

WIPP: The Only TRU Waste Repository?

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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?

- Nuclear Weapons Plutonium Pits (cores) manufactured at the Rocky Flats Plant, near Denver, CO – 1952-1989
- Transuranic (TRU) waste shipped to Idaho National Lab (INL) from 1954-1970 dumped:

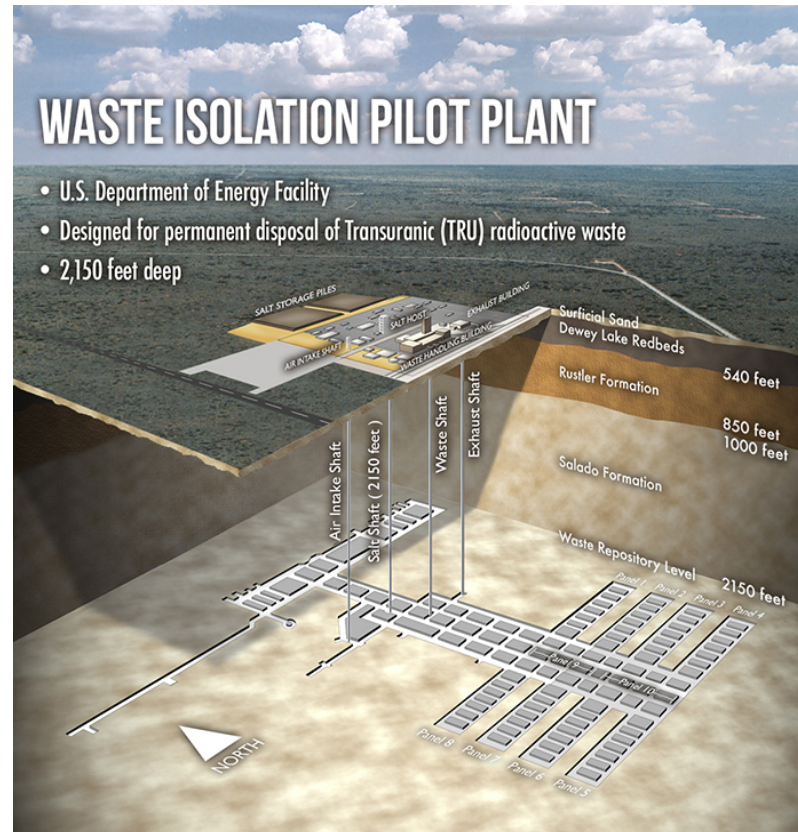


Brief Early History

- 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
- 1992 – PL 102-579 – WIPP Land Withdrawal Act Bans Spent Nuclear Fuel and High-Level Waste

WIPP's Mission

- “Start Clean, Stay Clean” to dispose of up to 175,564 m³ of defense transuranic (TRU) waste – **100,385 m³ 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 2024⁶

