NRC NEWS

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REMARKS

By

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Conference On Universities, Industry And Government:
Partners For The Future Of Nuclear Education And Technology

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Good morning. I am delighted to be able to participate in this morning's session. No small part of my pleasure in joining you here today is the opportunity to exchange views with the very distinguished participants with whom I share the platform today. I would like to single out President Shirley Jackson. She was my predecessor as Chairman of the NRC, and I have reaped the benefit of the many initiatives that she launched. She left a strong legacy. This is an occasion in which I can express my appreciation to her.

This morning's session deals with the contribution of universities, industry and government to the future of nuclear education and technology. I am confident that we share two common understandings: first, that progress in science and technology is essential for productive growth in both the private and public sectors and, second, that the historic partnership of industry, government, and academia in scientific and technological endeavors, including nuclear technology, has benefitted the Nation in the past and should continue to do so in the future. The challenge is finding the means to reinvigorate the partnership among the sectors.

My remarks today reflect the perspective of a Federal regulator. While we share with industry an interest in a common talent pool for future staffing needs and share the interest of all parties in a sound energy policy, the demands that the NRC places on the educational and research enterprise differ

from those of industry. I would like to describe the direction that nuclear regulation is likely to take in the near future, and explore the implications for university research and for education.

Let me begin by focusing briefly on the sources of change and challenge for the NRC that have had, and are likely to continue to have, a profound impact on the scope and direction of NRC activities. The most obvious change, of course, is generated by the continuing threat of terrorist attacks. Although nuclear power plants are among the most hardened potential targets in our civilian infrastructure, the Commission has sought to reduce the vulnerabilities of these facilities and to enhance the protection afforded to fuel cycle facilities and nuclear materials. In order to meet the challenge, the NRC is undertaking a comprehensive review of NRC's safeguards and security programs. This is a complex endeavor which has already had an impact on our staffing needs and is causing a new thrust in our research activities as well. The final outcome will include a wide range of actions, including legislative proposals, regulatory modifications, organizational change, guidance documents, assessment tools, training programs, and revisions to the inspection program.

Security cannot be our sole preoccupation, however. The safe operation of the Nation's 103 operating nuclear power plants must remain a central task. In that regard, over the past decade, we have seen remarkable progress in the overall safety and economic performance of the nuclear power industry. This has sparked strong and continuing interest among licensees in renewing their operating licenses beyond the original 40-year term. We established a license renewal process that involves a thorough and rigorous technical review to ensure that a plant will be able to operate safely through the 20-year term of its extended license. We expect that the licensees of almost all of the operating plants in the U.S. will ultimately seek to renew their licenses. If these are successful, nuclear power will make a significant contribution to the Nation's electricity supply through the early part of this century.

However, if nuclear power is to continue to contribute, new construction will be necessary. Although it is not NRC's role to promote new construction, we must be prepared to ensure that the public health and safety will be protected if it comes about. To that end, we have put in place a process for siting and licensing new plants and have established a new organization to coordinate new plant reviews. We anticipate three applications for early site permits in FY 2003 and 2004. Moreover, the interest in new reactor designs continues -- we are reviewing design certification for the Westinghouse AP 1000, and the staff is undertaking pre-applications discussions with regard to five other designs.[1]

To build the technical foundation for all these activities, the NRC must have in place research programs that enable the timely resolution of technical issues. Thus, a significant proportion of our research is devoted to issues associated with aging of our current nuclear plants, the central focus of license renewal, and the technology associated with advanced plant designs, particularly where that technology differs substantially from operating plants.

Our partnerships with university research programs reflect these priorities. Examples of such programs include the assessment of the behavior of reactor pressure vessel steels subjected to long-term neutron irradiation and the testing of the performance of passive safety systems in advanced light-water reactors. Other research programs involving university participation are directed at somewhat broader technical questions that are relevant to both current and future plants, such as the evaluation of seismic

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[1] GE's ESBWR, GA's GT-MHR (a gas-cooled reactor), AECL's advanced CANDU, Framatome's SWR, and over a longer term, Westinghouse's IRIS.

behavior, the development of improved thermal-hydraulic models for accident analyses, and the incorporation of probabilistic risk assessment into regulatory decision-making.

