



U.S. Department of Energy
Office of Civilian Radioactive Waste Management



Repository Site Operations

Presented to:
U.S. Nuclear Waste Technical Review Board

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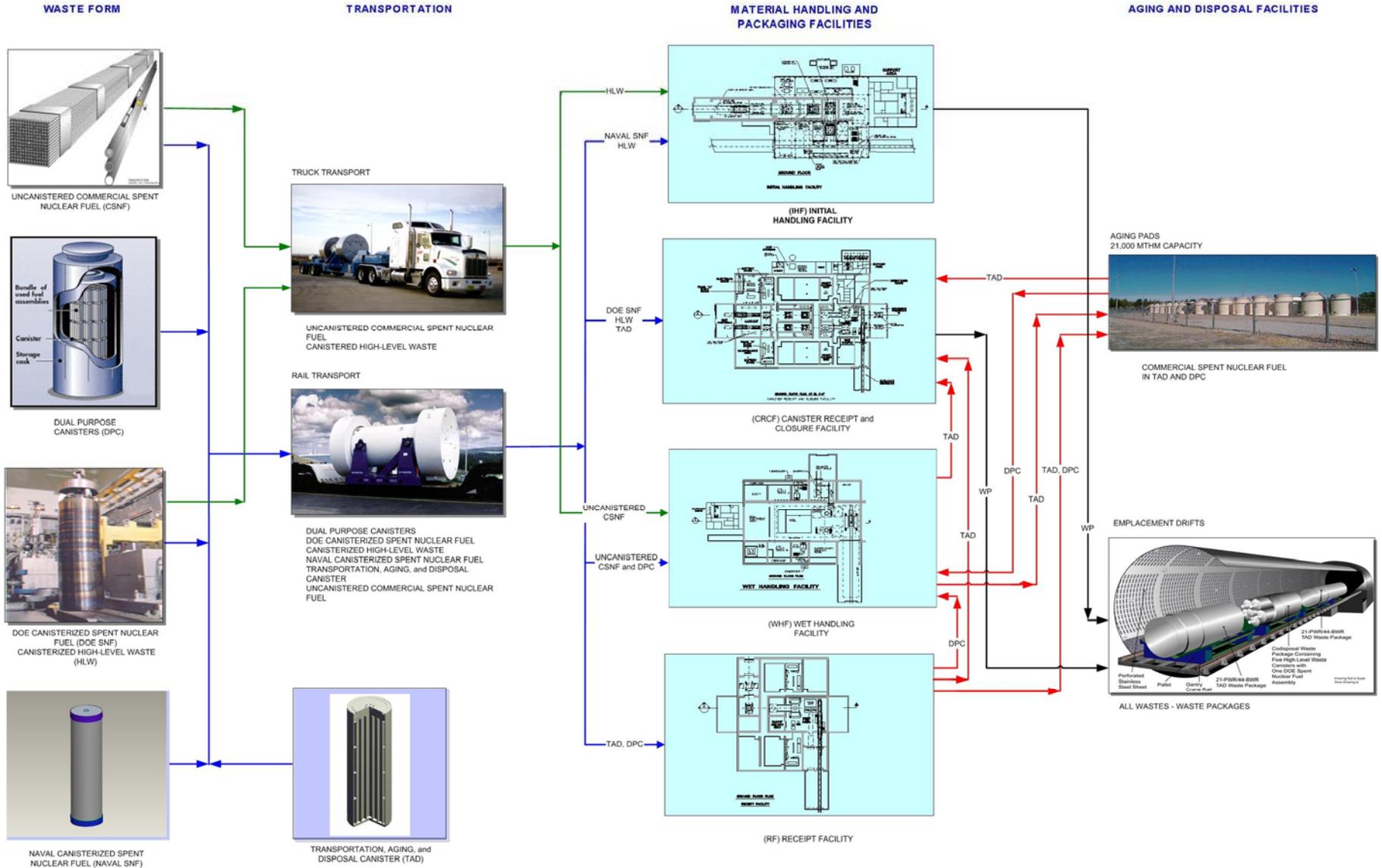
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Repository Site Operations

- **Content**
 - **Overview of repository design**
 - **Integrated surface facility throughput**
 - **Potential upset conditions**



CONCEPT OF OPERATIONS - NUCLEAR FACILITIES



Overview of Repository Design

- **Design configurations into modeling**
 - **Layout and facility configuration**
 - **Mechanical equipment envelopes**
 - **Time-motion study inputs**
 - **Operations inputs on staffing, etc.**
 - **Industry equipment speeds**
 - ◆ **Plant visits (trip reports)**
 - ◆ **Operational videos (timed operations)**
 - ◆ **Equipment specifications (vendor information)**
- **Throughput rates define a design-to-performance**
 - **NOT a must-maintain-performance-at-level**



Overview of Repository Design (cont.)