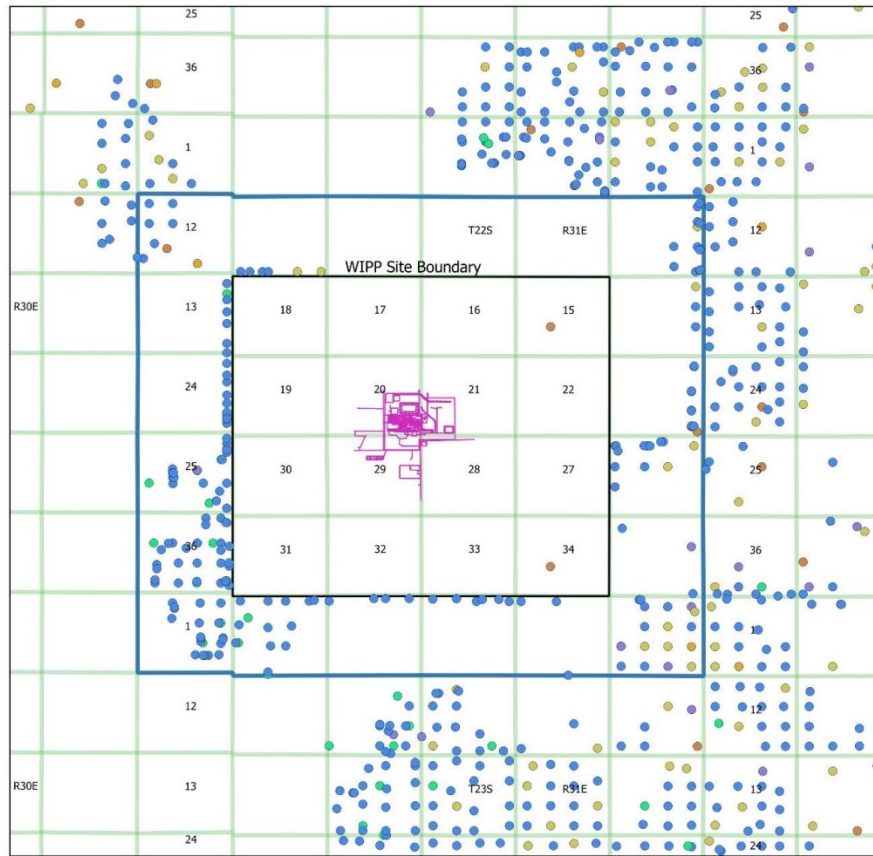
Other repositories are necessary for legal and technical reasons

- WIPP 1979, 1992, 1996 laws
- Nuclear Waste Policy Act of 1982 & 1987
- 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

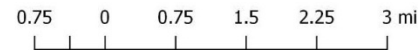
Within 1 mile:
160 Oil Wells
11 Gas Wells
11 Salt Water
Disposal
Wells

And increasing

> 570 wells
within 2.5 miles



Note: Well Status information is derived from the Delaware Basin Well Tracking Application maintained by the Delaware Basin Drilling Surveillance program. This tracking application is updated weekly with information from the New Mexico Oil Conservation Division records.



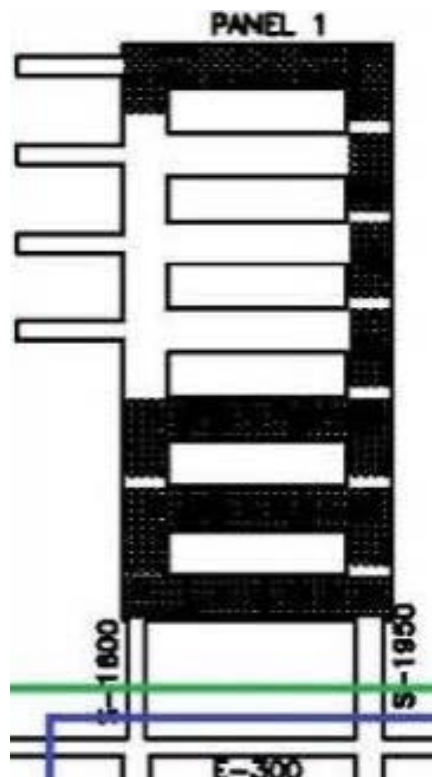
Legend

- WIPP One Mile Buffer Zone
- WIPP Site Boundary
- SALT WATER DISPOSAL WELL (11)
- DRY HOLE (4)
- OIL WELL (160)
- PLUGGED GAS WELL (2)
- PLUGGED OIL WELL (11)
- GAS WELL (11)

