WIPP: The Only TRU Waste Repository?

American Physical Society
March 18, 2022

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Summary

• The 50-year history of agreements and laws regarding WIPP

• WIPP’s performance since waste was first received in March 1999

• Recent DOE efforts to expand WIPP’s physical facilities and change permitting requirements to accommodate new sources and larger amounts of waste, and

• Issues raised by the National Academies of Sciences 2020 Report on Surplus Plutonium and public concerns about and opposition to DOE’s plans.
Why WIPP Created?

- Transuranic (TRU) waste shipped to Idaho National Lab (INL) from 1954-1970 dumped:
Brief Early History

• 1970 – AEC promised to ship waste out of Idaho, beginning in 1980; Began surface storage at INL
• 1971 – AEC selected Salt Mine near Lyons, KS – repository will begin operating in 1975
• 1972 – Lyons site abandoned; Carlsbad, NM officials recruit AEC
• March 1979 – NM Legislature prohibits waste storage or disposal “until the state has concurred”
• December 1979 – Public Law 96-164 – Consultation & Cooperation (C&C) Agreement
• February 12, 1980 – President Carter cancels WIPP
• July 1, 1981 – C&C Agreement signed after lawsuit
WIPP’s Mission

• “Start Clean, Stay Clean” to dispose of up to 175,564 m$^3$ of defense transuranic (TRU) waste – 100,385 m$^3$ as of 3/12/2022
WIPP’s Mission

• Safely truck waste through > 20 states without serious accidents or releases

• Safely remove TRU waste from DOE sites

• Safely close, decontaminate, and decommission the site beginning in 2024
Other repositories are necessary for legal and technical reasons

- WIPP 1979, 1992, 1996 laws
- Future waste generation, as there is no policy to stop weapons production – or nuclear power
- Technical problems at one site
- No state, including New Mexico, is willing to host the only repository
Within 1 mile:
160 Oil Wells
11 Gas Wells
11 Salt Water Disposal Wells

And increasing

> 570 wells within 2.5 miles
WIPP’s Performance

- March 26, 1999
- Unfilled space, starting with Panel 1

Peak Year – FY 2006
10,155 m³ Disposed
1,128 shipments
[Capacity in 17 years]
## WIPP PERMITTED VS. ACTUAL CAPACITY USED

(in cubic meters) - As of March 5, 2022

<table>
<thead>
<tr>
<th></th>
<th>CH-Permitted</th>
<th>Actual</th>
<th>% Used</th>
<th>RH-Permitted</th>
<th>Actual</th>
<th>% Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel 1</td>
<td>18,000</td>
<td>10,497</td>
<td>58.32%</td>
<td>0</td>
<td></td>
<td></td>
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<tr>
<td>Panel 2</td>
<td>18,000</td>
<td>17,998</td>
<td>99.99%</td>
<td>0</td>
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<tr>
<td>Panel 3</td>
<td>18,750</td>
<td>17,092</td>
<td>91.16%</td>
<td>0</td>
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<tr>
<td>Panel 4</td>
<td>18,750</td>
<td>14,258</td>
<td>76.04%</td>
<td>356</td>
<td>176</td>
<td>49.44%</td>
</tr>
<tr>
<td>Panel 5</td>
<td>18,750</td>
<td>15,927</td>
<td>84.94%</td>
<td>445</td>
<td>235</td>
<td>52.81%</td>
</tr>
<tr>
<td>Panel 6</td>
<td>18,750</td>
<td>14,467</td>
<td>77.16%</td>
<td>534</td>
<td>215</td>
<td>40.26%</td>
</tr>
<tr>
<td>Panels 1-6</td>
<td><strong>111,000</strong></td>
<td><strong>90,239</strong></td>
<td><strong>81.30%</strong></td>
<td><strong>1,335</strong></td>
<td><strong>626</strong></td>
<td><strong>46.89%</strong></td>
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**Shortfall**

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<tr>
<td>Panel 7</td>
<td>18,750</td>
<td>9,470</td>
<td>650</td>
<td>650</td>
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<tr>
<td>Panel 8</td>
<td>18,750</td>
<td>18,750</td>
<td>650</td>
<td>650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panels 1-8</td>
<td><strong>148,500</strong></td>
<td><strong>121,459</strong></td>
<td><strong>2,635</strong></td>
<td><strong>1,302</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal Capacity</td>
<td>168,485</td>
<td>121,459 ~ 73%</td>
<td>7,079</td>
<td>1,302 ~19%</td>
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**Notes:**

"CH" is Contact-Handled waste; "RH" is Remote-Handled
"Permitted" refers to the capacity limits in the New Mexico WIPP permit
Volume is by outer container volume=Final TRU Mixed Waste Volume
Green amounts are estimates
Red amounts are sums of volumes
% amounts are calculations
Why Performance Problems?

- DOE issued no public analysis
- Congress released no public analysis
- GAO continually finds DOE provides inadequate oversight/contract management
- 2012 New Contract: “receive waste to complete the disposition of 90 percent of legacy transuranic waste by the end of fiscal 2015” [Goal = 39,710 m³ – Actual = 12,982 m³]
Why Performance Problems?

