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Disposition of Nuclear Weapons Material in the United States:  
the Role of the Nuclear Regulatory Commission

Address by

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Management and Disposition of Nuclear Weapons Materials  
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Good morning ladies and gentlemen. I appreciate the opportunity to speak to you today on an issue of vital international and national importance - the safe, environmentally-sound and economically-realistic disposal of surplus nuclear weapons materials. I also want to thank the organizers of this forum for locating it so conveniently to my office, which is only a few miles up the road from this hotel.

This meeting deals with matters that are important to all of us. Following the end of the Cold War, the major nuclear weapons countries have taken steps to substantially reduce their nuclear arsenals. Thousands of warheads have been removed from weapons and declared surplus by government and military leaders. The United States is no exception. In March 1995, President Clinton declared 200 metric tons of fissile material to be surplus to U.S. national security needs. In this country, the U.S. Department of Energy (DOE) has the lead in managing the resultant stockpile of excess fissile materials--plutonium and highly-enriched uranium taken from defense programs. The DOE has also been developing plans for the possible use and eventual disposal of this material, as well as additional fissile material from the national stockpile. These plans, which propose NRC participation, are now being pursued, and the changes needed to support this initiative are being considered.

As the title of my talk indicates, I will be speaking about the NRC role in the disposition of this surplus fissile material. I will begin by briefly describing the historic NRC role vis-a-vis DOE. I also will discuss how that role has been changing in recent years, and I will conclude by describing how the NRC may participate in several aspects of the weapons material disposition activities.

Historic Role of the NRC in Regulating the DOE

From the earliest days of the U.S. nuclear program, most of those activities now operated by DOE were largely exempt from outside regulation. This included the processing of uranium ore and fabrication of fuel for production reactors, the separation of plutonium from the reactor fuel, the enrichment of uranium, and the fabrication of nuclear weapon devices utilizing plutonium and/or enriched uranium. The health and safety of operations at facilities now used by the DOE and its contractors in performing these activities were governed by contractual provisions imposed by the Atomic Energy Commission (AEC) rather than through licensing.

The Energy Reorganization Act of 1974 separated the AEC regulatory and promotional functions by creating the Nuclear Regulatory Commission and the Energy Research and Development Administration, or ERDA, which later became the Department of Energy. The Energy Reorganization Act identified four specific categories of DOE activities which were to be subject to NRC regulation. Among those were demonstration liquid metal fast breeder reactors and long-term storage facilities for high-level waste, commonly referred to as high-level waste repositories.

More recently, in 1992, additional oversight responsibility was given to the NRC, when the gaseous diffusion enrichment plants at Paducah, Kentucky, and Portsmouth, Ohio, were transferred to the United States Enrichment Corporation (USEC) and placed under NRC regulatory authority.

#### Changes in the NRC Regulatory Role Vis-a-Vis the DOE

With the cessation of the Cold War, the DOE mission at its weapons-related facilities has changed essentially from weapons design and production to stockpile stewardship; and cleanup and decommissioning. The need for secrecy that fueled much of the basis for DOE self-regulation has diminished. Four years ago (in the spring of 1994), Congress held hearings on proposed legislation to bring all DOE operations under some form of external regulation. This led to the creation of the Advisory Committee on External Regulation of Department of Energy Nuclear Safety which, in December 1995, recommended that all aspects of safety at DOE nuclear facilities be externally regulated. A follow-up DOE Working Group on External Regulation recommended that the regulation of DOE facilities be transferred to the NRC in stages over a 10-year period, following the enactment of appropriate legislation by the Congress.

One of the first steps toward introducing an NRC role into DOE activities occurred at about the same time that the report of the Working Group was being finalized. The DOE asked the NRC to participate in the DOE Hanford tank waste remediation system project, a major privatization initiative. An NRC/DOE Memorandum of Understanding (MOU) was executed on January 29, 1997, specifically for the demonstration phase (Phase I) of this project. This MOU calls for the NRC to provide technical assistance and support to the DOE in its development of a comprehensive regulatory program, consistent with the regulatory approach of the NRC, for processing all Hanford tank wastes into forms suitable for final disposal, while protecting the general public, workers, and the environment. The Congress continued to appropriate funding for NRC participation in this project for FY98.

To support this phase, the NRC has established a permanent resident on the Hanford site, and continues to assist in the review of initial DOE privatization contractor submittals, as well as in DOE development of guidance documents for the privatization contractors. Throughout Phase I of this program, the DOE is responsible for regulating the activities of the privatization

contractors. However, the ultimate goal of NRC participation is to provide a smooth transition into Phase II, if and when the tank waste processing becomes a commercial venture, with the intent that the contractors become NRC licensees.

Another area of potential NRC regulatory involvement is in the DOE program for disposal of excess plutonium.