Figure 3: Oil and Gas Wells within One Mile of the WIPP Site

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

	<u>CH-Permitted</u>	<u>Actual</u>	<u>% Used</u>	<u>RH-Permitted</u>	<u>Actual</u>	<u>% Used</u>
Panel 1	18,000	10,497	58.32%	0		
Panel 2	18,000	17,998	99.99%	0		
Panel 3	18,750	17,092	91.16%	0		
Panel 4	18,750	14,258	76.04%	356	176	49.44%
Panel 5	18,750	15,927	84.94%	445	235	52.81%
Panel 6	18,750	14,467	77.16%	534	215	40.26%
Panels 1-6	111,000	90,239	81.30%	1,335	626	46.89%
Shortfall		20,761			709	
Panel 7	18,750	9,470 3,000		650	26	
Panel 8	18,750	18,750		650	650	
Panels 1-8	148,500	121,459		2,635	1,302	
Legal Capacity	168,485	121,459 ~ 73%		7,079	1,302 ~19%	

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

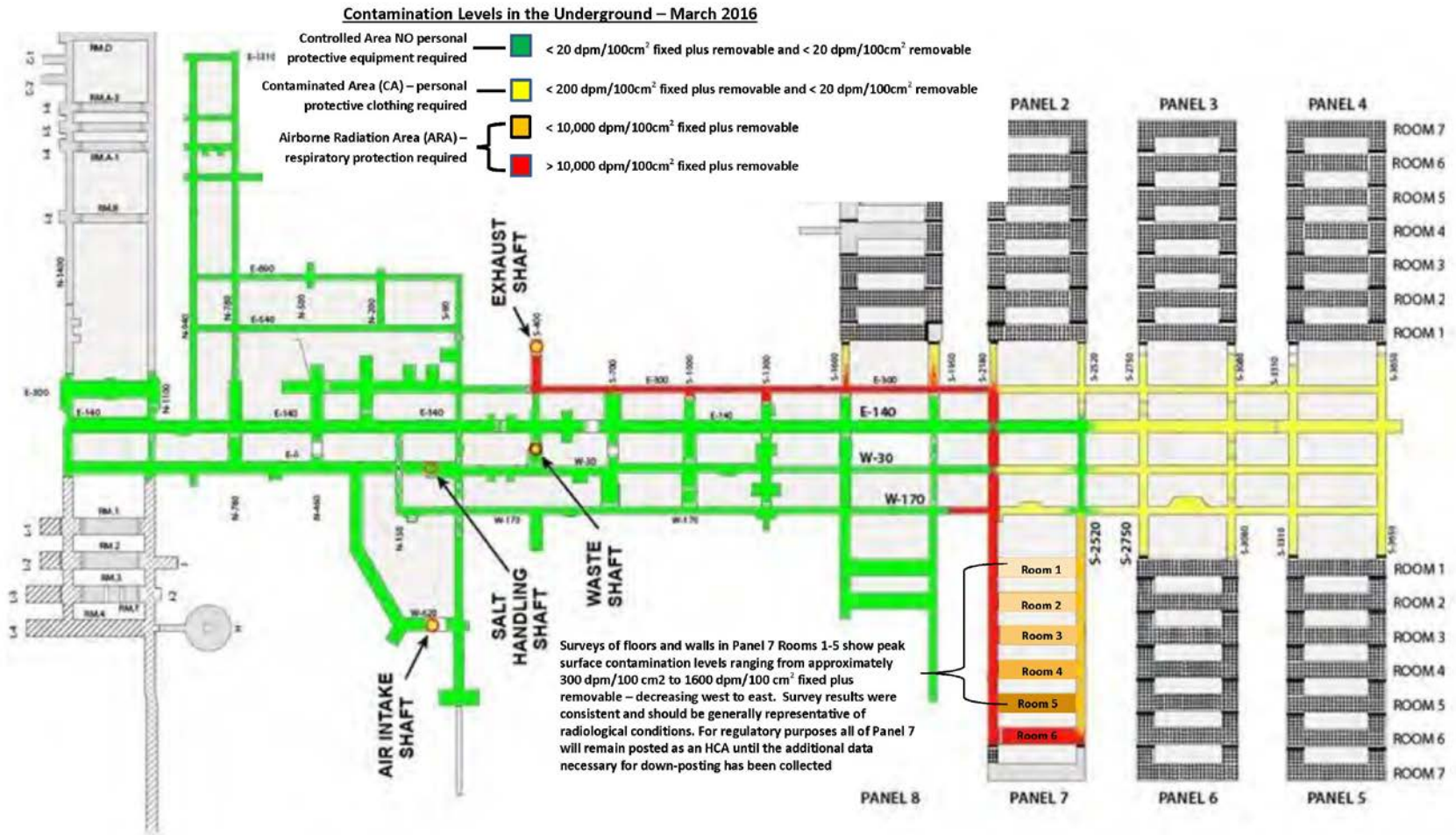
“DOE emphasizes there is no danger to human health or the environment” - 2/16 at 6:32 pm



