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PROVIDING CERTAINTY IN LOW-LEVEL RADIOACTIVE WASTE DISPOSAL: THE CONTINUING CHALLENGE

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Good morning. I am pleased to be here with you this morning to share my thoughts on the spectrum of issues facing nuclear licensees in their attempts to secure reliable options for disposal of low-level radioactive waste. The uncertainty as to the availability of safe and economical disposal options for low-level waste has become a key challenge for many categories of licensees.

Before discussing these issues, however, I would like to provide a status report on two related matters that could potentially affect low-level waste disposal activities. First, I will discuss the security measures that the NRC has taken in response to the terrorist attacks of September 11. And, second, I will provide a summary of recent activities related to the proposed high-level waste repository at Yucca Mountain, Nevada.

Security of Civilian Nuclear Activities

The terrible events of September 11 have had a profound impact on the NRC and its licensees. It has compelled all of us to reassess the full range of security issues involving NRC-related activities. This means, among other things, the examination of civilian uses of nuclear materials that have long been assumed to present minimal risks. As a result, the NRC has reassessed its assumptions about the nature of the threats with which our licensees might have to cope. In that regard, the events of September 11 have reinforced the fact that for all civilian nuclear facilities and activities, security concerns and safety are inextricably connected.

Nuclear security is not and cannot be an afterthought or an add-on; rather, it is integral to all our activities, across the board.

In the immediate aftermath of September 11, we advised reactor and fuel cycle licensees to proceed to the highest level of security -- a posture they have maintained in the intervening months. Many state and local government officials also took steps to augment power plant security forces with law enforcement personnel or National Guard troops. The NRC has worked closely with the Office of Homeland Security, the FBI, and other government agencies to provide our licensees with timely information about potential security threats. It is my view that nuclear facilities provide the strongest defenses that are to be found at civilian infrastructure in this country.

Although the NRC's primary safeguards focus has been on those facilities that constitute the highest risk, such as civilian nuclear power plants and fuel cycle facilities, we also are increasing security for those nuclear materials that could theoretically be used as radiological dispersal devices or "RDDs." Although there has been significant media attention to the hazards of such devices, our assessments indicate that RDDs are not particularly effective weapons in terms of the casualties that their use might be likely to cause. Large sources tend to be self-protecting and the dispersal of the material generally tends to reduce the hazard. RDDs are not very effective weapons, which is presumably the reason that such devices are not part of the arsenal of any country. Nonetheless, RDDs might be employed by a terrorist because of the fear that surrounds nuclear materials. Moreover, such a weapon could impose significant costs for cleanup and would obviously disrupt the use of the contaminated area until cleanup is accomplished. As a result, we have to assume that a terrorist might seek to use such a weapon.

The NRC has issued advisories to thousands of materials licensees and State agencies urging a number of specific actions to enhance the protection of nuclear materials. Generally speaking, these were directed to giving increased attention to unusual activities, ensuring conscientious use of security controls on radioactive materials, and restricting access during the use, storage, and transport of radioactive materials. The Commission is currently considering additional security enhancements as part of our comprehensive safeguards review.

The concern for security will result, over time, in a somewhat different focus in our regulation of nuclear materials. Our existing regulatory scheme is premised on ensuring the protection of the workers and the public from the licensed uses of radioactive materials, with little specific emphasis on preventing terrorist diversion and misuse of such materials. We clearly will have to build greater awareness that such materials could be used as weapons and to include elements in our regulations to reduce that threat.

Another area that we have had to reassess relates to the information that we make available to the public. September 11 made clear the need to rethink just how open we can and should be with respect to physical security issues. In assessing these issues, we must give due regard to two vital but competing interests. The first is the public's right to know, a right that is grounded in law and that is one of the most cherished principles of our democracy. The other is the need to keep sensitive information away from those whose purpose is to destroy that democracy. We are endeavoring to strike an appropriate balance between openness and security.

