

United States Nuclear Regulatory Commission
Office of Public Affairs
Washington, DC 20555
Phone 301-415-8200 Fax 301-415-2234
Internet:opa@nrc.gov

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Charting a Steady Course:
Nuclear Regulation and Nuclear Safety Cooperation in a Time of Global Change

by

Dr. Shirley Ann Jackson, Chairman
U.S. Nuclear Regulatory Commission

at the
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Good evening, ladies and gentlemen. I am honored and pleased to be speaking to you at this 40th anniversary celebration of the Nuclear Energy Agency within the Organization for Economic Cooperation and Development (OECD/NEA). Over these four decades, we have seen a remarkable evolution and maturation in the arena of nuclear energy--in the technology itself, in its stature as a global source of power, in design and operational standards, in nuclear safety regulation, in public perception, and in our concepts of, and overall approach to, enhancing nuclear safety. The Nuclear Energy Agency, with all its participants, deserves the highest level of congratulations for the contributions you have made toward the success of this evolution in the safe and responsible use of nuclear energy.

But maturity does not mean stagnation, nor does it guarantee stability. Despite these decades of development, nuclear energy today still is a changing field. Around the globe, the specific factors causing these changes vary somewhat--economic constraints (some growing out of electricity market deregulation), shifting political pressures, environmental concerns, fluctuations in energy demand, and changing currents of public perception. Singly, or in combination, these factors strongly impact, and ultimately may govern, the current and future contributions that nuclear energy makes in various sectors of the planet.

Most fields of human endeavor present choices, and present both challenges and opportunities. In fact, most challenges can be viewed as opportunities, and certainly, most opportunities present challenges. The safe use of nuclear energy is no different. There is much discussion, appropriately so, of the role of nuclear energy in mitigating greenhouse gas effects. The ability of nuclear energy to play this vital role depends upon two interconnected elements: (1) the compact that exists among operators, regulators, and the public with regard to the need for and confidence in the peaceful uses of nuclear energy; and (2) safety. Public belief in the safe use of nuclear energy and its actual safe use commend its choice, but the compact holds up only if we can avoid future Chornobyls with its safety and environmental legacies, and if the use of nuclear energy does not leave an environmental legacy in the form of unresolved nuclear waste

disposition. The G-7 nations and other countries are working to resolve the legacy problems of Chernobyl--both the safe shutdown of the remaining operating reactors, and the stabilization of the sarcophagus. Chernobyl represents the environmental legacy of what can happen without an intense focus on safety.

The current world situation offers an opportunity to those who believe in the importance of nuclear energy, but it offers a challenge which international cooperation, as represented by the OECD/NEA, can address. However, such international cooperation must be predicated on several elements which I would like to speak to you about this evening--derived primarily from my experience as a regulator and from my interactions with many of you. My remarks have both an organizational focus and a global focus.

Given the nature of nuclear energy itself, I believe it is vital for all involved parties--the designers, the contractors, the owners, the operators, and the regulators--to maintain a steady sense of purpose and focus within this changing environment--charting a steady course, so to speak, no matter how rough the seas. This evening I would like to share with you some of my perceptions as a nuclear safety regulator, perceptions that have been shaped and refined over the three-and-one-half years of my tenure as the Chairman of the U.S. Nuclear Regulatory Commission (NRC). I will highlight briefly for you a few of the areas of change at the NRC, and I will outline four elements which, I believe, are vital to the health of any nuclear safety organization that is undergoing change: (1) a clear sense of mission; (2) the ability to be responsive and flexible without losing focus; (3) the use of coherent, broadly applicable approaches to operation, such as the application of coherent business planning methods and a risk-informed approach to nuclear safety regulation; and (4) a global consciousness.

The NRC in a Time of Change

As many of you are aware, the past three years have been a time of considerable change at the NRC. The "currents" in the NRC ocean have been strong, and not always from the same direction. On March 4, 1996, approximately 8 months after I took over as NRC Chairman, *Time* magazine published a cover story entitled, "Blowing the Whistle on Nuclear Safety." The gist of the accusations leveled by that article, and by the accompanying criticisms from various NRC stakeholders, was that the NRC had failed to follow up properly on safety issues raised at certain nuclear power plants--and overall, that the NRC lacked the proper rigor in demanding that our power reactor licensees adhere to safety standards. In truth, we already were aware of the issues of concern, and had been pursuing our own inspection and investigation of several long-standing performance problems. At the three Millstone power reactors, owned by Northeast Utilities, these efforts uncovered a considerable range of issues related to maintaining the facility design basis, ensuring a healthy corrective action program, and responding appropriately to employee safety concerns. The outcome was an extraordinary degree of NRC oversight of these facilities, including the issuance of two NRC Orders mandating a range of licensee actions, the creation of an interim NRC Special Projects Office, and the requirement for Commission approval prior to the restart of each reactor.

