BRIEF HISTORY OF WIPP

INTERGOVERNMENTAL MEETING

11/20/2019

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Some slides attribution: Roger Nelson
HOW DID WE COME TO FEAR NUCLEAR POWER?
The US Government Asked the National Academy of Science the Best Way to Isolate Radioactive Waste

"The great advantage is that no water can pass through salt. Fractures are self healing….”
National Academy of Sciences, 1957

Salt and local community support are the reasons for WIPP’s location

NAS 1957*
Recommendation

- Stable geology
  (~250 million years)
- Lack of water
- Easy to mine
- Self-healing fractures
- Salt is impermeable
- Salt “creep” will encapsulate the waste
- High thermal conductivity

*Context: based on an aqueous HLW stream from separating Pu and U
Project Salt Vault – Lyons, Kansas
1963-1970

AEC begins to implement NAS recommendations at a commercial salt production mine

Seven sealed canisters containing 14 spent fuel assemblies from Exp. Test Reactor in Idaho (~5 kw each)

- Modeling and laboratory experiments were confirmed by the in-situ demonstration
- No measurable radiolytic or excessive structural effects in the salt were observed
- No hot cells used - maximum quarterly worker dose <2 mSv (principally to hands)
- All spent fuel removed and returned to Idaho 1967
- AEC announced plan for a national repository at Lyons in 1970
In the Mean Time, Events Turned Towards Carlsbad

All fire recovery wastes shipped to Idaho for burial or storage
Idaho Governor threatens to stop US nuclear Navy fuel supply system unless waste is immediately removed
AEC begins new urgent site selection in bedded salt
Carlsbad City leaders recognize possible economic opportunity as local potash mining declines

Local Politics in Kansas Force AEC to Terminate Plans for a National Repository Near Lyons

AEC Commissioner, Glenn Seaborg commits to removing all Plutonium waste from Idaho by 1980
Carlsbad Sites Begin Extensive Investigation

Local city leaders learn of problems at Lyons (1972), and actively pursue AEC to explore nearby potash district for candidate sites

- Existing mining workforce
- Vast uninhabited area
- Citizenry okay with hazardous extraction industry

Delaware Basin turns out to be deepest and thickest (>1000 meters), but nearby oil production and potash mining still make site selection controversial

1979 Exploration Begins
The next step was authorization and Funding


Authorized and funded DOE to construct WIPP and to seek New Mexico endorsement to operate a R&D facility to demonstrate safe disposal of radioactive waste from U.S. defense activities and programs (weapons development waste).

- Divided weapons production waste disposal from commercial power production waste disposal in the US.

Substantial and sustained influence by both local and state politicians to proceed. Economic impact (jobs) drove influence but “good science” demanded at every step!
WIPP Facility Was Completed Before Disposal Regulations Were Established

Anti-WIPP sentiment in Northern New Mexico built up in proportion to construction progress.

State Attorney General Jeff Bingaman negotiates a legal agreement called the Cooperation and Consultation Agreement between DOE and NM State that limits waste characteristics and amount that can be emplaced in WIPP (also prohibits HLW/SNF).
ContactHandledWasteShippingContainer

- Licensed by NRC: 1989
- Extensive testing
- Multiple payload options
- Double containment
- \(~3\ m^3\) capacity
- 12,500 lbs (5700 kg)
ANOTHER BUSINESS AGAINST WIPP

Concerned Citizens for Nuclear Safety
The WIPP Land Withdrawal Act of 1992 Created a Regulatory Process to Open WIPP

- LWA recognized Cooperation and Consultation Agreement with New Mexico, and codified most of those requirements
- Established EPA as the licensing authority, and required DOE to seek hazardous waste permit from the State of New Mexico
- Required NRC licensing of all shipping packages to WIPP
- Established 15 years of economic assistance for New Mexico, primarily in the form of road building funds
- Provided funding and assistance related to transportation for other States and Tribes along shipping corridors
- Set aside 16 square miles around the completed facility for WIPP development
- Exempted TRU mixed waste disposal from Land Disposal Restrictions

The WIPP Land Withdrawal Act Removed Distrust over DOE Self-Regulation
Seven More Years Required to Begin Disposal Operations

- EPA took 4 years to promulgate the safety case criteria that the repository would be required to meet
- DOE submitted the WIPP License Application in 1996, and EPA approved the safety case in 1998.
- The State of New Mexico issued a Hazardous Waste Facility Permit in 1999
- WIPP was no longer a R&D Project

4:00 am March 26, 1999
1980’s
Santa Fe
New Mexico
Transuranic (TRU) waste

- TRU waste generated during production of nuclear weapons at DOE facilities
- Includes surplus separated Plutonium
- >3700 Bq/g (t½ > 20 years)
- Alpha emitting isotopes (>~1 ppm Pu)
- Two types of TRU waste
  - Contact-Handled (<2 mSv/hr)
  - Remote-Handled (>2 mSv/hr <10 Sv/hr)
- Legacy inventory ~700,000 drum equivalent

The WIPP Mission

Characterization  Transportation  Disposal
February 14th Radiation Release 9 days Later After Fire

Radiological Release Event Unrelated to Salt Truck Fire

Above ground release ~37 MBq
Improper Waste Treatment and Packaging at LANL Caused a Single Drum to Burst

Accident Investigation Board found that a saturated metal nitrate salt waste stream was mixed with an organic neutralizer and an organic absorbent before packaging.

Restart Efforts Required more than 3 years
- Decontamination
- Supplemental ventilation measures
- Introduced treatment and packaging changes at all DOE sites

Remote photo 8 weeks after the event
Future Waste Capacity in Planning Stages

One Possible Space Increment Option
(Lifecycle Planning to 2050)

Underground Footprint superimposed on 16 square mile Land Withdrawal Area

New Utility Shaft

New Filtration System (surface)

16 square mile Land Withdrawal Area

Access Road
NOTHING

Editorial: NM, Holtec track records bury storage site worries

BY ALBUQUERQUE JOURNAL EDITORIAL BOARD

Tuesday, May 29th, 2018 at 12:35am

There are two ways to look at the proposal to license an interim storage facility in southeast New Mexico for the nation’s spent nuclear fuel from power plants:

New Mexico, a poor minority-majority state, is once again destined to be the dumping ground for dangerous items no other state will take, and those items
THANK YOU

WIPP WOULD HAVE NEVER HAPPENED WITHOUT THE COMMUNITY