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





Phase 2
Radiological Release Event at the
Waste Isolation Pilot Plant,
February 14, 2014
April 2015

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

Waste Isolation Pilot Plant
Recovery Plan

Revision 0
September 30, 2014

- 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



United States Government Accountability Office
Report to Congressional Committees

March 2022

WASTE ISOLATION
PILOT PLANT

Construction
Challenges Highlight
the Need for DOE to
Address Root Causes

March 2022

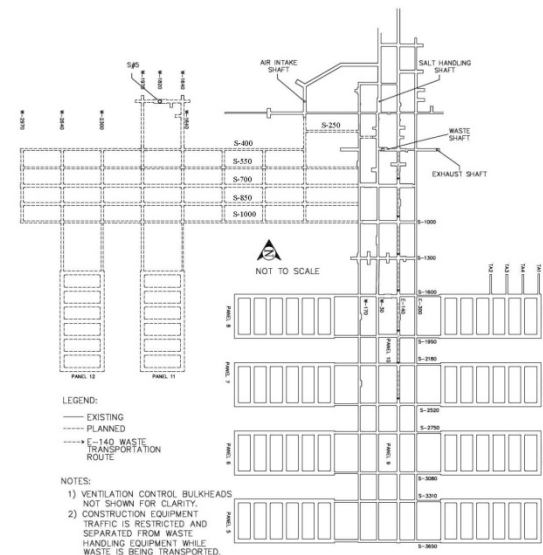
- “NWP resumed operation of the unfiltered 700C fan on January 14th....Shortly after restarting the fan, pieces of metal were ejected from the fan-exhaust.”
- “On January 6th, NWP initiated non-compliance reports after discovering that WIPP personnel had failed to meet training requirements.”
- “On January 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

