WIPP Update

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Office of Environmental Management

National Council of State Legislators
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WIPP Update

• **WIPP Background**
  • Location and geology
  • Process
  • Transportation
  • 2014 fire and radiological release events
  • Key steps to recovery
  • Recovery/Challenges

• **WIPP Future - Near-Term (next 12 months)**
• **WIPP Future - Long-Term (1 to 5 years)**
WIPP Footprint
WIPP Facility - Underground

- U.S. Department of Energy facility
- Designed for permanent disposal of transuranic radioactive waste
- 2,150 feet deep

- Air Intake Shaft
- Air Exhaust Shaft
- Waste Hoist Shaft
- Salt Shaft
LWA: 6,200,000 ft$^3$
175,500 m$^3$

Current: about 50%
• Waste associated with defense
• Materials contaminated with man-made radioactive elements heavier than uranium (mostly Plutonium)
  • Alpha emitting isotopes/t^{1/2}>20 years
  • Clothing, tools, rags, containers, etc.
  • Soils and debris
• Two types of TRU waste
  • Contact-Handled (<200 mrem/hr)
  • Remote-Handled (>200 mrem/hr)
• Various Container Types
  • 55 gallon drums
  • 100 gallon drums
  • Boxes
• Legacy inventory ~700,000 drum equivalents
National TRU Program Process
WIPP Transportation System
NRC certified Type B containers:
Waste containers are loaded into protective shipping containers (such as TRUPACT-II).

Shipping containers are loaded onto specially designed flatbed trailers. State personnel inspect load before departure.

Drivers inspect their rigs and loads every 3 hours or 150 miles. Some states require additional inspections at their ports of entry.

For safety and security reasons, shipments are tracked throughout their journey using a satellite system (TRANSCOM).

WIPP-trained state and local emergency responders along all shipping routes, with frequent exercises.
22 sites completed
11,800 shipments thru Feb. 2014
14 million loaded miles
Waste containers are unpackaged and placed on waste hoist for 2155’ descent into underground
In underground, waste is removed from the hoist and transported to a disposal room.
Waste is emplaced in recently mined rooms. Magnesium oxide is placed on waste stack.
Factors Affecting Shipping

Shipping priorities are based on many factors, including:

- Equipment maintenance
- Stacking to maximize footprint usage
- Ground Control
- Curie limits
- VOC limits
Facility mined in salt:
2,150 feet deep in ancient salt formation that closes in and entombs waste forever
The February 2014 Accidents at WIPP
WIPP Status

- Shipments made 1999 through 2014
  - 11,897 shipments from 22 sites around the country
- Waste receipt and emplacement suspended in February 2014 due to two events:
  - Fire on underground vehicle
  - Thermal event in an emplaced drum
Incident Location

Event locations more than 2,300 feet apart

Salt Haul Truck Fire Location (North part of mine)

Continuous Air Monitor Alarm Location (Panel 7 Exhaust Drift)

www.wipp.energy.gov
Reopening and Resumption of Shipments
Key Steps Toward Recovery

- Documented Safety Analysis Revisions
- Safety Management Program Revitalization
- Underground Restoration
  - Re-Establish Degraded Equipment
  - Fire Protection
  - Maintenance and Ground Control
  - Radiological Roll-back
  - Soot cleaning of electrical panels
- Expedite mine stability
Key Steps Toward Recovery

• Initial Panel 6 and Panel 7, Room 7 Closure – isolation of nitrate salt waste
• Procurement and installation of Interim Ventilation System
Key Steps Toward Recovery
Key Steps Toward Recovery
Key Steps Toward Recovery

- Significant improvements to site safety management programs
- Extensive readiness activities performed in 2016
- DOE/State of NM authorized operations in December 2016
- First emplacement in early January 2017
- First shipments received in early April 2017
Current Status

- Emplaced 208 of the 234 containers in Waste Handling Building
- Started shipping waste from WCS in Texas
- Receiving shipments from Idaho and Savannah River
Projected Shipping Estimates

Key considerations in the development of the shipping estimate and points of origin included:

- WIPP waste emplacement rate;
- Available waste to ship;
- Regulatory commitments and agreements;
- WIPP transportation/waste acceptance capabilities;
- Flexibility for changing technical and policy constraints.