As many of you may already know, we initially brought down our website in order to give ourselves the opportunity to review its contents carefully. We needed to make sure that we were not inadvertently providing terrorists with information that could be valuable to them. In the intervening

months, we have restored much of that information to public view. We realize that this has been an inconvenience to many who deal with the NRC, and we appreciate the patience and understanding that the agency has received in this critical period.

Status of Activities Related to High-Level Waste Disposal

Let me now briefly discuss recent events related to the proposal to site a high-level waste repository at Yucca Mountain.

As you know, several months ago, President Bush formally accepted the Secretary of Energy's recommendation that the Yucca Mountain site be developed as a repository for the disposal of high-level nuclear wastes and spent nuclear fuel. On April 8th of this year, the Governor of Nevada provided the Congress with the State's "Notice of Disapproval of the Proposed Yucca Mountain Project." Under the law, the President's determination will become a final decision if, within 90 calendar days of continuous session, Congress passes a resolution approving it. The House took such action last week and hearings on the site recommendation are scheduled in the Senate. If Congress endorses the President's approach, DOE will be authorized to apply to the NRC for a license to construct the repository.

Of course, we cannot know with certainty what the outcome of the Congressional consideration will be. Nonetheless, the NRC needs to be prepared for the possibility of such an application. Specifically, as required under the Energy Policy Act of 1992, the NRC has promulgated the health and safety regulations to guide a licensing decision on Yucca Mountain. These are demanding regulations, and we are confident that any proposed repository that can be shown by DOE to comply with them will adequately protect the public, now and in the future. In addition, in order to prepare for a potential license application review, the NRC staff recently published a draft of the Yucca Mountain Review Plan. Thus, NRC's regulatory framework for a review of a license application, should one be submitted, is largely in place.

If an application is submitted, the administrative proceeding before the NRC is likely to be extensive and complex. Our Atomic Safety and Licensing Board Panel has already begun work to prepare the ground, including development of the electronic tools that will make it possible for the parties to have access to the enormous volume of documents that can be expected. We plan to harness electronic technology to replace traditional document discovery and to expedite the hearing.

One issue that has been prominent in recent discussions of Yucca Mountain relates to the safety of the transport of spent fuel. Federal regulation of spent fuel transportation is shared by the U.S. Department of Transportation (DOT) and the NRC. DOT regulates the transport of all hazardous materials, including spent fuel, and has established regulations for shippers and carriers regarding, among other things, radiological controls, hazard communication, and training. For its part, NRC establishes design standards for the casks used to transport licensed spent fuel, and reviews and certifies cask designs prior to their use. NRC also conducts an inspection and enforcement program, and reviews and approves physical security plans for spent fuel shipments.

The safety record associated with the current regulatory system is exemplary – approximately 1,300 shipments of civilian fuel and 920,000 miles without an accidental radioactive release. But, as elsewhere in our activities, a record of success does not preclude the possibility that undetected weaknesses may exist, and neither the NRC nor its licensees can afford to become complacent. We

therefore continually examine the transportation safety program. Over two years ago, NRC began the Package Performance Study to study cask performance under severe impact and fire accident conditions. The study plan calls for full-scale testing of a cask to confirm computer models of cask response to severe accident conditions. As a part of its evaluation, the NRC staff is analyzing appropriate national transportation accidents, such as the 2001 train accident in Baltimore, to determine if our transportation requirements need to be modified. Finally, NRC is sponsoring a study to update its evaluation of cask response to acts of sabotage. These studies, together with any resulting changes to our security requirements, if necessary, should further ensure the safety of the transportation of spent fuel.

Low-Level Waste Disposal

I will now turn to the central focus of this meeting -- low-level radioactive waste disposal. It will not be news to any one here that the low-level waste siting program in this country is not working. Moreover, barring Congressional action, which is unlikely in the near term, the situation is unlikely to change. Access to low-level waste disposal sites affects many classes of licensees, including nuclear power plant licensees intending to decommission their plants. My remarks today will concentrate on the strategies that the NRC is considering to make sure the uncertainty in obtaining uninterrupted access to licensed low-level waste disposal sites does not adversely affect licensees' ability to decommission their plants safely.

