

SHIPPING SPENT NUCLEAR FUEL IN THE 21ST CENTURY: Focus on Safety, Communication, Consultation, Cooperation, and Competency

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ABSTRACT

Transportation activities to support the Department of Energy's Civilian Radioactive Waste Management Program will be a significant undertaking. The Program's activities are described and discussed as a background for the main topic of the paper, *Shipping Spent Nuclear Fuel In The 21st Century*. In addition to the subjects of engineering and safety, this paper considers the significance of communication, consultation, and cooperation in achieving success in major engineering projects.

INTRODUCTION

I am pleased to have the opportunity to address the PATRAM attendees in this morning's plenary session. Those of you who have participated in past PATRAM symposia are aware that PATRAM 2001 has a somewhat different format with a specific theme for each day. Today's designated theme is Engineered for Safety.

The job of the engineer in the 21st century goes beyond the traditional view of engineer as designer, planner, builder, and operator. While the traditional duties remain, the times increasingly demand that the engineer also support program interactions with affected stakeholders through communication, consultation, and cooperation. It is not enough to design for safety – we must also establish the confidence of those who will be affected by our work.

I will describe the engineer's duties in the context of the Department of Energy's Civilian Radioactive Waste Management Program, focusing on the sizeable transportation task facing the Department

The Department's success in developing a shipping campaign to support the repository program will call not only for competency in all aspects of cask development and operations, but also consultation with those affected by the program. The Department will be able to build on the recent transport successes of its foreign fuel shipments and the current shipping campaign to the Waste Isolation Pilot Plant (WIPP) in Carlsbad, NM. These successful campaigns have taught us the value of communication, consultation and cooperation with affected stakeholders.

THE OCRWM PROGRAM

The Nuclear Waste Policy Act established deep geological disposal of spent nuclear fuel and high-level radioactive waste as the national policy for the United States. It gives

DOE the responsibility of implementing the Act, and establishes OCRWM as the Office within DOE to carry out that responsibility. In addition to the responsibility for developing, licensing, constructing, and operating a repository, OCRWM is also responsible for transporting the waste to a repository from commercial nuclear power plants and certain DOE facilities where it is stored. The schedule for the starting date for shipments will begin with the startup of a repository, which is planned for 2010.

The magnitude of the OCRWM SNF and HLW shipping campaign will be much larger than any that have been done anywhere in the world. After a brief start-up period, OCRWM plans to ship about 3,000 metric tons of heavy metal (MTHM) per year to a repository. The Yucca Mountain draft EIS includes estimates of the number of shipments for mostly truck and mostly rail transport scenarios. For the mostly truck scenario about 50,000 truck cask and 300 rail cask shipments are expected over 24 years. That is an average of about 2000 truck casks and 13 rail casks shipped annually. In the mostly rail case about 2600 truck cask and 11,000 rail cask shipments are anticipated over 24 years. That is an average of about 110 truck casks and 460 rail casks shipped annually.

THE OCRWM TRANSPORTATION PROGRAM

The transportation activities will include planning, transport services acquisition, development of operational transportation protocols, technical and financial assistance for emergency response training, and public outreach. Planning is a continuous process, which will accelerate over the next several years. As required by the Act, OCRWM will use private industry to the fullest extent possible in each aspect of its transportation mission. Prior to 1995, this requirement of the Act was being met by the Cask Systems Development Program (CSDP). Under CSDP, OCRWM had been developing high capacity, advanced technology truck and rail casks to transport SNF and HLW. OCRWM planned to own the casks and use private railroad companies and trucking companies for the transport services. However, about 1995, OCRWM decided to consider having the private sector own the casks and provide comprehensive services for transporting SNF and HLW.

As the private sector initiative was being considered it became increasingly evident that advances in cask design and new industry trends made the concept attractive. OCRWM proceeded to issue Draft Requests for Proposal (RFP) for the acquisition of waste acceptance and transportation services in 1997 and 1998. Current planning is still based on the privatization of transportation services. However, potential concerns about financial risks, uncertainty about schedules, characteristics of the SNF that will be offered by utilities for disposal, and new trends in cask and fuel designs, make the task increasingly challenging. Resolving these concerns may require reconsideration of the original approach of launching immediately into privatization. The early years, after the start of transport operations, is the period of greatest uncertainty.

OCRWM has participated in development of the DOE operational transportation protocols. The protocols build on the Department's extensive transportation experience, which includes the return of DOE SNF from foreign research reactors and the continuing shipment of transuranic waste to the WIPP facility in Carlsbad, NM. This effort had a

twofold objective to standardize operating practices when appropriate and to communicate those practices. Recognizing the value of experience gained in these activities and the need for consistency within the Department, a task force was assembled to develop Department-wide protocols. This task force was comprised of those who have shipped and those who will ship.

Section 180(c) of the Nuclear Waste Policy Act requires the DOE to provide technical assistance and funds for training of local public safety officials in procedures for safe routine transport as well as procedures for dealing with emergency response situations. OCRWM will work with stakeholders to begin this assistance and funding at the appropriate time. That is, when a repository site has been approved and routes identified, and we are closer to the start of shipping in 2010.

Finally, we need to address the timing of assistance and funding for emergency response training. Two of the factors that are important to the decision of when to begin training are turnover of emergency response personnel and training retention. With regard to turnover, we want to train the people who will be in place when shipments begin in 2010. In terms of training retention, training should not be so early that trainees forget what they learned when it's needed.

OCRWM has had a number of cooperative agreements in force with various regional state and national organizations. For the past several years, with the curtailment of transportation activities, OCRWM has not funded cooperative agreements to address transportation issues. With the revitalization of transportation activities, transportation cooperative agreements could again be useful in fostering two-way communication with stakeholders.

