



U.S. Department of Energy



Transport, Aging and Disposal (TAD) Cask System Development and Implementation

Presented to:
Nuclear Waste Technical Review Board

Presented by:
Christopher A. Kouts
Director, Waste Management Office
Office of Civilian Radioactive Waste Management
U.S. Department of Energy

May 9, 2006
McLean, Virginia

Introduction

- **DOE is examining implementation of a primarily canistered transport, aging and disposal (TAD) system approach to simplify the design, licensing, construction and operation of repository surface facilities at Yucca Mountain**
- **TAD systems will address transportation, at-reactor storage, and repository aging and disposal of commercial spent nuclear fuel (CSNF), and will be consistent with DOE's current waste package designs**
- **DOE is considering providing incentives to industry to encourage the development and early utilization of TAD based systems**



Benefits

- **TAD system standardizes at-reactor CSNF storage, transport, repository aging and disposal packaging, allowing integration of CSNF handling operations throughout industry and at Yucca Mountain facilities**
- **TAD system utilizes utility fuel handling experience in packaging CSNF**
- **TAD system simplifies DOE operations and minimizes handling of bare CSNF assemblies at the repository**
 - **Reduces low-level waste production and worker radiation exposure at DOE facilities**
 - **Reduces complexity and cost of DOE facilities**
 - **Eliminates a number of technical issues**



TAD Performance Specifications

- **DOE is developing performance specifications for the following components of a TAD system:**
 - TAD canister
 - Transportation overpack
 - Transportation skid
 - Ancillary equipment*
 - Shielded transfer cask*
 - Aging overpack*
 - Aging system on-site transporter*

* For use at the repository only. Utilities will be responsible for defining performance requirements for use of similar components at their respective site(s).



TAD Performance Specifications

(Continued)

- **TAD performance specifications will delineate the requirements that DOE will rely upon in the repository license application to demonstrate compliance of the TAD system with 10 CFR 63**
- **Suite of performance specifications may also include other requirements that are expected to improve the efficiency of TAD system handling operations at the repository**
- **DOE will identify and establish in the TAD performance specifications any TAD system operational requirements, such as loading and verification requirements, that must be implemented to maintain acceptability of TAD canisters**



TAD Licensing Approach

- **Cask vendors will work directly with utilities and the NRC to receive certification for transportation (10 CFR 71) and storage (10 CFR 72) utilizing TAD cask systems**
- **DOE will be responsible for reviewing TAD system designs and affirm compliance with TAD performance specifications**
 - **TAD performance specifications will be reviewed by NRC as part of DOE's License Application (10 CFR 63)**
 - **Any modifications to the performance specifications arising from the NRC approval process will be communicated to the cask vendors**



Certification for Part 71 and Part 72

- **DOE will issue the TAD system performance specifications to the public and solicit TAD canister conceptual designs**
- **DOE will review the TAD canister conceptual designs to assess feasibility and compliance with DOE requirements**
- **Upon DOE approval of conceptual design, cask vendors will proceed with development of complete TAD system designs and safety analysis reports (SARs) to be submitted to NRC for certification under 10 CFR 71 and 72**



Certification for Part 71 and Part 72

(Continued)

- **Cask vendors will submit DOE-reviewed TAD system SARs to NRC for review and approval**
- **Cask vendors will notify DOE of any proposed modifications of TAD designs resulting from the NRC review.**
 - **In such an event, DOE will evaluate any proposed changes to ensure continued compliance with DOE performance specifications**



Continued DOE Oversight of TAD Development

- **DOE will review NRC-certified (Part 71 and 72) TAD systems to affirm compliance with DOE performance specifications**
 - **NRC-certified TAD systems that DOE determines meet the DOE performance requirements will be placed on a DOE-maintained list of approved TAD system cask models**
 - **The list will be updated regularly to include the latest DOE approved TAD designs that are consistent with repository licensing requirements**



DOE Oversight of TAD Fabrication

- **After NRC certification, cask vendors will fabricate and utilities deploy TAD systems for utility at-reactor storage**
- **DOE will require that utilities using TAD-based systems for at-reactor storage certify that TAD systems and components are fabricated in accordance with approved design drawings, specifications, and NRC-approved quality assurance (QA) requirements**
 - **Modifications to TAD systems or components that arise during the fabrication process will require DOE review to ensure continued compliance with DOE performance specifications**



Loading by Utilities

- **Utilities that use TAD systems for at-reactor storage or for direct transfer to DOE will be required to certify to DOE that the canister has been loaded and prepared in accordance with all DOE specifications and requirements under the provisions of an NRC approved QA program**
 - **DOE will require utility certification prior to acceptance of each TAD canister**
- **DOE asserts NO regulatory authority over utility operations**



Waste Acceptance Operations

- **DOE will procure TAD system transportation overpacks and provide TAD canisters for acceptance of spent fuel directly from utility pools for transport to the repository**
- **DOE will procure TAD system transportation overpacks for the purposes of transporting utility-purchased TAD canisters from utility dry storage sites to the repository**



Waste Acceptance Operations

(Continued)

- **A fully documented TAD that is accepted at a utility site and experiences normal transport operations to the repository will be deemed suitable for repository surface aging or direct disposal without further examination**
- **In case of an off-normal event after DOE accepts a TAD canister from a utility, the canister will not be placed in aging or disposal unless evaluation by DOE demonstrates continued compliance with all repository licensing requirements**
 - **If the canister is determined to be out of compliance, the materials will be repackaged by DOE in a new canister prior to aging or disposal**



Conclusions

- **TAD systems will enhance CSNF management and disposal operations; DOE will specify performance requirements for TAD systems to allow use at the repository for aging and disposal**
- **TAD performance specifications will comprise part of the repository license application, which will require approval by the NRC for use at Yucca Mountain**
- **DOE will rely on commercial industry to design and engineer TAD system components**



Conclusions

(Continued)

- **DOE will confirm TAD system compliance with repository requirements for storage and disposal throughout the design, licensing, fabrication and operation of the systems**
- **NRC is the regulatory authority to approve the use of TAD systems for utility at-reactor storage, transportation to the repository, repository aging and disposal**