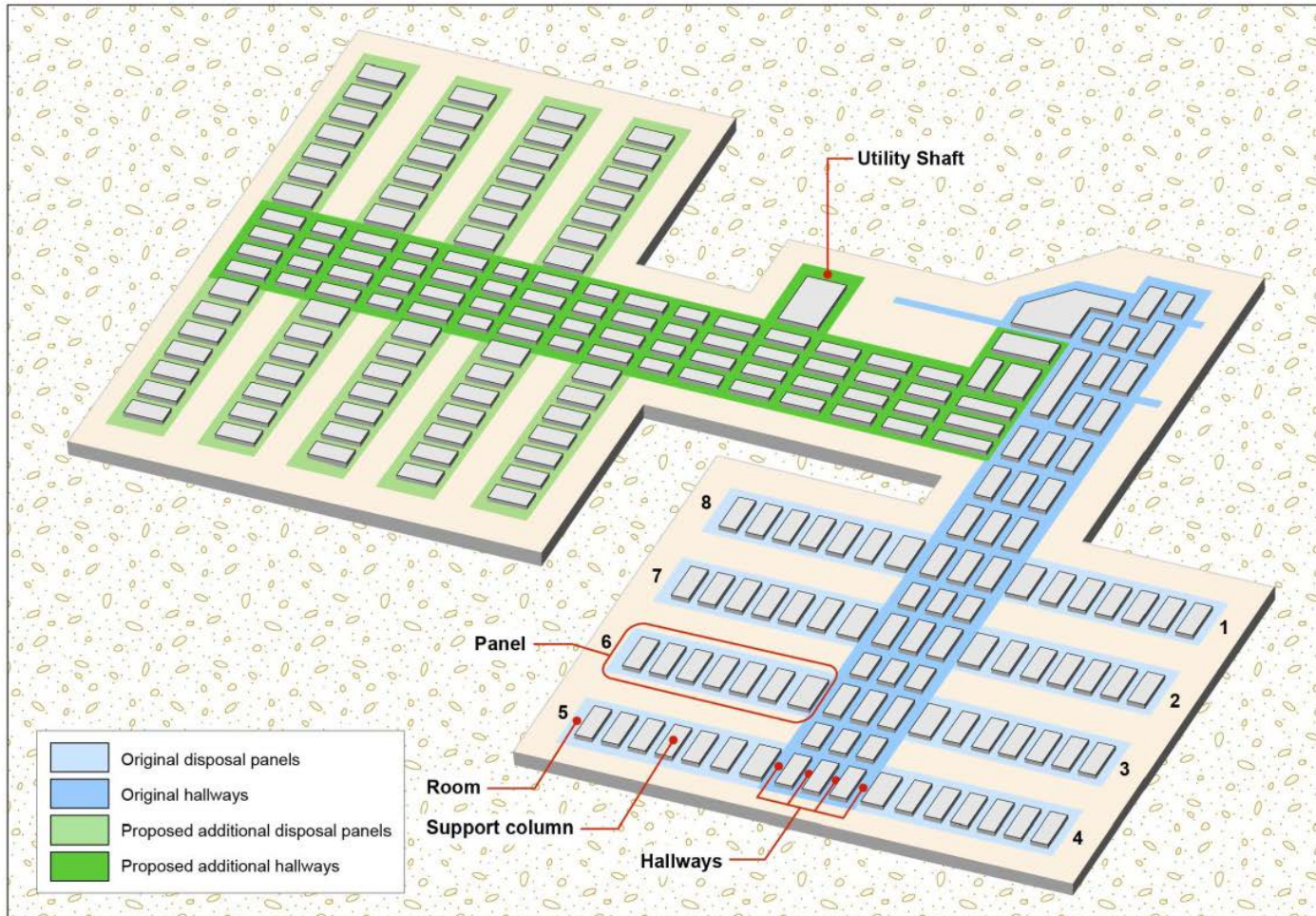


Expansion Described/Denied

- 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.”