Another important avenue for communication and consultation has been the Transportation External Coordination Working Group (TEC). Despite the reduction in our transportation activities over the last few years, OCRWM has continued as a DOE co-chair of this group. TEC affords opportunities for state, local, and Tribal government representatives, other federal agencies, and industry and professional organizations interested in transportation to interact with DOE programs, and to discuss issues of mutual interest.

ENGINEERING AND SAFETY

The engineer's role covers many aspects of transportation including design, testing, licensing, manufacture, and operations. The cask designer is concerned with many attributes of cask performance. I will focus on just one of them, safety. Safety requires that workers and the public be protected during all phases of transportation operations. For transport of SNF and HLW, as for other radioactive materials, safety requirements are codified into federal regulations. The federal transport regulations are promulgated in the United States by the Department of Transportation (DOT) and the Nuclear Regulatory Commission (NRC). The DOT and NRC regulations are based on *Regulations for the Safe Transport of Radioactive Material* developed by the International Atomic Energy

Agency (IAEA). Although the IAEA regulations are not legally binding, they form the basis for most of the national transport regulations, which are legally binding.

The regulations that govern the design of transport casks are a set of test conditions and radiological performance criteria. The objective of such a system is to capture the requirements of safety in a succinct way. What the engineer understands, but others may not, is that such a system can protect public health and safety for conditions beyond those specified in regulations. That is, even when real accident situations exceed regulatory test conditions, casks designed to the regulatory standards can adequately protect public health and safety.

The NRC has demonstrated the applicability and adequacy of its regulations to so called "extra regulatory" conditions in the Modal Study in 1987 and again in the *Reexamination of Spent Fuel Shipment Risk Estimates* in 2000. The reason for the endurance of the protection offered by the regulations is the engineering design approach that avoids catastrophic failures. This conservative design practice is embodied in the regulations and in regulatory practice. In addition, this design approach is widely used in consensus codes and standards, which reflect regulatory practice.

The regulatory functions carried out by DOT and NRC are rigorous applications of administrative law, which can at times become adversarial. . The success of the regulatory process, with its small group of regulators overseeing a large volume of regulated activities, is attributable in large part to the exercise of engineering practices, which encourage cooperation to achieve a common safety goal. This practice is most evident in the development of codes and standards. These consensus documents are developed away from the regulatory arena, but with a significant amount of regulatory input. The standards development process allows the regulator, designer, and system operator opportunity to work together as peers to develop practical codes and standards that complement and enhance the safety goals of the regulations.

The robustness of the regulatory process, the engineering practices, and body of consensus standards that have developed in the area of SNF and HLW transport, give OCRWM confidence in the safety of transports. But OCRWM's confidence alone is not enough. The other essential challenge faced by program engineers is to convey the basis for that confidence, in a way that is useful to its stakeholders.

COMMUNICATION, CONSULTATION, AND COOPERATION

Major engineering projects have the potential to affect large segments of the public. The OCRWM transportation Program exemplifies this situation. Many large projects performed in the late 20th century have been characterized by public participation. We have learned that success in managing those large engineering projects can depend on inviting early public involvement and planning, for such involvement can avoid or at least minimize difficulties.

The recommended approach, or rule for openness, for the 21st century is to employ communication, consultation, and cooperation in engineering projects. Communication

serves to inform those affected by the project. The initiators of a project must inform affected parties at every step along the way from conception, through design, construction, and operation. Consultation requires listening and understanding by all parties. Finally, cooperation can be accomplished if the project developers and the affected public know the issues, and have acknowledged the concerns of each party. Cooperation can lead to the classic “win-win” situation when all sides work together.

We hope that we have practiced the rules of openness well and engaged the public and affected communities in an effective way. We have sought to inform the public about our transportation activities in a variety of ways. During development of the Yucca Mountain EIS OCRWM held numerous meetings in the State of Nevada, and other affected states to seek public comment. OCRWM frequently participates in town and tribal meetings to inform and consult. The cooperative agreements that OCRWM has held with regional and national groups have been used in the past and will be restarted when the transportation activities expand. Although OCRWM has deferred some of its transportation activities for the past few years, participation in the TEC Working Group has continued.

COMPETENCY

Competence is the core requirement for gaining and maintaining public trust and confidence. To be competent is to be well qualified and capable. Competency in the individual does not require knowledge of everything, nor does it mean the ability to do all things. It does require knowledge and expertise in one’s area of work, awareness of one’s limitations, and willingness to seek assistance when necessary.

CONCLUSION

As OCRWM awaits the decision on a recommendation to proceed with repository development, we stand ready to resume transportation activities. We will review the approach reflected in the 1998 Draft RFP and revise it as needed to address financial risks and uncertainties. We will implement the provisions of section 180(c) regarding assistance and funding for routine transport and emergency response training will begin at the appropriate time. Designation of a repository site will allow us to re-initiate cooperative agreements and to resume other transportation-related outreach activities. When shipping begins in 2010, OCRWM will benefit from prior DOE transportation successes by using the DOE-wide operational transportation protocols.

OCRWM believes that the regulatory process, that is the regulatory standards and their implementation, provides an appropriate basis for protection of the health and safety of the public and workers. This regulatory process, complemented and enhanced by a comprehensive body of consensus codes and standards, assures consistency and integrity for transport systems and their use. Finally, OCRWM is committed to openness, and is using communication, consultation, and cooperation in dealing with individuals and communities that are or may be affected by our activities. We recognize that competency is the means for developing and maintaining the trust and confidence of the public.