultimately exceed 85% of the current fleet. Under these circumstances, nuclear power could continue to make a substantial contribution to the U.S. energy portfolio through at least the first half of the 21st century. Furthermore, in the last few months, there has even been the first stirring of interest in the possibility of new construction of nuclear power plants in the U.S. In short, in the period of a few years, we have seen a remarkable change in the prospects for nuclear power in the United States.

The renewed interest in nuclear energy by the business community is a result of many factors -- steadily improving economic performance, changing economic conditions as a result of electric price deregulation, the increasing and highly variable cost of fossil fuels, and, importantly, the environmental advantages of nuclear power at a time when emissions from conventional plants must necessarily be subject to more stringent limits. I have termed the current climate for nuclear in the U.S. a "quiet renaissance," however, because a resurgence of interest in nuclear power in the business community has been largely unnoticed by the public and even the mainstream business press.

Fortunately, the data show that strong economic performance goes hand-in-hand with strong safety performance: attention to safety serves to make plants more reliable. Safety and economic performance are not merely compatible; they are mutually reinforcing. It is no accident that the steadily improving economic performance of nuclear plants over the past decade is accompanied by remarkable improvements in the safety performance indicators -- fewer scrams, greater availability of critical equipment, fewer unplanned shutdowns, and reduced radiation exposure of workers.

The Regulatory Role

The task for the NRC in this environment is to maintain acceptable safety performance, while simultaneously eliminating needless regulatory burden. By "needless regulatory burden," I mean those rules and regulations that are not needed to assure public health and safety, to protect the environment, or to safeguard nuclear materials. I would like to describe briefly some of our efforts in this regard.

One of the most significant programs that we have undertaken is the use of risk insights in revising our regulations and regulatory processes. The use of risk information, along with more traditional deterministic analyses and engineering judgment, has permitted the agency to focus attention on those aspects of plant design and operation that are important to safety, while eliminating regulatory requirements that do not serve to enhance safety. This offers a win-win opportunity: an improved focus on safety, while eliminating needless burden.

One of the more important initiatives in this regard is an improved reactor oversight process. Our aim was to produce a system that allocated the inspection effort to those matters important to safety, and while providing greater objectivity and transparency. We developed Performance Indicators (PIs) to allow the systematic assessment of plant performance over time, coupled with a baseline inspection program that was focused on risk-significant issues. Objectivity is served by a new

and systematic process for assessing performance, coupled with predefined actions that flow from risk-significant findings. Transparency is served by making the process, Performance Indicator data, and inspection reports available to all, including by means of our NRC website. The program was developed with substantial input of our stakeholders and, although we have had only about 6 months of industry-wide implementation, the early response is quite favorable by licensees and the public.

Other efforts to improve the substance of our regulations using risk insights are also underway. For example, consideration of risk is used to modify the allowed outage times in technical specifications for safety-related equipment. Risk insights have also allowed us to approve modifications related to in-service inspection and testing requirements. And the rules governing plant changes and testing and maintenance were modified to couple regulatory requirements to risk considerations.

We have also launched a close examination of special treatment requirements – the rules governing equipment deemed to be safety-related. With insights provided from probabilistic risk assessments, we now realize that some equipment that has been categorized as safety-related, and thus subject to special restrictions, in fact can be shown to make a limited contribution to risk. Conversely, other equipment that was not previously categorized as safety-related is now understood to have safety significance. We are engaged in an extensive process to rethink the regulatory requirements that bear on these categories of equipment. Other efforts include the standards for combustible gas control systems [10 CFR 50.44] and the acceptance criteria for Emergency Core Cooling Systems [10 CFR 50.46].

Although our effort is extensive, we have taken only the first steps in our efforts to risk-inform our regulatory systems. In a series of studies conducted in 1993, the National Academy of Engineering found that it took the Environmental Protection Agency an average of 15 years to modify its standards after scientific consensus had been reached on a better understanding of the underlying risks.[2] I expect the NRC to do much better. Nonetheless, we have a long and difficult road ahead of us for which we will require informed input from the industry and from other stakeholders.

