Presentation to the
Water Reactor Safety Meeting
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By

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INTRODUCTION - October 27

Good Morning Ladies and Gentlemen.

For those of you who do not know me, my name is Ashok Thadani and I am the Director of the Office of Nuclear Regulatory Research. On behalf of the U.S. Nuclear Regulatory Commission, I am pleased to welcome you this morning to the 26th Water Reactor Safety Information Meeting. This year we have a three day program which will focus on many of the nuclear safety issues that we are facing today.

All of us here pursue a common goal, that of nuclear safety. And your presence here means that your organization shares a common value that the pursuit of knowledge through reactor safety research and experimentation should continue despite the pressures of budgetary constraints and downsizing. We share this value because we all know that research is essential to assuring safe use of nuclear technology because good science leads to good decisions - both in terms of safety as well as resource allocation. Your attendance here in times of declining budgets and international monetary strife speaks to the importance that your organization places in the belief that developing and sharing technical knowledge and understanding are essential to the safe and efficient use of nuclear technology.

But we cannot take anything for granted. Just because we share the same concerns and have drawn the same conclusions does not mean that others have also done so, even in our own organizations and governments. We are in a changing regulatory environment which is challenging us as researchers to be more pro-active, outcome oriented and cost-effective. We must use risk-informed thinking throughout our programs to effect safety improvements and reduce regulatory burden. This will result in significant changes in the way we conduct business. In a few minutes Chairman Jackson will share her thoughts on transitioning to risk informed and performance based regulation, a major departure from the NRC's past largely prescriptive regulatory philosophy. The nuclear industry is undergoing economic deregulation and restructuring which will increase pressures on them and us to use risk insights and other research to gain efficiencies. Also, there is increased stakeholder interest in research programs, a phenomenon which promotes increased cooperative interactions. Looking inside, we must synchronize our research programs with agency needs for safe and efficient regulation. Looking out, those of us who are regulators must be more mindful of industry and international efforts so that we can use cooperative research programs to achieve mutual goals. Lastly, and in summary, we must be more accountable–continued resource constraints and

public scrutiny and legislation require us to focus on outcome measures which will gauge our performance and tell whether our research efforts are “on the mark.” I am not daunted by these challenges. In fact, I am energized that you and I can all make a difference, whether it be in extending the safe life of our existing plants, or in licensing a new generation of future plants, or assuring that plants continue to be operated in a safe manner.

I look forward to this year’s plenary sessions and the presentations of papers. You will find the papers to be topical and representative of the leading edge of nuclear safety research. Today, our NRC Chairman will speak on ”The Transition to Risk-Informed Regulation: the Role of Research,” and NRC Commissioner Diaz will speak after lunch today on “Light Water Reactor Safety: The Convergence Process.” I am especially pleased to have a separate session on Tuesday afternoon covering the full Halden Program and its Organization for Economic Cooperation and Development Program Director Carlo Vitanza will speak about Halden at the Tuesday luncheon. A new session of papers will be presented this afternoon on nuclear materials issues and health effects research featuring new insights on the “Linear Non-threshold Dose Response Hypothesis.” There is also a separate session Wednesday afternoon on cable aging which you will find revealing. Of course we have many of the same sessions as before with updated research results.

I encourage your attendance at Tuesday’s panel discussion on the Future of Research as I am certain that you will find it stimulating and lastly, on Wednesday at lunch, Dr. Herb Kouts, of the Defense Nuclear Safety Board, and previously NRC’s first Research Director will speak on the history of safety research programs and lessons to be drawn from It. I am sure you will agree that the three day program is indeed focused on issues of interest to all of us.

I would now like to introduce the Chairman of the NRC as our keynote speaker. Dr. Shirley Ann Jackson. Dr. Jackson has been Chairman of the NRC since July 1, 1995. Dr. Jackson earned a Bachelor of Science degree in Physics and a Doctorate in Theoretical Elementary Particle Physics both from the Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts. Among the many firsts which Dr. Jackson has achieved, she is the first African-American woman to receive a Doctorate from MIT in any subject.

Prior to her becoming Chairman of the NRC, she conducted research at Bell Laboratories and was a Professor of Physics at Rutgers University. Since joining the NRC, she has brought energy and a sense of commitment to the agency. Among her achievements here have been her emphasis on the pursuit of risk-informed, performance-based regulation; her initiative of a strategic assessment and rebaselining effort which has indeed given new direction to the agency. Her recent induction into “The National Women’s Hall of Fame” in 1998 reflects very well the many achievements of Dr. Jackson. We are privileged to have her with us today to share her thoughts on risk-informed regulation.

“FUTURE OF NUCLEAR SAFETY RESEARCH” - October 28

I am pleased to welcome all of you this morning to this plenary session’s panel discussion on the future of nuclear safety research. This is a topic of great importance not only to us at the NRC, but also to you and to our other colleagues from around the world, especially in today’s climate of dwindling resources.