- **Assumptions in facility models**
 - **Equipment available ON DEMAND**
 - ◆ **Crawlers, locomotives, trolleys, etc.**
 - ◆ **Quantities necessary to meet specified rates**
 - ◆ **Becomes a program funding issue**
 - **Facility studies determine number of cranes and hoists**
 - ◆ **Separate jib cranes instead of using main crane hoists (ex.)**
 - ◆ **Equipment interferences and utilization were primary drivers**
 - ◆ **Design changed to allow achieving throughput rates**
 - **Staff made available to operate equipment as necessary**
 - ◆ **Operators and supporting personnel (ex. health physicist)**
 - **Only 75% facility/equipment availability (address later)**
 - **Rolling stock (National Transportation) is available to supply facility demand/availability (previous presentation)**



Integrated Surface Facility Throughput

- **Nuclear facilities explicitly modeled in SimCAD**
- **Balance of Plant structures, systems, or components not modeled but included in assumptions**
- **Total System Model uses individual facility results**
 - **8-hour time-step model**
 - **Scenarios examine rolling stock affects on throughput**
 - ◆ **To define needed rolling transportation stock**
 - ◆ **Still being studied for National Transportation Program**
 - **Results show repository meets design throughput requirements**



Potential Upset Conditions

- **Individual facility models used 75% availability for:**
 - Periodic and emergent maintenance
 - Idle time caused by other facility operational interruptions
 - 75% much less than manufacturing sector at >85%
 - ◆ Provides margin or excess capacity
 - Reasonable inputs/assumptions for design
- **Events causing shutdown / severe interruption**
 - Affect ability to meet established design throughput rate
 - May not be appropriate to continuing operating
 - Events will be evaluated to assess resuming operations



Throughput Capabilities

- **Canister Receipt and Closure Facilities -**

Table 1. Summary of Throughput Model Results

Scenario	Model Results			
	Waste Packages	Transportation Casks	MTHM ^a	DOE SNF/HLW Canisters ^b
DOE SNF/HLW Canisters Only ^a	140-141	158-159	N/A	144/710-144/715
TAD Only ^b	183-219	185-221	1550-1882	N/A
Mix of DOE and TAD ^c	164-182	173-185	891-1087	63/305-54/250

- **Meets 700 metric tons of heavy metal (MTHM)/year commercial SNF into waste packages and DOE SNF/HLW rates per building**
 - **~26% excess design capability**
- **Receipt Facility –**
 - **Minimum determined capability is 1,783 MTHM/year**
 - **Meets throughput capability in all cases**
 - **~55% excess design capability**



Throughput Capabilities

- **Wet Handling Facility –**

Table 1. Summary of Throughput Model Results

Scenario	Model Results		
	TADs Produced ^a	Transportation Casks ^b	MTHM ^c
Truck Only	36	191-192	309-315
DPC Only	46-47	44-46	410-418
Mix of Truck and DPC	40-52	61-147	363-464
Small, Med, Large Roll Bare CSNF	54-74	60-138	461-627

- **Meets 307 MTHM/year (worst-case trucks)**
- **>20% excess design capability based on specified mix**
 - ◆ **10/90% split bare fuel to Transportation, Aging, and Disposal canister receipts (assumed all commercial – DOE SNF/HLW not included – provides margin)**
- **Operate based on equipment required to achieve design throughput rates for the following:**
 - **Aging Facility**
 - **Balance of Plant**
 - **Subsurface Facility**



Confidence in Results

- **SimCAD models sum to ~40% excess repository capability**
- **Total System Model results confirm repository capability**
- **Facility designs provide adequate design capability to accomplish mission**
- **Facility designs have excess capability to allow flexibility and fluctuations in receipts and operations**
- **Extending waste receipts for a year or two does NOT mean repository cannot achieve it's mission**



Follow On Work

- **Integrated repository throughput model is planned**
 - **Confident in current results**
 - **Updates to facility models will be conducted as necessitated by detailed design development**
 - ◆ **To confirm continuing acceptability of design**
 - **Detailed design for construction and procurement is still being completed**
 - **Include Aging Facility, Balance of Plant, Subsurface Facility, and National and Nevada Transportation**

