Waste Isolation Pilot Plant (WIPP) Update


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The WIPP deep geologic disposal facility achieved almost 15 years of safe operations

- ~12,000 shipments received and ~91,000 m³ disposed
- 22 sites cleaned up of legacy TRU waste
- Regulatory changes in process to optimize facility (currently on hold)
- Shipping now from only four major DOE sites (Currently no shipping to WIPP is on-going)
- New Panel 7 emplacement operations begun
Two recent incidents have temporarily closed the WIPP facility

- An underground vehicle fire on 5 February 2014 caused the evacuation of the underground (all personnel exited the mine safely)

- Nine days later a continuous air monitor detected radiation late in the night (no personnel underground)
  - Re-entry into what is now a partially-contaminated mine is a methodical and intense undertaking
  - Addressing the root cause of the contamination event will precede restart of disposal operations
Recovery from these incidents is a phased process: Truck-Fire Phase

- First: determine the cause of the truck fire and recommend appropriate changes to prevent recurrence (completed)
- Second: critique the emergency response and recommend changes to improve future response performance (completed)
- Third: implement recommended changes (in progress)
Recovery from these incidents is a phased process: Radiation-Release Phase

• (While the cause of the release is being investigated) critique the emergency response and recommend changes to safety equipment and safety culture to improve future response performance (completed)

• Determine the cause of the release and recommend changes to future prevent recurrence (in progress)

• Implement recommended changes (in progress)
Recovery from these incidents is a phased process: Recovery phase

- The Recovery Phase will be the longer-term effort of addressing all of the recommendations made

- Purchasing new equipment and installing additional safety and ventilation systems

- Re-rewriting procedures and re-writing and augmenting calculations in documented safety analyses

- In terms of staff, retraining and requalification will be necessary, as will practicing emergency responses to various scenarios until they become second nature
Accident Investigation Reports (AIRs)—with cause-analyses and recommendations, are made public


- Phase 1 of the radiation-release accident-response investigation report is available at: http://energy.gov/sites/prod/files/2014/04/f15/Final%20WIPP%20Rad%20Release%20Phase%20201%2004%2022%202014_0.pdf
What has been learned from re-entry investigations at this point in time (I)

Some hanging roof bolts above disturbed bags of magnesium oxide, but no roof failure
What has been learned from re-entry investigations at this point in time (II)

- Polypropylene magnesium-oxide bags have disappeared on right and left deeper in disposal room leaving piles of MgO:
What has been learned from re-entry investigations at this point in time (III)

- Polypropylene MgO bags melted, suggesting exothermic reaction in waste containers:
What has been learned from re-entry investigations at this point in time (IV)

• Evidence of heat on side of white large waste box:
Underground investigation continues. . .

- The second part of the radiation-release Accident Investigation Report (AIR) will be completed once there is understanding the cause of the release.
- The first part of the AIR listed potential causes to be a physical collapse of a wall, portion of ceiling, or released roof-bolt.
  - Further investigation has shown these scenarios are not applicable.
  - Worker exposure and risk are to be minimized through careful evaluation of investigative options.
  - The cause and effects of potential reactivity in the waste stream of interest are being evaluated using containers in storage at places other than WIPP.
In Conclusion….

- **WIPP will reopen**
  - Recovery from the truck-fire and radiation-release incidents will take considerable time and investment
  - External expertise has been brought in to help the recovery process
  - Published recommendations in the Accident Investigation Reports completed so far are being meticulously implemented

- **The outcome will be a more robust geologic repository**
  - With new and well-maintained safety and supporting systems
  - With a highly trained workforce that understands and practices all aspects of a nuclear-safety culture
  - *Lessons learned will be made available to all who desire to learn from the WIPP experience*
Rock salt: an excellent repository host rock

- The fire and release incidents at WIPP are operational incidents. Findings to date indicate:
  - independent of repository host rock
  - no negative implications for use of rock salt as repository host rock

Permanent Isolation in Deep Geologic Salt – Providing Key Insights to Nuclear Waste Disposal Challenges