Over the past several years, the Commission continually has pressed for improvements across the full spectrum of NRC programs--including better organizational planning, clarification of our inspection and performance assessment standards, improvement in the consistency of our enforcement, streamlining our rulemaking processes, and overall, moving toward a more risk-informed and performance-based regulatory framework. As one might expect, however, in addition to these self-initiated programs and assessments, the NRC has continued to receive

evaluations and critiques during this time--including, on the one hand, pressure from the U.S. nuclear power industry to reduce our level of oversight, concomitant with industry improved safety performance, and, on the other hand, analyses from the U.S. General Accounting Office and other stakeholders stating, once again, that we were not regulating strongly enough. Perhaps the most dramatic call for NRC change came in June of this year, when our appropriations subcommittee in the U.S. Senate issued draft appropriations legislation with language that was strongly critical of the NRC as an overzealous and unduly restrictive regulator. As originally drafted, that proposal recommended cutting over 700 staff (out of a current level of about 2930), with most of the cuts targeted at reducing nuclear reactor oversight. As I will cover in more detail shortly, our agency still is in the process of responding to some of these more recent criticisms.

While these specific pressures are unique to the NRC, I am quite certain that each of the agencies and organizations represented here today could recite their own litany of factors, internal and external, that create pressure and demand changes in the way we operate. Quite frequently, these pressures occur across a wide range of issues, or even oppose each other. Moreover, emerging issues such as electric utility deregulation, increasing globalization in the energy marketplace, Year 2000 computer problems, or specific technical or safety concerns continue to demand resources and vie for our attention.

In such a time of change, how does one go about "charting a steady course?" How does one ensure that emergent safety issues or valid organizational criticisms are given appropriate attention and response, while still maintaining control of what already was a full agenda? As leaders in the nuclear energy arena, how can we ensure that such pressures do not divert our attention inappropriately from our mission, or steer us off the track, but ensure that we are responsive to calls for change.

I would like to share with you four key points that, in my experience, provide an answer to these questions--four elements that will be critical factors for the health of any nuclear safety organization in what we are calling this "new global age."

A Clear Sense of Mission

First of all, I believe that as leaders and organizational managers, we must never lose sight of our primary mission. Regardless of what role we play in the nuclear field, that mission ultimately must be tied to ensuring nuclear safety. For the NRC, that mission is characterized as "ensuring adequate protection of the public health and safety, the common defense and security, and the environment in the use of nuclear materials in the United States." Closely tied to the performance of that mission is adherence to what we call the "Principles of Good Regulation," defined as follows:

- ◆ Independence: legal, ethical, and professional separation from the organizations we regulate.
- ◆ Openness: ensuring that all our stakeholders--including the U.S. Congress, other government agencies, our licensees, and the general public--are kept informed and are able to participate in the regulatory process.
- ◆ Efficiency: providing the best possible management and administration of the resources needed to regulate, consistent with the degree of risk reduction achieved by our

regulatory activities.

- ◆ Clarity: the use of regulations and regulatory processes that are coherent, readily understood, and easily applied, with a demonstrable nexus between requirements and the safety objectives they seek to achieve.
- ◆ Reliability: administering our regulations in a manner that is prompt, fair, consistent, and based on the best available knowledge from research and operational experience.

With change and emerging pressures, this first element--never losing sight of our primary health and safety mission--remains the most vital characteristic of any nuclear safety organization.

Being Responsive and Flexible Without Losing Focus

The second key element is a counter-balance to the first. It consists of being flexible and responsive to the need for change. In our case, maintaining a focus on our primary safety objectives cannot translate to a blind adherence to traditional methods, outdated regulations, or the comfort of the "status quo." As I have told my NRC managers, "you cannot hold back the future by clinging to the past." In fact, change properly implemented, can sharpen our safety focus. The need for change must be anticipated and incorporated into strategic and operational planning. For example, the ongoing deregulation of the U.S. electric utility industry, combined with the increasing globalization of the energy marketplace, has led the Commission to anticipate changes in ownership arrangements, to update our provisions for decommissioning, to give additional attention to measures for ensuring the reliability of the electrical grid, and to emphasize the necessary continued focus on the safety of nuclear operations.

A clear component of flexibility then, for the NRC, involves adjusting our rules and processes--in concrete ways-- to face the reality of changing external factors as they relate to the nuclear industries we regulate. Just earlier this month, the Commission issued its Final Rule on Decommissioning Funding Assurance, and last year the Commission issued its License Termination Rule, predicated on what we believe to be sensible, defensible clean-up standards which protect the public health and safety, in the decommissioning and decontamination of shutdown nuclear facilities.