We have, today, a very distinguished panel of experts in the field ofnuclear safety, they are:

Mr. Ralph Beedle, Senior Vice President and Chief Nuclear Officer, Nuclear Energy Institute, Washington, DC; Mr. Jim Lang, Director, Delivery Energy Conversion Division, Electric Power Research Institute, Charlotte, NC; Dr. Michel Livolant, Director, Institute of Nuclear Safety and Protection, Paris, France; Mr. Dennis Harrison Director, Operating Reactor Research Program, Department of Enerby, Washington DC; and, Dr. Dana Powers, Vice Chairman, Advisory committee for Reactor Safety and Department Manager for Energy Nuclear Facilities, Sandia National Laboratory, Albuquerque, NM

In order to conserve time, I will not describe their many accomplishments except to note that their contributions to nuclear technology have, in fact, been noteworthy. Our plan is for each of us to briefly provide our views on the future of research, and allow sufficient time for questions and answers.

I would like to speak to you on the challenges that we face, here at the NRC, and on the direction and the steps that the NRC's Office of Nuclear Regulatory Research is taking to meet these challenges. At the outset let me state what I believe should be our mantra - "Safety research should be pro-active, outcome oriented, and risk-informed."

The nuclear industry is changing and maturing. New technologies are evolving. New information and operational data are being generated, and our operating plants are aging. These factors pose new issues and challenges for nuclear safety research.

Our research needs to be responsive to this changing environment. Research is needed not only to provide the necessary information in order to support nuclear safety but it is also needed to support removing unnecessary conservatism or requirements and providing additional licensee flexibility (i.e, burden reduction decisions). Resource constraints (declining budgets and dwindling qualified staff) and an increased focus on outcome measures, emphasize the need for efficiency and effectiveness. Economic deregulation and restructuring will continue to increase pressures on the industry to gain efficiency. Efficiency will be sought by the industry by employing new technologies, including risk assessment, and improving operational performance in areas such as power operation and extended operating cycles and higher fuel burn-up levels.

In recognizing these changes and their demand to improve the way we conduct our business, and as Chairman Jackson noted yesterday, the NRC is currently in transition to a more risk-informed regulatory process. This transition also requires that our analytical tools should be modified to better understand margins for safety and to remove any unnecessary conservatism that can be determined by research results.

The following viewgraphs identify what I believe is our mission and future role of research at the Nuclear Regulatory Commission.

Viewgraph 1: THE MISSION AND FUTURE ROLE OF RESEARCH

- Safety - Fundamental Mission
- Efficiency & Effectiveness - Good Business Practice
- Maintenance of Infrastructure [People, Tools]

Viewgraph 2: MISSION AND FUTURE ROLE OF NRC RESEARCH (contd.)

- ❑ Resolve Safety/Regulatory Issues While Providing Appropriate Flexibility to the Licensees
- ❑ Reduce Uncertainties in Areas of Potentially High Risk or Safety Significance.
- ❑ Recommend Improvements to NRC's Regulatory Programs/Processes to Achieve Enhanced Safety While Improving Efficiency and Effectiveness.
- ❑ Develop and Maintain Regulatory Tools and Data Bases.

Viewgraph 3: MISSION AND FUTURE ROLE OF NRC RESEARCH (contd.)

- ❑ Keep Pace with New Technology Such that the Licensee's Use of Technology is not Delayed by the Regulatory Acceptance Process.
- ❑ Take Specific Actions to Improve the Effectiveness of Interactions with Internal and External Stakeholders.
- ❑ Using Risk-Informed Thinking Throughout Agency Programs
- ❑ Sunset Activities When Sufficient Information is Available for Regulatory Purposes
- ❑ Maintain a High Caliber Professional Staff

I believe that research remains a critical and vital component in the infrastructure that ensures the safe and efficient use of nuclear technology. The specific challenges for research include:

- Providing the tools and understanding of emerging issues so that they can be properly dealt with in a timely fashion. Research should be pro-active.

  In Hockey the best players don't go to where the puck is, but rather where the puck is going to be

- Research should be outcome oriented. Updating codes and standards, criteria, practices, processes and analytical methods to reflect experience that leads to improved safety and/or reduce unnecessary conservatism.

- Maintaining the infrastructure of tools and data so that the best available knowledge is used in safety decisions and that lack of such knowledge does not become a hindrance to safe and efficient nuclear plant operation.

Given these challenges, I would like to focus our panel discussion on the following questions:

Viewgraph 4: ROLE OF RESEARCH

- ❑ What Should be the Major Role for Research in the Future?
  - Improve Operational Efficiency
  - Respond to Emerging Issues
  - Support Advanced Designs

- ❒ What Technical Issues Most Need Research to Ensure an Effective and Efficient Solution?

- ❒ What Role Should Risk Information Play in Defining Future Research Programs?

- ❒ How Best Can Research Capabilities be Assured in Light of Large Budget Reductions?

- ❒ What Deciding Factors Should be Considered in Terminating a Research Program?