Repository Site Operations

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

Presented by:
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Repository Site Operations

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

<table>
<thead>
<tr>
<th>Scenario</th>
<th>TADs Produced</th>
<th>Transportation Case</th>
<th>MTHM</th>
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<tr>
<td>Truck Only</td>
<td>36</td>
<td>191-192</td>
<td>309-315</td>
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<tr>
<td>DPC Only</td>
<td>46-47</td>
<td>44-46</td>
<td>410-418</td>
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<td>Mix of Truck and DPC</td>
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<td>61-147</td>
<td>363-464</td>
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<td>Small, Med, Large Rail Bare CSNF</td>
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<td>60-138</td>
<td>461-627</td>
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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 its 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