

U.S. DEPARTMENT OF ENERGY
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

PRESENTATION TO
THE NUCLEAR WASTE TECHNICAL REVIEW BOARD

**SUBJECT: MINIMIZING WASTE HANDLING WITHIN
THE WASTE MANAGEMENT SYSTEM**

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OCTOBER 22, 1990

- **BACKGROUND**
- **INTERFACE WITH UTILITIES**
- **PREVIOUS STORAGE AND TRANSPORTATION SYSTEMS STUDIES**
- **CURRENT INTERACTIONS WITH UTILITIES**
- **CURRENT SPENT FUEL HANDLING RELATED STUDIES**

BACKGROUND

WASTE MANAGEMENT PHYSICAL SYSTEM FUNCTIONS

- Accept Waste
- Transport Waste
- Store Waste
- Dispose of Waste

BACKGROUND

WASTE MANAGEMENT SYSTEM

Some Necessary and Desirable Features:

- Safe
- Reliable
- Low risk
- Low cost
- Reduce number of waste shipments
- Eliminate unnecessary waste handling operations
- Compatibility of equipment and procedures

BACKGROUND

SPENT FUEL AND REACTORS

- Most spent fuel in U.S. is from Light Water Reactors
- By 2013, a quantity equal to the repository's complement of spent fuel will have been discharged from reactors
- There is no "standard reactor." Reactors in service have a wide variety of site-specific constraints which influence the shipment of spent fuel
- Reactors are running out of Spent Fuel Pool storage space
- Delays in the start of Waste Acceptance, if they occur, will exacerbate the spent fuel storage problem

BACKGROUND

AT-REACTOR STORAGE OPTIONS

- A variety of out-of-pool, at-reactor dry storage systems are being selected by utilities, or are being offered for consideration by suppliers:
 - Metal storage-only casks
 - Concrete storage casks
 - Metal transportable-storage casks
 - Multiple Element Sealed Canisters
 - Modular Vault Dry Storage

BACKGROUND

WASTE MANAGEMENT SYSTEM REQUIREMENT

- Accept for disposal all spent nuclear fuel from commercial nuclear power operations in the U.S.

INTERFACE WITH UTILITIES

- Defined in the Nuclear Waste Policy Act
- Specified in Detail in the Standard Contract
(10CFR961)

STORAGE TECHNOLOGIES

- Suppliers have no direct interface with the Waste Management System
- Suppliers of Storage Systems typically have substantial investments in the design, demonstration, and preparation for licensing of their systems
- DOE can influence the selection of storage systems by utilities

PREVIOUS STORAGE AND TRANSPORTATION SYSTEMS STUDIES

- Identification and evaluation of alternative waste management system scenarios with potential benefits (completed circa 1986)
 - Use of metal cask systems including:
 - Dual Purpose Cask
 - “Universal Self-shielded Waste Package”
 - Standardized Universal Canister
 - Mobile Hot Cell for use at reactors
 - Common Canister concepts
 - Central Spent Fuel Processing, Packaging, and Storage Facility

PREVIOUS STORAGE & TRANSPORTATION SYSTEMS STUDIES

MONITORED RETRIEVABLE STORAGE ENVIRONMENTAL ASSESSMENT REFERENCE & ALTERNATIVE SYSTEM CONFIGURATIONS DOSE AND COST WERE ESTIMATED

SYSTEM CONFIGURATION

REFERENCE

1. LEGAL-WEIGHT TRUCK
2. LEGAL-WEIGHT TRUCK
3. LEGAL-WEIGHT TRUCK
4. CONVENTIONAL RAIL TRANSPORT, 100-T CASKS
5. CONVENTIONAL RAIL TRANSPORT, 100-T CASKS
6. CONVENTIONAL RAIL TRANSPORT, 100-T CASKS
7. FUEL CONSOLIDATION AT REPOSITORY
8. WET TRANSFER FROM DRY STORAGE AT REACTORS
9. DRY STORAGE IN NON-TRANSPORTABLE CASKS AT
REACTORS

ALTERNATIVE

1. RAIL TRANSPORT
2. OVERWEIGHT TRUCK TRANSPORT
3. HEAVY-HAUL TRUCK & RAIL TRANSPORT
4. TRANSPORT IN 150-T RAIL CASKS
5. MARSHALLING 5 RAIL CARS PER TRAIN AT REACTOR
6. MARSHALLING 5 RAIL CARS PER TRAIN AFR
7. FUEL CONSOLIDATION AT REACTORS
8. DRY TRANSFER FROM DRY STORAGE AT REACTORS
9. DRY STORAGE TRANSPORTABLE CASKS AT
REACTORS

STORAGE AND TRANSPORTATION SYSTEMS STUDIES

- MRS System Studies

- Evaluated various waste management system configuration options including:

- Installation of disposal package at reactors

- Installation of disposal package at MRS

- Many Others

- Considered Effects on:

- Facility design

- Transportation

- Cost

- Licenseability

STORAGE AND TRANSPORTATION SYSTEMS STUDIES

- Evaluation of Dry Storage Technology Options
 - Prepared in response to Congressional directive in NWPAA
 - Considered use of dry storage technologies for interim storage of spent fuel until a repository is available
 - Considered cost, effects on human health and the environment, costs and risks of transportation, and the use of the Nuclear Waste Fund to finance at-reactor storage
 - Received review by States, utilities, and others

ACR ISSUE RESOLUTION PROCESS

- Forum to identify, discuss, and resolve issues in a straightforward, cooperative manner
- Provide DOE with a better understanding of utility problems and priorities
- Provide utilities with a better understanding of DOE concerns and requirements

CURRENT SPENT FUEL HANDLING STUDIES

- Facility Interface Capability Assessment
 - Define current capabilities of reactors to transfer Spent Fuel to System
 - Findings from site visits to each reactor facility incorporated into data base

CURRENT SPENT FUEL HANDLING STUDIES

- **Near Site Transportation Infrastructure Study**
 - Determine local-to-reactor transportation adequacy for waste management system
 - Approximately 50 Reactor Sites have been visited to date
 - Preliminary report expected in June, 1991

CURRENT SPENT FUEL HANDLING STUDIES

- **NUHOMS BASKET STUDIES**
 - Study to qualify NUHOMS Canister for transportation inside a specially designed cask
 - Grant issued to Pacific Nuclear Fuel Services Inc.