The Commission has worked to ensure a focused, complete, and timely license renewal review process. We have two applications for license renewal (for an additional twenty-year license term) from the Baltimore Gas and Electric Company for its Calvert Cliffs plant, and from the Duke Power Company for its Oconee plant. Other applications are expected.

Because we expect new ownership arrangements to emerge in the electric utility industry which require review by the NRC, we have revised our regulation with respect to the type of hearings necessary for license transfers, to allow more "legislative type" proceedings. We expect the new rule to become final by the end of the year, and to allow license transfers to be processed within a six to eight month timeframe. We also are reviewing, with the U.S. Congress, the

foreign ownership restrictions in our governing statutes, although a change is not likely at this time.

This element of flexibility and responsiveness also demands continual introspection and self-

assessment, as well as openness and objectivity when responding to the need for change. As I mentioned earlier, in recent months the NRC has been subject to a number of external reviews, some of them sharply critical, from our Congressional appropriations committees, the General Accounting Office (GAO), the NRC Inspector General, the nuclear industry, and other stakeholders. Whether or not one we agree with these criticisms, the Commission believes it to be vital that we give them careful consideration. Viewed constructively, these critiques provide a source of energy which, if harnessed properly, can be of significant benefit--a strong impetus for sharpening and accelerating initiatives that already were underway, as well as for addressing new issues where they have been identified.

At the NRC, the Commission and staff have taken aggressive actions to be responsive to these external analyses. We have introduced a variety of measures to ensure that our enforcement of relatively low-level violations does not place an undue burden on our licensees or on our own staff, while still ensuring our ability to track and monitor the emergence of adverse performance trends. We have accelerated considerably the development of a revised Reactor Assessment Process (known as IRAP)--a single, integrated process that will be more objective, more scrutable, and less resource intensive than our current mix of processes. We also are examining our more informal processes, such as Confirmatory Action Letters and generic communications, to ensure that process controls are clear and are implemented properly. And, perhaps most importantly, we have taken--and are taking--a variety of steps to accelerate the use of a risk-informed approach to regulation--which leads me to my next point.

The Use of Coherent, Broadly Applicable Approaches to Operation

In order to accomplish the first two elements--that is, in order to be responsive and flexible in the face of change, while maintaining a clear sense of an agency's primary safety mission--it is vital that a third element also be in place. This element involves the use of coherent, broadly applicable approaches that undergird the overall operation of the organization--approaches such as applying business-like methods to planning, and a risk-informed approach to regulatory oversight. When approaches of this sort are not in place--even when a clear sense of mission exists--the organizational response to emerging issues can become a patch-work of quick fixes, knee-jerk reactions, and/or redundant programs that quickly balloon into overall inefficiency, ineffectiveness, and a lack of clear priorities.

Shortly after I became the NRC Chairman, we began a series of initiatives that, in its fullest form, comprises a business-like approach to NRC planning. This began with the NRC "Strategic Assessment and Rebaselining," a systematic review of all agency activities, to ensure that our statutory bases were understood, that functional relationships were clear, and that the Commission had a clear foundation for deciding on "direction-setting issue" initiatives for each NRC program area. The Strategic Assessment and Rebaselining laid a natural foundation for constructing the NRC Strategic Plan--the long-range, high-level framework of agency goals and objectives to guide future decision-making--as well as the more fluid and dynamic NRC Performance Plan and the individual program-level operating plans. This effort to operate under an overall coherent framework represents a significant change in the way of doing business for many NRC managers. In essence, it provides a consistent framework for approaching any agency functional area, by addressing a series of questions: (1) What are the primary goals in this area? (2) What outcomes and strategies will ensure that those goals are achieved? and (3) What metrics can be use to measure the efficacy of the outcomes?

The second "broadly applicable approach" is the use of risk-informed regulatory oversight--that

is, applying the greatest focus to the areas of greatest risk. This effort may be, in truth, the most significant of all the changes the NRC is undergoing. The historical NRC approach, developed over several decades, includes many regulations based primarily on deterministic engineering criteria, with safety margins established through the use of multiple barriers and the "defense-in-depth" philosophy. Since these requirements first were put into place, significant advances have been made and considerable experience has accrued with quantitative Probabilistic Risk Assessment (PRA) methods. As many here already know, these methods offer the potential to sharpen the safety/risk focus and to improve the effectiveness of the existing regulatory approach, allowing a more structured, consistent basis for safety decision-making, and achieving better utilization of resources, while reducing unnecessary burden. This logic provides a coherent, systematic, and defensible approach that can be applied across the full spectrum of regulatory activities, including rulemaking, licensing, inspection, enforcement, and performance assessment--as well as providing a basis for prioritization in the establishment of programs and the allocation of resources.