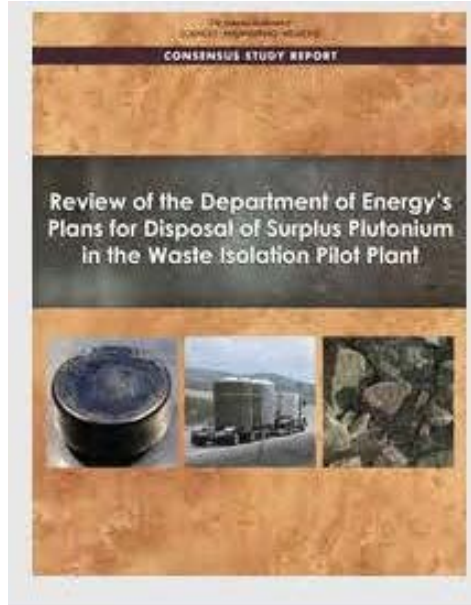
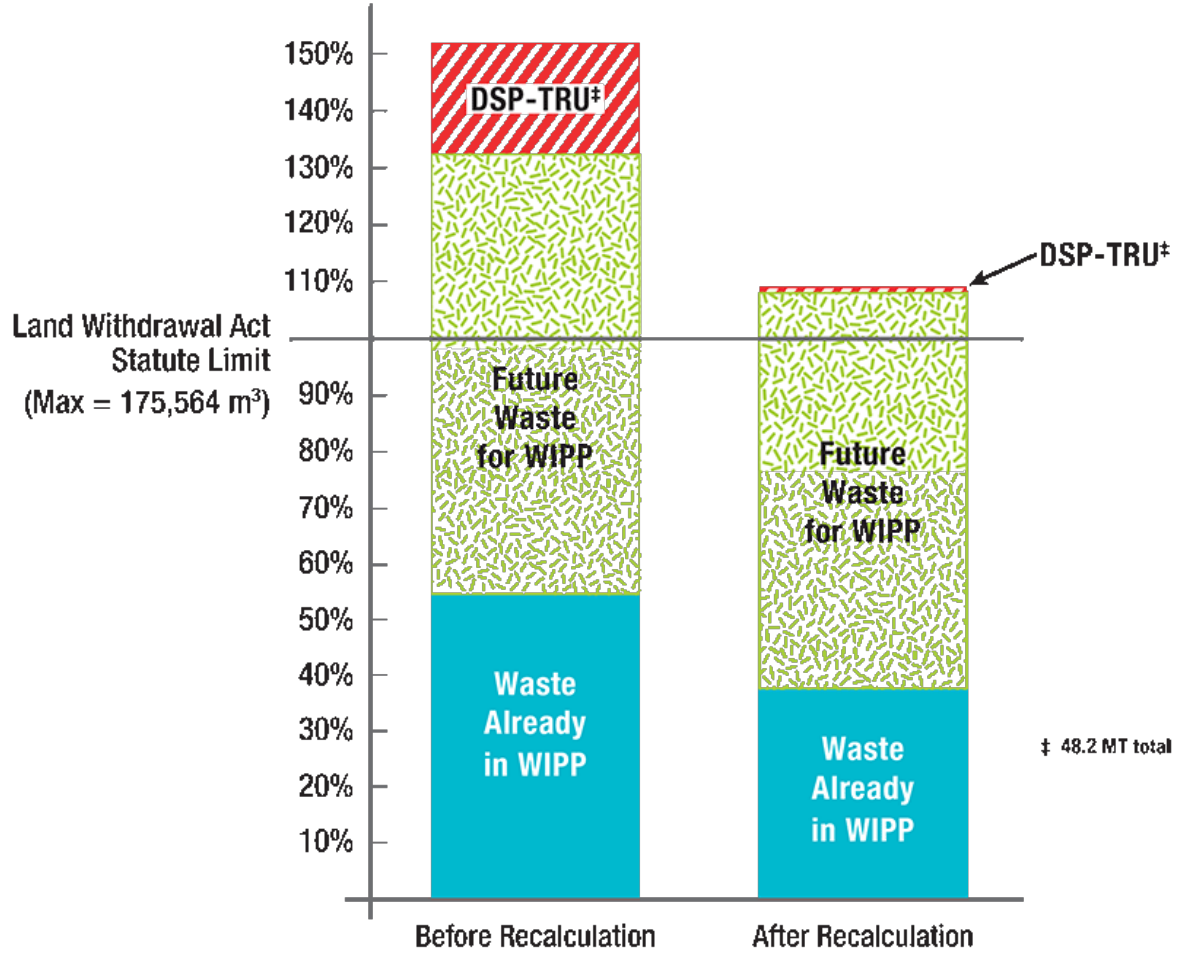
Future WIPP

Figure 4: Draft Conceptual Design for Additional Waste Disposal Physical Space at the Waste Isolation Pilot Plant (WIPP)



Source: GAO analysis of Department of Energy information. | GAO-21-48

DOE Needs Bigger “Forever WIPP”



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.

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
- 1998: EPA Certification (1998-2033): No surplus Plutonium/No Larger repository
- 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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