



U.S. Department of Energy



# Design and Engineering Update

**Presented to:  
Nuclear Waste Technical Review Board**

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# Main Topics

- **Critical Decision-1 revision process**
- **Potential features of revised design approach**
- **Preclosure safety analysis impacts**
- **Independent engineering study**



# Critical Decision-1 Revision Process

- **On October 25, 2005, DOE directed contractor to develop revised Critical Decision-1 (CD-1) package, including Conceptual Design Report, for selection of preferred alternative and range cost estimates for canister-based waste handling**
- **Implementation of canister-based approach**
  - **Commercial spent nuclear fuel (CSNF) generally would be sent to the repository in a transportation, aging and disposal canister (TAD)**
  - **CSNF would not require repetitive handling prior to disposal**
  - **Primarily canistered handling would result in cleaner facilities**



# Critical Decision-1 Revision Process

(Continued)

- **On February 14, 2006, DOE selected a recommended configuration to be developed in the CD-1 revision package**
  - **Modular, flexible configuration**
  - **90% of CSNF received in TADs; 10% of CSNF waste stream as uncanistered SNF assemblies**
  - **Adds dedicated facilities for receipt and waste package (WP) closure**
- **CD-1 package being developed, including:**
  - **Conceptual Design Report**
  - **Preliminary Hazard Analysis**
  - **Risk Assessment**
  - **Project Execution Plan**
  - **Cost and schedule information**



# Critical Decision-1 Revision Process

(Continued)

- **Until Energy Systems Acquisition Advisory Board (ESAAB) review and approval, this information is preliminary**
- **Following ESAAB approval, design development and updates to preclosure and postclosure safety analyses will be performed to support License Application (LA)**



# Potential Features of Critical Decision-1 Revision

- **Revised sets of surface facilities**
  - **Receipt Facility accepts TADs and dual purpose canisters (DPCs) and sends to aging**
  - **Canister Receipt and Closure Facility (CRCF) accepts TADs and other disposable canisters and inserts into WPs**
  - **Wet Handling Facility accepts uncanistered CSNF or DPCs, transfers to TADs, and sends TADs to CRCF or aging**
- **Subsurface layout unchanged**
- **CSNF WPs similar to naval long WPs**
  - **TADs similar in size to naval long canisters**



# Potential Features of Critical Decision-1 Revision

- **Uncanistered CSNF assembly handling performed in pools**
- **Canister handling generally performed with local shielding**
- **WPs to include shield plugs to support local access during WP closure operations**
  - **Shield plugs included in full-diameter canisters (TADs, naval) and in WPs for small-diameter canisters (DOE SNF and high level waste)**
- **Deletion of separate site rail system and associated transportation cask transfers**



# Potential Effects on Preclosure Safety Analysis

- **Category 1 event sequences reduced or eliminated due to reduction of number of uncanistered CSNF assembly lifts**
- **Consequence of uncanistered CSNF drops reduced due to confinement provided by pool**
- **Likely little change to Category 2 event sequences**
- **Important-to-Safety classification still expected for structures, lifting/handling equipment, electrical power, ventilation systems**



# Independent Engineering Study

- **Independent systems engineering study performed**
- **Similarities to BSC recommendation**
  - Wet handling of uncanistered CSNF assemblies
  - Canister handling uses local shielding
- **Differences from BSC recommendation**
  - Equipment for handling canisters
  - Potential for underground aging
- **Evaluate further through value engineering studies during preliminary design development**



# Summary

- **Canister-based design will simplify waste handling**
- **Until ESAAB review and approval, this information is preliminary**
- **Following ESAAB approval, baseline will be updated and LA products developed**
- **Greatest changes in surface facilities, less in subsurface and waste packages**
- **Event sequences will be minimized and consequences likely reduced**