- First repository is a learning experience
- DOE exploring expanded missions –
  * Hanford HLW tank waste,
  * West Valley, NY commercial waste,
  * TRU waste surface storage
  * Heater tests for high-level defense waste
- Inadequate oversight/contract management - Contractor maintained
February 5, 2014

13 workers treated for smoke inhalation of 86 evacuated
At least 1 worker was disabled; he sued and settled
Waste Hoist out of service for 11+ months while soot cleaned
Pervasive lack of maintenance, equipment replacement, worker training, emergency response, and mine safety practices
February 14, 2014

DOE stated:

“No personnel contamination has been identified” - 2/15 at 2:49 pm
“No contamination has been found on any equipment, personnel, or facilities” - 2/15 at 9:17 pm
“No surface contamination has been found on any equipment, personnel or facilities” - 2/16 at 6:32 pm
“DOE emphasizes there is no danger to human health or the environment” - 2/16 at 6:32 pm
In Reality

- CEMRC detected radiation release
- All 13 workers internally contaminated
- Bioassay testing on February 19; Workers notified on Feb. 26
- 9 other workers contaminated on Feb. 15 – not notified until March 9 or later
- No medical treatment provided
- No screening of vehicles, homes/families
- Presumed <10 millirem dose
> 8,000 feet of contamination
DOE Accident Investigation

- Release was “Preventable”
- 24 Conclusions
  Failures at DOE Headquarters, WIPP, Los Alamos, Contractors in Training, Characterization, Safety Culture
- 40 Judgments of Need
  Improvements for DOE Headquarters, WIPP, Los Alamos, Contractors to address the failures
WIPP Recovery Plan

- Estimated Cost ~ $242 million
- “new permanent ventilation system, with an estimated cost range of $65 million–$261 million”
- “a supporting exhaust shaft, with an estimated cost range of $12 million–$48 million”
- Disposal Operations by March 2016
March 2022

➢ New Ventilation (SSCVS): $486 million, operating in January 2026

➢ New Shaft: $197 million+, operating in 2025?

➢ 700 C Fan: Restart unventilated airflow, constant contaminated air

GAO-22-105057, 3/15/2022
March 2022

• “NWP resumed operation of the unfiltered 700C fan on January 14th….Shortly after restarting the fan, pieces of metal were ejected from the fan-exhaust.”

• “On January 6th, NWP initiated non-compliance reports after discovering that WIPP personnel had failed to meet training requirements.”

• “On January 18th, NWP reported that during preparation of a contact-handled (CH) package for empty shipment, personnel found multiple parts installed in the wrong positions.”

• “On January 3rd, NWP reported that two maintenance supervisors proceeded to replace two fuses in the Air Intake Shaft (ASI) Hoist without following the Hazardous Energy Control process.”

WIPP Expansion Drivers

- Existing waste generation by NNSA
- “Surplus Plutonium” – Dilute at SRS and Dispose at WIPP (not MOX)
- Plutonium pit production creates new waste with no place to go unless it stays at the generation site or goes to WIPP if there are no other repositories
Expansion: Design and Capacity

- 2013: Panels 9A/10A “Repository Reconfiguration”
- 2017: New Filter Building and “New Shaft”
- 2018: “Volume of Record” – Two Capacity Volumes [~30% capacity volume increase]
- 2019: “New Shaft”
- 2021: Panels 11 and 12
Expansion Described/Denied

- June 27, 2016: “Operations Through 2050”
  - $250,000 Bonus. Publicly released under FOIA
- August 8, 2017: “meet...disposal needs to 2050”
- Dec. 2019: FEIS – WIPP operate to 2080
- March 31, 2020: No disposal end date
- July 15, 2020: “authorization for an expansion is not yet even before NMED, let alone this [NM Supreme] Court.”
- March 25, 2021: “planned expansion in reality is not a plan, but a future possibility.”
Future WIPP

Figure 4: Draft Conceptual Design for Additional Waste Disposal Physical Space at the Waste Isolation Pilot Plant (WIPP)
DOE Needs Bigger “Forever WIPP”

Land Withdrawal Act Statute Limit (Max = 175,564 m³)

Before Recalculation

After Recalculation

DSP-TRU Waste
Future Waste for WIPP
Waste Already in WIPP

DSP-TRU is diluted surplus plutonium transuranic waste that was generated by defense program activities.

Review of the Department of Energy’s Plans for Disposal of Surplus Plutonium in the Waste Isolation Pilot Plant

Consensus Study Report

48.2 MT total
NAS Recommendations/Findings

RECOMMENDATION 5-5: DOE “should implement a new comprehensive programmatic environmental impact statement (PEIS).”

RECOMMENDATION 5-6: “DOE’s National Nuclear Security Administration, DOE’s Office of Environmental Management, and DOE higher-level officials should take additional actions beyond those defined by the National Environmental Policy Act toward transparency and stakeholder engagement.”

FINDING 5-7: “A segmented and incremental approach to revealing the full inventory under consideration for disposal as diluted surplus plutonium transuranic waste in the Waste Isolation Pilot Plant (WIPP) (initially 6 metric tons [MT], then 7.1 MT, and 34 MT, and so on) obfuscates the total anticipated inventory expected for WIPP and its consequences.”
Agreements/Requirements

1981: New Mexico “Consultation & Cooperation” Agreement – State/Public Comment before expansion

1992: WIPP LWA: No SNF, No HLW EPA Certification/State RCRA Authority


1999: WIPP Permit: Disposal ends in 2024
Conclusions

- WIPP demonstrates that geologic repositories are difficult to develop and operate for technical, legal, and public acceptability reasons.
- Laws, the C&C Agreement, and Permits were essential for WIPP to operate.
- Non-adherence to those requirements heightens public controversy and undermines establishing other repositories.
- The federal government must develop a program to site new repositories for TRU waste (and spent fuel/high-level waste).
Website Information Sources

DOE WIPP Website:
http://www.wipp.energy.gov

NM Environment Dept. WIPP Documents:
https://www.env.nm.gov/hazardous-waste/wipp

NAS 2020 Report:
https://www.nap.edu/resource/25593/interactive/

Defense Nuclear Facilities Safety Board:
https://www.dnfsb.gov/

SRIC website:
http://www.sric.org
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