Public Acceptance

Let me now turn to the question of public acceptance. It is completely clear to me that public attitudes will be crucial in the determination whether nuclear technologies will be part of the portfolio of energy technologies on which the world will rely to confront the challenges of the 21st century. Moreover, understanding and confronting public concerns about nuclear matters is a central obligation of nuclear regulators in any event.

There are two issues that bear on public confidence that I would like to address briefly: the first is nuclear waste disposal, and the second is the NRC's role in affecting public attitudes.

As I have traveled around the country and visited our licensees, I have noted that many people who live in the communities near nuclear power plants have become comfortable with the plants as neighbors. But one of the persistent questions about the use of nuclear power is: "what are we going to do about the waste?" A ready answer is not at hand. The "compact" system that was supposed to

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[2]National Academy of Engineering, "Keeping Pace with Science and Engineering: Case Studies in Environmental Protection," National Academy Press (1993).

address low-level waste has clearly not worked in the way that Congress intended. In fact, now that the Barnwell disposal facility is part of the Atlantic compact, there is currently no widely available disposal facility for several types of low-level waste. While this does not present an immediate problem for most plants, it may well become one unless action is taken to devise a workable system for dealing with low-level waste.

Even more serious is the challenge of disposing of spent fuel and high-level waste. As most of you no doubt know, the Department of Energy is scheduled next year to make a recommendation to the President on the suitability of the Yucca Mountain site as a location for a deep geologic repository. If that recommendation is positive, and if it is accepted by the President and the Congress, DOE will then make a formal application to the NRC to license the repository. The NRC will confront technical challenges in evaluating such an application. For example, both NRC and EPA contemplate the assessment of impacts over a 10,000-year period, which is longer than recorded history. The Commission is obliged to make an informed and impartial judgment, based on the best information available, about whether DOE has adequately demonstrated compliance with the applicable EPA standards and NRC requirements. Moreover, we anticipate that any NRC decision will be the subject of intense litigation. An acceptable strategy for the disposition of spent fuel must be resolved, however, if there is to be public acceptance of nuclear technology. For the Nation to accept significant growth in the application of nuclear power, the resolution of the full cycle of impacts of the technology must be addressed.

The more general problem, and one that is not independent of the concerns about waste, is one of public attitudes. As I have mentioned, the NRC does not have a promotional role with respect to the use of nuclear technology. Nonetheless, we do recognize that the way in which we perform our jobs can have a significant impact on public attitudes. We must both be, and be seen, as a rigorous, independent and capable regulator. The significance that the Commission places on its obligations in this regard is reflected in the fact that we have identified enhancing public confidence in the NRC as one of our four major goals in our strategic planning.

In order to enhance public confidence, we must provide open processes so that the public has the opportunity to raise concerns and to see that those concerns have been weighed and fairly evaluated. To achieve this objective, we seek to involve our stakeholders – everyone with an interest in the impact of our licensees' activities – in the development and consideration of our regulatory processes. We also seek to ensure that the information that we receive from our licensees and other interested parties and that which we develop ourselves is readily available to the public – with due consideration for protection of legitimate proprietary interests. Finally, we have sought to reach and justify our regulatory decisions and policies by means that are open, so that the considerations that have guided decisions and the bases for our actions are fully accessible to the public. We cannot expect that everyone will agree with our decisions, but we can aspire to show that no legitimate concern has been ignored.

Conclusion

To sum up, I believe that, in order for nuclear power is to play a significant role in sustainable development, there must be a demonstrated commitment to safety. To this end, the industry and the NRC both have a responsibility to ensure safe operations. Moreover, the fulfillment of nuclear technology's potential is dependent on its acceptance by the public. The NRC's responsibility is to ensure that the public has reason to be confident in the NRC's capabilities as a strong, competent, and fair regulator. Other issues, such as waste disposal, must also be dealt with promptly and forthrightly.

If these issues can be resolved, the renaissance of nuclear power that appears on the horizon may be realized.

Thank you.