#### NRC Participation in Storage and Disposition of Excess Plutonium

In January of 1997, the U.S. Department of Energy (DOE) issued its Record of Decision for the Storage and Disposition of Weapons-Usable Fissile Materials. In its Record of Decision, the DOE stated that it has decided to implement a program for the safe and secure storage of weapons-usable fissile material (plutonium and highly enriched uranium), and announced a strategy for the disposition of surplus weapons-usable plutonium. The DOE plans, as you know, involve pursuit of a hybrid approach for plutonium disposition, which would include (1) immobilizing surplus plutonium with high-level radioactive waste in a glass or ceramic material for direct disposal in a permanent geologic repository; and (2) burning some of the surplus plutonium as mixed oxide (MOX) fuel in existing domestic commercial reactors before disposal in a geologic repository. The DOE intends for the NRC to provide regulatory assistance and possible actual licensing of the fabrication and irradiation of the MOX fuel. Shortly after issuing its Record of Decision, the DOE briefed the full Commission on its plans for plutonium disposition. In February and March of last year, the NRC hosted two technical seminars, both open to the public, in which representatives of the nuclear industry, including several foreign representatives, made presentations on the fabrication of MOX fuel and its use in commercial nuclear reactors.

Last July, the DOE issued a program acquisition strategy for selecting private sector organizations to assist in implementing the MOX fuel alternative for disposing of surplus weapons-grade plutonium. The MOX fuel fabrication services detailed in the proposed strategy include: designing, constructing or modifying, licensing, and operating a MOX fuel fabrication facility; supplying commercial nuclear fuel for reactors; and ultimately, deactivating the fabrication facility. The proposal would involve a one-time use of MOX fuel to dispose of existing weapons-grade plutonium, but would specifically exclude reprocessing of the fuel following removal from the reactor. In addition, the MOX fuel fabrication facility would cease operation and be decommissioned by the DOE after completing its mission of weapons-grade plutonium disposition.

The DOE has taken additional steps to proceed with the MOX fuel initiative. It has issued a request for proposals from the private sector for fabrication and irradiation of MOX fuel. DOE has stated that it intends to contract with a consortium for services that would include:

- ◆ design of commercial MOX fuel;
- ◆ design, construction, licensing and operation of a MOX fuel fabrication facility that would be located on a government-owned site (probably at one of the national laboratories);
- ◆ design and execution of the reactor modifications necessary for the use of MOX fuel;  
and

- ◆ architect/engineering and construction management services associated with these activities.

An explicit element of this request for proposals is a requirement that the successful bidder must obtain NRC licensing of the MOX fuel fabrication facility. In this regard, the NRC has been working closely with the DOE under a Reimbursable Agreement to plan for possible facility licensing. The NRC staff already has evaluated the regulatory implications of collocating an NRC-licensed operation--such as a MOX fuel facility--with non-licensed operations, such as plutonium pit disassembly. The general conclusion of this review was that, while no issues were identified that would prevent collocation, regulation of a collocated MOX fuel facility may be complicated and burdensome. The degree of complication would largely depend on the degree of integration between the MOX fuel facility and the other operations that would not be NRC-regulated.

It is not clear at this time what the regulatory role of the NRC will be in this program. The scope of involvement by the NRC could range from complete licensing of the MOX fabrication facilities to simply providing technical assistance, from a regulatory perspective, to the DOE. If the NRC were to assume a more formal approach to these facilities, a number of issues may have to be addressed in legislation that would authorize both the DOE to proceed with its program and the NRC to regulate it. Examples of some of these issues that the Commission will have to consider are embedded in a set of questions.

- ◆ Who should be the licensee--the DOE, the contractor, or both? The DOE is proposing to have the MOX fuel fabrication activities performed by a contractor, with the DOE owning the facility, the plutonium, and any waste generated during the process. Hence, both the DOE and the contractor will possess certain attributes of a licensee.
- ◆ Should the regulation of the DOE MOX fuel facility be by a license or by a certificate-of-compliance process? Although NRC has traditionally regulated by way of its licensing authority, the Energy Policy Act of 1992 created the certificate-of-compliance process, which was used when we assumed responsibility for the gaseous diffusion enrichment facilities. The certificate-of-compliance process could be more appropriate if the DOE determines that the MOX fuel fabrication will take place in a previously constructed facility.
- ◆ What should be the role of other Federal agencies? The Environmental Protection Agency is responsible, among other things, for regulating emissions from nuclear fuel fabrication facilities, and the Occupational Safety and Health Administration is responsible for worker protection. The NRC has, in the past, coordinated with both of these agencies to eliminate or minimize dual regulation, and we believe that similar arrangements can be made in the case of a MOX fuel facility.
- ◆ What should be the role of the Defense Nuclear Facility Safety Board? This Board currently has the authority to investigate health and safety concerns with regard to DOE-owned defense nuclear facilities. Therefore, there is the possibility of dual oversight if the Board would determine the MOX fuel facility to be a defense nuclear facility.
- ◆ Who should be responsible for the oversight of decommissioning the MOX fuel facility--the DOE or the NRC? The NRC normally regulates the decommissioning of facilities in which licensed activities are carried out. In this case, however, as now proposed, the

DOE would be responsible for decommissioning of the facility, which would be located on a DOE site.