Before I begin, let me say that the NRC staff will make a number of detailed presentations at this meeting on some of these topics, so I will discuss them only briefly.

It has been estimated that the volume of low-level radioactive waste generated over 40 years of operation is approximately 600 cubic meters for a pressurized water reactor and is approximately 2700 cubic meters for a boiling water reactor.¹ Thus, the total volume of low-level waste generated by existing reactors is on the order of 150,000 cubic meters. If decommissioning is also considered, however, the estimates are 8,000 cubic meters of waste for a pressurized water reactor and 15,000 cubic meters for a boiling water reactor.² The resulting total volume is on the order of a million cubic meters. Volumes of contaminated soil at fuel cycle sites and sites managed under NRC's Site Decommissioning Management Plan are less well known, but could be on the order of 650,000 cubic meters. Consequently, although the estimates carry considerable uncertainty, it is clear that there is a significant volume of low-level waste for which a disposal site or sites will be needed.

Sufficient disposal capacity currently exists to handle today's disposal needs, particularly in light of the trend towards license renewal of civilian nuclear power plants. (License renewal delays decommissioning and hence postpones the need to dispose of the waste associated with decommissioning.) In addition, waste minimization, volume reduction, and decay-in-place strategies

¹ C.C. Miller, "Radwaste Management at U.S. Nuclear Power Plants: Where We Are Today (and How We Got There)", Radwaste Magazine, Volume 6, Number 6, at 8, November/December 1999.

² G. Konzek and others, "Revised Analysis of Decommissioning for the Reference Pressurized Water Reactor Power Station," NUREG/CR-5884, November 1995, and R. Smith and others, "Revised Analyses of Decommissioning for the Reference Boiling Water Reactor Power Station," NUREG/CR-6174, July 1996.

reduce the overall volume of material. Nonetheless, the disposal situation is increasingly uncertain. With the eventual closure of the Barnwell disposal facility to states outside the Atlantic Compact, the absence of progress in other Compacts to site low-level waste disposal facilities, and few other disposal options, access to facilities for the disposal of low-level waste is increasingly constrained. Although Envirocare of Utah may eventually obtain state approval for disposal of Class B and C wastes, the limited options for disposal are likely to keep disposal costs high. There is thus the potential that the decommissioning process for many sites and the medical use of radionuclides will be affected adversely.³

Even today, the reduced availability and the associated high cost of disposal at licensed low-level waste disposal sites are fostering exploration of a series of alternatives (e.g., assured isolation, rubbleization, and entombment). However, all these alternatives face considerable uncertainty.

Moreover, the situation is aggravated by the reality that one important aspect of the license termination rule -- restricted release -- is not functioning as intended. You will recall that the LTR allows, under certain circumstances, license termination with restrictions on future site use, so long as there is an appropriate third-party custodian, such as a governmental entity, that will maintain the site in perpetuity and there are legally enforceable institutional controls that limit exposure to 25 mrem for an average member of the critical group. Those NRC licensees interested in restricted release are finding it extremely difficult to find an appropriate custodian. Thus, it now seems that the broad flexibility that the NRC's license termination rule was intended to provide is not being realized. As a result, licensees with sites to be decommissioned are being forced to pursue unrestricted release, which means increased volumes that must be shipped to offsite waste disposal sites. This, of course, simply serves to enhance the demand for increasingly unavailable low-level disposal sites.

The Commission is aware of and concerned by these developments. In November 2001, I sent a letter to Secretary Abraham of the Department of Energy noting that Section 151(b) of the Nuclear Waste Policy Act allows the Department to assume title and custody of low-level radioactive waste and the land on which such waste is disposed of, provided the NRC makes certain findings. We advised that NRC has identified a number of sites (currently about seven) that might be appropriate for future license termination under restricted conditions and that could be candidates for the exercise of DOE's statutory authority for long-term stewardship. I encouraged DOE to continue to work with NRC staff to develop a Memorandum of Understanding that addresses issues associated with long-term stewardship. In January 2002 Undersecretary Card responded to my letter by recommending that DOE and NRC work together with an appropriate Federal land management agency such as the Department of the Interior, as well as with the Office of Management and Budget, to seek a solution. DOE and NRC staff are preparing to begin discussions with OMB and DOI. In the meantime, it has become apparent that the Commission must also explore other ways to make restricted release a viable decommissioning option under the license termination rule.

