The Civilian Spent Fuel and High-Level Waste Transportation Program

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INTRODUCTION

Nuclear Waste Policy Act

Since the 1950's the United States has been studying methods to dispose of its nuclear waste. In 1982 the NWPA created the Nuclear Waste Fund so that owners and generators of waste will pay for the costs to manage for the disposal of spent fuel and high-level waste. As the agency responsible for managing the program, the Act authorized and required the DOE:

- To site, construct and operate a high-level radioactive waste geologic repository;
- To submit a proposal to Congress to construct a facility for the monitored, retrievable storage (MRS) of waste (after conducting a study for the need for, and the feasibility of, such a facility);
- To provide for the participation of State and Indian Tribes; and
- To develop a waste-transportation system.

The NWPA charges the DOE to develop the transportation system to take title at the reactor or generating site, to use the private sector to "the fullest extent possible", and to have all costs be covered by the waste fund. To plan, design and develop a transportation system the DOE is faced with two major tasks: providing for the technical and physical development of the transportation system and to resolve any institutional issues that could be expected, given the vast network of interested parties.

Nuclear Waste Policy Amendments Act of 1987

In 1987 the Congress approved a number of amendments to the NWPA, in the Nuclear Waste Policy Amendments Act, which included:

- Authorizing the DOE to characterize a site at Yucca Mountain in Nevada for potential development as a repository (with only one repository to be developed at present).
- Authorizing the construction of an MRS facility subject to specific conditions.
- Providing for a negotiator to seek a State or Indian Tribe willing to host a repository or MRS facility.

The Amendments Act also specified the following requirements related to transportation:

- The use of casks having designs certified by the Nuclear Regulatory Commission (NRC).
- Compliance with NRC requirements for the provisions of notification of State and local governments before waste is transported and for the physical protection of waste shipments.
- Provision of DOE technical assistance and funding for the training of safety officials of Indian tribes and local governments through whose jurisdictions shipments to a repository or MRS will occur. Training shall cover procedures required for safe routine transportation as well as emergency response situations.

Development of the OCRWM Transportation Program

To meet the goals of the NWPA, as amended, the OCRWM is fortunate to be able to build on a long history of safe shipping experience and a comprehensive system of Federal regulation and international standards. Because the schedule for the transportation program is linked to the schedule for the development and operation of waste disposal and storage facilities, the OCRWM is afforded the opportunities to refine and improve shipping equipment and procedures, and to coordinate transportation planning with other Federal agencies, industry, States, Indian Tribes, and other interested parties.

As the OCRWM transportation program has evolved, planning has expanded into four areas: (1) cask design, development and testing; (2) support-systems development and operational plannings (both originally outlined in the Transportation Business Plan (DOE/RW-0046); (3) systems analysis and (4) institutional interactions (outlined in the Transportation Institutional Plan, DOE/RW-0094).

A program plan for the transportation program is being developed that combines the activities first described in the Transportation Business Plan and the Transportation Institutional Plan with descriptions of the system analyses and operational planning activities and an explanation of the OCRWM transportation organizational structure. The Transportation Plan will be a consolidated overview of OCRWM's national transportation program plans, and will be revised as needed.

Cask Design and Testing

All casks designs for NWPA shipments will be certified by the NRC. The cask design efforts are composed of four initiatives. The four initiatives are:

- From-Reactor Casks for Spent Fuel to the Repository or MRS;
- From-MRS Casks to the Repository;
- Specialty Casks for Non-Standard Fuel and Fuel Bearing Components; and
- Defense High-Level Waste Casks.

The OCRWM is proceeding with the "from-reactor" cask initiative suitable for shipping waste either to a repository or to an MRS facility. In support of this design initiative, the OCRWM issued a "Request for Proposals" (RFP) in July 1986 for cask and transporter design and engineering, testing, certification by the NRC, and prototype fabrication. Contracts were signed for the design of two legal-weight truck casks and three rail-and-barge casks and work initiated in 1988 with the following companies: General Atomics, Nuclear Assurance Corporation, Nuclear Packaging Incorporated Westinghouse Electric Corporation, and Babcock & Wilcox. Plans for the design of overweight truck casks and dual-purpose (storage/transport) casks have been deferred, pending resolution of operational and institutional issues.

The from-reactor cask development contracts range in value from approximately $8 million to $15 million. Because of such factors as the increased age of fuel to be shipped to NWPA facilities and burn-up credit, the proposed cask designs promise a considerable increase in carrying capacity over currently available casks. This in turn should result in a significant reduction in the number of shipments and costs required to move spent fuel. Capacities for legal-weight truck casks are expected to increase from current payloads of 1 PWR or 2 BWR assemblies to approximately 3 PWR or 7 BWR assemblies per cask. Rail/barge cask capacities are expected to increase from current payloads of 7 PWR or 16 BWR assemblies to approximately 21 PWR or 48 BWR assemblies per cask. Completion of all the from-reactor preliminary cask designs are expected in 1989. After completion of the final designs the cask contractors are scheduled to apply for NRC certificates of compliance in 1991.