- ◆ Who is responsible for the safe disposal of low-level radioactive waste from the MOX fuel fabrication site? The issue primarily involves whether the DOE will be solely responsible for the transfer and disposal of the low-level waste generated during MOX fuel fabrication, or whether the contractor would share some responsibility for disposing of the waste. Because they contain elevated levels of transuranic nuclides, the wastes that would be generated at a MOX fuel facility are different from those generated by other NRC-licensed nuclear fuel plants. The NRC would have to reconsider the environmental assessments conducted in support of its regulatory framework to determine if they should be revised to account for these changes in the inventory of wastes for disposal.
- ◆ Should the NRC or the DOE have regulatory responsibility for safeguards at the MOX fuel fabrication facility? This issue deals with both fixed site physical protection and materials control and accounting. This is an important issue when one considers the inter-relationship between aspects of facility safety and safeguards programs.
- ◆ Should the DOE or the NRC be responsible for the transportation safety of the MOX fuel assemblies? If the DOE is responsible, transportation would be accomplished using the DOE Safe Secure Transport. If the NRC is responsible for regulation of a commercial carrier, an upgrade to the transportation regulations in 10 CFR Part 73 may be needed to ensure a comparable level of protection.
- ◆ Should the safeguards requirements at nuclear power plants using MOX fuel be upgraded to allow plant security forces to bear arms under Federal authority rather than under authority granted by individual states?
- ◆ Should Price-Anderson liability coverage be extended by the NRC or by the DOE? Both the NRC and the DOE are authorized to offer coverage under the Price-Anderson Act. However, under NRC authority, indemnity would be limited to \$500 million, whereas the DOE could offer up to \$9 billion in protection.
- ◆ How should NRC resource needs for this activity be met? This issue is important because it is necessary to ensure that current NRC licensees would not be forced to pay any costs arising from the NRC regulation of a DOE MOX fuel fabrication facility. This could be accomplished either through fees assessed to the DOE and/or its contractor, or by direct appropriation from the Congress.

As part of our continuing cooperation with the DOE, the Commission will be briefed by both the DOE and the NRC staff next week on Friday, April 3, on the status of the Mixed Oxide Fuel Facility Licensing. I expect that many of the questions that I have just mentioned to you will be addressed and discussed at that briefing. I urge you to attend.

If, as we expect, the DOE proceeds with its plans and NRC is assigned the role of regulator, we will have to make some changes and additions to our regulatory base in order to deal with the regulation of a MOX fuel cycle. A proposed revision of our regulation dealing with licensing of special nuclear material, which includes plutonium and enriched uranium, is nearing completion. This revision to 10 CFR Part 70 has been one of my highest priority rulemakings, and the

subject of an industry petition for rulemaking. We believe that no other significant rule changes will be needed to support the NRC licensing of a MOX fuel fabrication facility, nor to support the NRC regulation of the use of MOX fuel in licensed nuclear power plants. However, the NRC will have to define and evaluate the safety issues associated with a MOX fuel fabrication plant and develop related guidance for the licensee and our staff. The unique chemical and radiological hazards associated with plutonium-bearing materials should be addressed in this guidance.

Several technical, financial, and political questions, related to the MOX fuel initiative and to plutonium disposition in general, remain unanswered. Some supporters of the MOX fuel option have argued that plutonium immobilization is not an adequate method of disposal, because the plutonium later could be re-extracted from the glass or ceramic immobilization medium. In the U.S., industry representatives have expressed reservations about the size and duration of the investment necessary for commercial nuclear power companies to invest in the MOX fuel program--based on the financial vulnerability that could exist if unforeseen national or international events later prompted the DOE to cancel the MOX program. Also, certain U.S. public interest groups have asked that the DOE set minimum standards of safety or performance for commercial utilities selected to participate in the MOX program. All of these issues will have to be addressed before moving ahead with some form of regulatory program.

#### Conclusion

I hope that this discussion has given you a perspective regarding the NRC regulation of DOE activities. I also have tried to bring you up-to-date on the status of our interaction with the DOE on the regulation of the MOX fuel cycle activities that is a key part of the disposition of surplus plutonium removed from the nuclear weapons program. We will continue to stress the public health and safety, the common defense and security, and environmental protection in this, as in all our activities. I am confident that the NRC will perform its role effectively in ensuring the safe and secure disposition of the excess plutonium stockpile in MOX fuel if the Congress determines that this is the appropriate path for the United States to take.

... Questions?