The Commission is also taking other steps that may address, to some extent, the lack of disposal options. The NRC has reaffirmed that uranium mills can be used for processing alternative feed material, such as material from the Corps of Engineers Formerly Utilized Sites Remedial Action Program. Similarly, the Commission has voted to approve the use of mill tailings impoundments for

³ National Research Council, Board on Radiation Effects Research, "The Impact of Low-Level Radioactive Waste Management Policy on Biomedical Research in the United States" 2001.

disposal of other radioactive wastes similar to mill tailings, so long as the approvals of the long-term custodian and the relevant Low-Level Waste Compact are received prior to disposal. Also, because mill tailings impoundments and RCRA Subtitle C facilities can provide similar levels of public health and safety protection, we are beginning to work with EPA to consider a rule that would allow for disposal of certain radioactive material in RCRA impoundments. Finally, the NRC has agreed to help fund an assessment by the National Academies of the key issues affecting the safe and cost-effective management of civilian low-level waste. Many of these topics will be discussed in detail by other presenters at this meeting.

One further option that the NRC is exploring in its search for safe and otherwise suitable approaches to decommissioning is the unrestricted release of slightly contaminated material that poses no significant health threat. If this could be accomplished, it would serve to preserve scarce space in low-level waste sites. As many of you may recall, in June 1999, the NRC published an issues paper in the Federal Register to foster discussion about alternative courses of action for control of slightly contaminated materials. We indicated an interest in exploring options to address the issues, including whether to establish a standard for release by rule. In addition, the NRC staff held a series of public meetings during the fall of 1999 at four locations around the country to provide further opportunity for public input.

Over 800 written comments were received. Potential recipients of solid material, such as scrap metals and cement industry representatives, strongly objected to the release of contaminated solid materials. These commenters asserted that there would be severe economic impact on their industries if consumers were to refuse to buy their products because of concerns over the presence of radioactivity. Citizen groups and other individuals expressed concern about health effects of the potential presence of this material in the environment and many argued that NRC should prohibit the release of any contaminated material. Others strongly favored the establishment of clearance levels.

The number and intensity of these comments indicated that further careful examination of the issue was needed. Moreover, it was clear from the comments that there was an element of distrust among some stakeholders as to the objectivity of the NRC in these matters. As a result, the Commission concluded that any successful resolution of the debate over the unrestricted release of slightly contaminated material would be facilitated by an independent assessment. Accordingly, the NRC deferred action so that the National Academies could study

the issue and make recommendations to us. In the interim, the NRC and Agreement State staff would continue to handle releases on a case-by-case basis.

The NAS study is now complete and the NRC staff is currently evaluating the report and its recommendations.⁴ The report finds that there is no immediate need for resolution of the issue, but that steady progress toward resolution should be undertaken. Although urging further careful engagement with stakeholders, the Academies clearly see conditional release -- that is release of slightly contaminated materials to unlicensed individuals for limited uses -- as an option that is worthy of careful exploration. I am very much looking forward to receiving the staff's analysis of the report and

⁴ National Research Council, Board on Energy and Environmental Systems, "The Disposition Dilemma: Controlling the Release of Solid Materials from Nuclear Regulatory Commission-Licensed Facilities," March 2002.

its recommendations for further steps on the part of the Commission. The staff's analysis is due to the Commission within a few months.

Conclusion

Let me note in closing that the Commission fully appreciates the importance of bringing greater clarity and predictability to the issue of access to low-level waste disposal for both current and future needs. The challenges are complex. Technology, science, economics, law, and public opinion all play a part. While none of us expects quick or easy answers, there is a need to bring greater certainty to low-level waste disposal. The Commission is committed to this task.

Thank you.