<table>
<thead>
<tr>
<th>Site</th>
<th>Projected Shipments</th>
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<tbody>
<tr>
<td>Idaho</td>
<td>61</td>
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<tr>
<td>Savannah River</td>
<td>8</td>
</tr>
<tr>
<td>Waste Control Specialists</td>
<td>11</td>
</tr>
<tr>
<td>Los Alamos</td>
<td>24</td>
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<tr>
<td>Oak Ridge</td>
<td>24</td>
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<tr>
<td>TOTAL</td>
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</table>

*Out years: Argonne, Lawrence Livermore, Sandia*
• With Panel 7 contaminated, emplacement rates are 2-3 pallet emplacements a week.
• The goal will be getting to 4-5 emplacements next year.
• Panel 7 will take 3-4 years to fill.
• Shipping rates will return to higher rates once emplacement begins in Panel 8 and a new ventilation system is on-line.
Challenges
Radiological Conditions
Ground Control

Limitations:

• 9 – months with no ground control following incidents
• Low ventilation rates limited bolting operations
• Need for workers to operate in personal protective clothing and respirators
• Bulkheads were placed at both ends of Room 7
  • isolates waste from events
• Rock fall occurred in Room 4 on November 3, 2016
  • fall was predicted and room was already prohibited
• Room 6 is prohibited due to ground control
  • also contains abandoned equipment
• Rooms 1, 2, 3 and 5 are safe and usable for waste emplacement
• Waste emplacement has started in S2520 moving west to east
• Currently available disposal capacity in Panel 7
  • should last approximately 3 years, depending on shipping rates
Mining of Panel 8:

- Planned to begin in October 2018
- No contamination present
- Required to bolt our way into the panel to remove equipment that has remained there since events
- Mining operations are expected to take approximately 3 years
Supplemental Ventilation System (SVS) will add 70 KCFM to underground to support mining operations
• on line in late September/early October

Use of new “de-dusting” technology should reduce impacts of salt dust on air filtration systems
• Initiated preparations for the withdrawal from the far south end (Panel 9)
• Cribbing, ventilation curtains and geomechanical instrumentation installed in the south mains by June 2017
• Regulatory approvals for final closures - 2+ years with implementation to follow
Future
Path Forward: Near-Term and Long-Term

- **Near-Term (next 12 months)**
  - WIPP reopening ✓
  - Waste emplacement operations in Panel 7 ✓
  - Resumption of shipping – establishing priorities ✓
  - Supplemental Ventilation
  - Restart of mining operations
  - Mining and waste emplacement model
  - Withdrawal from far south end of the WIPP underground

- **Long-Term (1 to 5 years)**
  - New - air intake shaft
  - New safety significant permanent ventilation system
  - Conceptual model for additional disposal area
New Ventilation Shaft

• Using top-down drilling method
• Geotechnical core drilling to 2,300 feet is complete
• Critical Decision 2/3 (Start Construction) expected in March 2018
• CD 4 (Operation) expected in December 2020
• **New footprint is being evaluated with the following criteria:**
  ✓ Priority will be to create panels to compensate for authorized disposal area that was reduced by ground control issues in the far south end
  ✓ Panels and drifts construction is under review
  ✓ Panels will be mined with existing equipment and methods
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  ✓ Panels will be mined with existing equipment and methods
  ✓ Regulatory issues
WIPP is pursuing adding Above Ground Storage Capability

- System is similar to that used at Savannah River Site
- Storage limited to one year
- Would accommodate up to 8 weeks of shipments at 17 shipments per week
- Storage is for operational flexibility, not for storage from other sites
Out-Year Available Shipping Weeks

Projected Available Shipping Weeks / FY

- Reduced Weeks Due to:
  - Shipments start April '17
  - Reduced Weeks Due to:
    - Annual outage
    - Waste Hoist Controller Replacement

<table>
<thead>
<tr>
<th>Year</th>
<th>Available Waste Emplacement Weeks</th>
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Out-Year Projected Shipments

Projected Shipments (FY17 - FY24)

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<thead>
<tr>
<th>Fiscal Year</th>
<th># of Shipments</th>
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Questions