The Commission has been very supportive of this adjustment in the NRC regulatory approach. In August 1995, we issued the Probabilistic Risk Assessment Policy Statement, formalizing our commitment to risk-informed regulation. In the ensuing years, we have demonstrated this commitment in a number of significant actions, including the issuance of the NRC Maintenance Rule, which uses a risk-informed and performance-based (i.e., results-oriented) approach to ensure the availability and reliability of key structures, systems, and components in power reactor facilities. Under the Probabilistic Risk Assessment (PRA) Implementation Plan, the NRC also has published generic regulatory guidance to support risk-informed plant changes, as well as application-specific guidance in the areas of technical specifications, in-service testing, in-service inspection of piping, and graded quality assurance. Finally, in response to the recent critiques I mentioned earlier, the Commission has accelerated the pace of efforts to become more risk-informed across the full range of regulatory functions, including our revised reactor performance assessment process, which will make more explicit use of risk insights and objective performance indicators. It also includes establishing a risk-informed baseline level of inspection needed for adequate licensee oversight, and, as a logical connection, the resources and core competencies needed to accomplish that baseline level.

A Global Consciousness

The final element vital to the health of a nuclear safety organization, in today's environment of change, is what I would characterize as a global consciousness. A host of reasons exist to make this a vital element, but I will focus on only a few.

First of all, as I am sure any member of this assembly would agree, safe nuclear electric generation and the effective regulation of nuclear energy and reactor byproduct materials are topics that transcend national boundaries. Emergent issues that can have a bearing on nuclear safety and/or nuclear regulation--for example, the current trend in electric power industry competition and restructuring, decisions about the effects of exposure to low-level radiation, and the establishment of appropriate radiological criteria for decommissioning--command attention throughout the world. The globalization of the electricity marketplace, by itself, is a factor that demands an increased understanding of international business practices, in order to provide responsible evaluation and oversight of new ownership arrangements for nuclear power facilities. The mitigation of greenhouse gases and global climate change demand an understanding of the role of safe nuclear power in sustainable development. While we each must understand and focus on our own domestic issues, we must work simultaneously within

the larger sphere of international energy demands, emergent safety concerns, and regulatory activities. This requires sharing knowledge to broaden international perspectives on nuclear issues, and to enhance a global nuclear safety culture.

A second compelling aspect of this “global consciousness” is the obvious efficiency and perspective gained from cooperative international research. A good example of leveraging research resources through such cooperation is the joint U.S.-Russian research program on radiation health effects, which is being performed under the auspices of the U.S.-Russian Joint Coordinating Committee on Radiation Effects Research (JCCRER). While this study may involve both U.S. and Russian populations, the initial focus is on the unique opportunities in the southern Urals in Russia, particularly in the vicinity of the Mayak nuclear complex. As you know, present radiation protection standards have been developed, in part, based on the deleterious health effects observed in populations exposed to short bursts of high radiation (such as the atomic bomb survivors), by assuming that the risk of such effects can be extrapolated to the chronic exposures that are characteristic in civilian uses of nuclear material. The studies in the southern Urals will contribute to a better understanding of what models are most appropriate to describe the relationship between low dose-rate (chronic) radiation exposures and radiation-induced health effects.

The third benefit of operating with this global consciousness may be the most obvious, and, as a regulator, has become the most apparent for me in working with the International Nuclear Regulators Association (INRA). For nuclear safety organizations that are similar in purpose and function--in this case, national nuclear regulatory bodies--the benefits of detailed comparisons, highlighting commonalities and differences in approach are invaluable. As an example, within the INRA, we have gained significant insight by seeking to identify the fundamental components of a sound nuclear regulatory infrastructure, with an ongoing focus on such topics as independence, the powers and sanctions of regulatory bodies, regulatory processes, internal quality assurance, and regulatory effectiveness. This kind of activity can strengthen regulatory bodies, and can lead to harmonization (within national laws) of safety regulatory approaches, as well as more focus, less duplication, and more leveraging of resources in international assistance efforts. This is critical in order to ensure that all countries choosing the nuclear power option, or using nuclear materials, have the necessary infrastructure--technical, statutory, and regulatory--to safely use nuclear energy.

Conclusion

In conclusion, I would like to reiterate my opening statement, that the increasing maturity of the nuclear energy arena is neither a signal of stagnation nor a guarantee of stability. Change will happen, and new change-inducing factors will continue to emerge. As these changes occur, it becomes the vital responsibility of all concerned to maintain a clear sense of our primary health and safety goals, while remaining responsive to criticisms and emerging concerns. Our effectiveness in meeting those goals will be facilitated by the use of coherent, broadly applicable approaches to the operation of our organizations. And finally, we will be well served by a global consciousness that the OECD/NEA typifies--that broadens our perspectives on safety issues, leverages our resources through cooperative research efforts, and enhances our insights through comparing our commonalities and differences. Within the changing environment of this new global age, these four elements will go far in helping us to chart a steady course through shifting currents.

Thank you.