Still another development that has important implications for the NRC's staffing and research needs is the High Level Waste Program. With Congressional approval of the Yucca Mountain Site, we expect to receive an application in December 2004 from the Department of Energy to authorize construction of the repository. The technical challenges surrounding the review of this application are very significant as the review of the application will include an assessment of compliance with strict environmental standards over a period of 10,000 years -- longer than recorded history. Obviously, any such undertaking must involve sophisticated understanding of the phenomena that determine repository performance, and development of reliable tools to project performance over time. A strong research effort is essential to the completion of this effort. Universities are contributing to the NRC's activities through the Center for Nuclear Waste Regulatory Analyses.

The challenges I have described not only reflect our research needs, but also underscore another fundamental issue -- the need to maintain NRC's technical skills at a time when a large number of NRC staff are approaching retirement. In 2000, roughly 20% of the NRC staff were over 55 years of age, the age at which many career Federal employees become eligible to retire. Despite aggressive hiring of new recruits, the percentage is growing. Approximately 15% of NRC's engineers are already eligible for retirement and another four percent of the current workforce of engineers will become eligible for retirement in the next few years. At a time when the challenges we face have expanded considerably, we may not have the necessary staff resources to resolve them without significant actions to renew and revitalize our staff.

To address this issue, we have made a concerted effort to identify skill gaps, to hire new staff to fill those gaps, and to ensure that essential technical skills are maintained and strengthened. NRC's mission-critical skills are in engineering, various sciences (including chemistry, physics, metallurgy, hydrology, seismology, and geology), mathematics, threat analysis, and information technology. In FY 2002, we reshaped our human capital management strategies to provide NRC managers greater flexibility to recruit, train, and retain individuals with the appropriate skills. The strategies include recruitment bonuses, additional entry-level hires, retention incentives, and a college tuition reimbursement program.

Our Nuclear Safety Intern program is a key piece of this strategy. Earlier this month I attended an agency dinner celebrating Hispanic Heritage Month. When I asked how many interns were having dinner with us, nearly two dozen hands shot up. They represent schools as close as the University of Maryland, in our own backyard, and as far away as UC Berkeley and the University of Puerto Rico at Mayaguez. All told, we have over 100 recent graduates in our intern programs, and we plan to hire another 50 this year. This reflects the reality that the NRC has always relied heavily on academia for staffing resources, and not just at the entry level. For example, my predecessors as Chairman include President Jackson, who came to the NRC from the faculty at Rutgers, and Nunzio Palladino, who previously was the Dean of Engineering at Penn State. In addition, current Commissioner Nils Diaz came from the University of Florida, former Commissioner Kenneth Rogers from the Stevens Institute of Technology, and former Commissioner Forest Remick from Penn State.

In short, there are both staffing and research needs for which the NRC is vitally dependent on universities. In this connection, there are several important issues that must be addressed:

- The NRC relies upon the universities to provide training for the next generation of nuclear scientists and engineers. This role is especially important in light of the demography of the NRC workforce and the need to replenish our staff. We watch declining enrollments in some critical fields with dismay.

- Universities must help develop experimental data and analytical tools that will be used by the next generation of nuclear engineers. For example, some of the advanced reactors now under consideration contain features that may not be adequately addressed by the currently available analytical codes. As a result, we depend on a healthy university research enterprise to develop these tools. The government must find the funding to support university researchers appropriately.

- The universities provide fertile ground for the development of new ideas for the generation of electrical power. In this connection, any continuing decline in the universities' commitment to nuclear engineering is particularly worrisome.

- We are seeing a steady erosion in the universities' willingness to maintain research reactors. The number of research reactors at universities has declined from 58 in the late 1960s to 28 today, with many of the current reactors under threat.[2] This is troublesome both because of declining availability of neutrons for research, and because of the loss of educational opportunities that these reactors provide.

Given the fundamental nature of these issues, I believe it is appropriate to reexamine the university/industry/government partnership to ensure we are able to meet the needs of the 21st Century. The NRC values its relationship with universities and we look forward to strengthening our relationship with universities in the years ahead.

Thank you.

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[2]Kenneth C. Rogers, "The Past and Future of University Research Reactors," Science, March 22, 2002, pp. 2217-2218.