The other cask initiatives are expected to be developed as deemed necessary. Under current assumptions the "from-reactor" casks are projected to be capable of carrying a majority (75 - 85%) of the spent fuel expected to be generated at nuclear reactor sites. After the from reactor cask development is underway, adaptions may be able to be made to already developed casks to support some of the other initiatives.

Support System and Operational Development

The OCRWM has begun to evaluate alternative approaches for providing the support facilities, equipment and services needed for an operating transportation system. Requirements for cask-maintenance will be developed during cask design. Decisions on the scope and location of facilities to provide such maintenance and the development of other support facilities, such as a control center for operations, will proceed as functional requirements of an operational transportation system are defined.

Operations planning has proceeded in two major areas: reviewing management options, and evaluating the technical and Procedures requirements for an operational transport system. Consistent with NWPA directives, the OCRWM plans to use private industry to the maximum extent possible in conducting future transportation operations. A preliminary study has therefore been initiated to review potential management configurations and industry's willingness and capability to provide efficient management services. The OCRWM has also initiated the drafting of documents on the requirements and description of their operational waste transport system.

Systems Analysis

To ensure system integration within the transportation program and within the waste-management system, the OCRWM is conducting various transportation system studies to provide the information necessary to undertake the development, integration, and evaluation of the transportation system. The objective is to address and resolve key system issues, relationships among the various parts of the program, system configuration, interfaces, system performance, functional allocations, and major design parameters. The information provided by this activity will assist the decisionmakers in the selection of appropriate alternatives for program decisions. This "systems" approach should help ensure that the many system elements and subsystem decisions will complement each other rather than complicate or isolate individual program elements.

To conduct transportation systems analysis OCRWM has developed a technical database program that uses existing transportation models and databases along with models and databases developed specifically for OCRWM activities.

Institutional Interactions

The OCRWM initiated a strong program of institutional interactions to complement all transportation activities with the publication of the Transportation Institutional Plan in 1986. As described in the plan, the OCRWM is seeking and encouraging public participation in program planning by sponsoring, and participating in, a wide range of meetings and workshops, with special emphasis placed on regular meetings of the Transportation Coordination Group. Participants in the

Transportation Coordination Group include representatives of the DOE and its contractors, utilities, the States, Indian Tribes, local governments, and the transportation industry. The group serves to coordinate transportation planning and promotes broad based interactions for the eventual resolution of technical and institutional issues. The OCRWM also continues to develop a wide range of public-information materials on program activities. The OCRWM is updating the Transportation Issue Discussion Papers originally released in the Transportation Institutional Plan which discusses transportation issues and methods underway for their resolution.

To assist in the study of issues of special interest to States and Indian Tribes, and to promote the cooperative development of plans and procedures, the OCRWM has also initiated contractual and cooperative arrangements with national, regional, and transportation-related organizations. Such contractual or cooperative arrangements are now in place with the following organizations: The Commercial Vehicle Safety Alliance (CVSA), The American Association of State Highway and Transportation Officials (AASHTO), the Conference of Radiation Program Control Directors (CRCPD), the National Congress of American Indians (NCAI), the National Conference of State Legislatures (NCSL), the Western Interstate Energy Board (WIEB), the Southern States' Energy Board (SSEB), and the Midwest Office of the Council of State Governments (COSG).

In working with such groups—and with representatives of other Federal agencies, the utilities, the transportation industry and other interested parties to address transportation issues, attention most recently has focused on DOE's assistance to the State for training of safety officials as mandated by the Amendments Act. Section 180(c) of the amended NWPA requires the OCRWM to provide technical assistance and funds to States for the training of public-safety officials of local governments and Indian Tribes through whose jurisdictions waste may be transported to a repository or monitored retrievable storage facility. Training is to cover procedures for routine transportation as well as emergency response.

The OCRWM believes that the schedule for the development and operation of the overall waste-management system affords the time necessary for carefully evaluating all issues related to training and the need for training assistance. This effort will be implemented in phases, in time for the operation of waste-disposal and storage facilities.

CONCLUSION

Although the OCRWM transportation program will continue to evolve as the entire NWPA waste-management system develops, the objectives of the transportation program will not chance. The OCRWM will develop a transportation system that is safe, secure, and efficient, meeting all applicable regulatory standards and which provides opportunities for meaningful public participation in all phases of program planning.

REFERENCES

Transportation Business Plan, (DOE/RW-0046), U.S. Department of Energy, Office of Civilian Radioactive Waste, Washington, DC 20585 (1986).

Transportation Institutional Plan, (DOE/RW-0094), U.S. Department of Energy, Office of Civilian Radioactive Waste, Washington, DC 20585 (1986).