

The Long Road to the WIPP

The journey to the WIPP began nearly 60 years before the first barrels of transuranic waste arrived at the repository. The United States produced the world's first significant quantities of transuranic material during the Manhattan Project of World War II in the early 1940s.

The government idled its plutonium-producing reactors and warhead manufacturing plants at the end of the Cold War and scheduled most of them for dismantlement. However, the DOE will generate more transuranic waste as it cleans up these former nuclear weapons facilities. The WIPP is a cornerstone of the effort to clean up these facilities by providing a safe repository to isolate transuranic waste in disposal rooms mined out of ancient salt beds, located 2,150 feet below ground.

The need for the WIPP

The DOE and its predecessor agencies, beginning with the Atomic Energy Commission in the 1940s, designed and tested dozens of nuclear warhead models and manufactured a

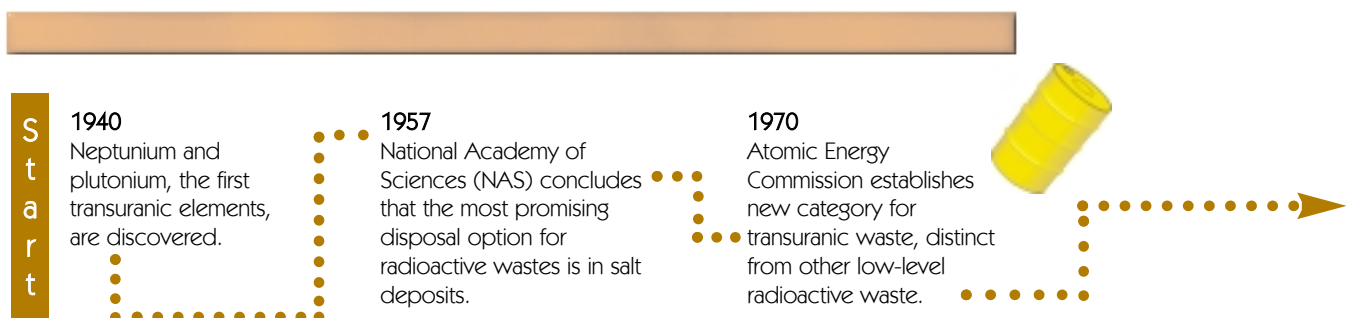
total of about 70,000 individual weapons. (Fewer than half of these weapons were present in the arsenal at any one time.)

In recent years, the DOE's emphasis has shifted to the legacy of nuclear arms production: numerous contaminated sites and a large accumulation of radioactive and hazardous wastes in temporary storage. The government must protect present and future generations from exposure to these materials. The primary concerns related to transuranic waste management are

- Plutonium's long half-life, requiring isolation for tens of thousands of years
- Serious health hazards posed by tiny quantities of plutonium, particularly if inhaled or ingested
- Potential radiation exposure to workers who handle, repack, and transport the waste

Scientists have explored many alternatives for managing transuranic waste. Since no practical method for destroying radioactive isotopes exists at pres-

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ent, the only option is to wait for them to decay.



Until the WIPP opened, transuranic waste stored at sites around the country waited for a safe, permanent disposal option.

Temporary aboveground storage of transuranic waste has not posed serious imminent hazards to the public, but it is unacceptable for the long term. Many barrels and

boxes containing waste have exceeded their design lifetimes, and some of them have corroded and leaked. Continued temporary storage would require periodic repackaging, at considerable expense and some risk to workers, for the indefinite future. The land occupied by surface storage cannot be used for other purposes, and the sites must be guarded and monitored at an annual cost of roughly 70 million dollars. These facilities are vulnerable to natural catastrophes, such as fires, storms, and earthquakes.

Permanent disposal must satisfy a demanding set of criteria:

- By law, the disposal site must isolate its wastes, causing no significant risk to the public for at least 10,000 years.

- Due to uncertainty about future cultures and languages, durable and comprehensible warnings must be created to discourage human intrusion.
- The disposal facility should be in an area unlikely to be in high demand for agriculture, mineral extraction, or residential or industry use.
- Surface and underground construction of the facility must comply with all safety and environmental standards.

What is transuranic waste?

Transuranic waste consists of material contaminated with elements that have atomic numbers greater than that of uranium, the heaviest natural element.

In 1970 the Atomic Energy Commission created a separate category for transuranic waste, which until then had not been distinguished from other "low-level" radioactive waste. Most of this waste is everyday industrial trash, including used protective clothing, rags, old tools and equipment, and pieces of dismantled buildings. Some of the waste contains residues from chemical processes or soils from cleanup activities. A small portion consists of plutonium chips, cuttings, and other scraps that were not economically recoverable.

1972
Lyons, Kansas ruled out as a possible site for a radioactive waste repository.

1974
After a nationwide search for a suitable disposal site, field investigations begin at a site 30 miles east of Carlsbad, New Mexico.

1975
New Mexico Governor Apodaca establishes a "Governor's Advisory Committee on WIPP."

- Waste shipment to the site and emplacement in the repository must pose minimal risk to workers and to citizens along transport routes.
- During the entire process of establishing and operating the facility, the DOE must fully inform—and listen to—other government agencies, scientific advisory panels, and concerned citizens.
- As a taxpayer-funded project, the disposal site must meet its goals in the most cost-effective manner.

Establishment of the WIPP has not been easy, quick, or cheap, but the

process produced a facility that is safe, that satisfies scientific and regulatory requirements, that has earned awards for safe operation, and that has served as a model for citizen involvement.

The National Academy of Sciences

The National Academy of Sciences first suggested salt beds for disposing of radioactive waste in a 1957 report. A committee evaluated several radioactive waste disposal media and said, “Disposal in cavities mined in salt beds and salt domes is suggested as the possibility promising the most practical immediate solution of the problem.” However, the report noted that

Carlsbad and the nation — then and now

The National Academy of Sciences first identified salt as a promising medium for the disposal of radioactive waste in 1957. Carlsbad and the nation have changed a lot since then. Here are a few examples.*

| | <u>1957</u> | <u>2000</u> |
|--------------------------------|-----------------------|---------------------|
| U.S. President | Dwight Eisenhower (R) | William Clinton (D) |
| Carlsbad population | 18,000 | 28,000 |
| World population | 2.5 billion | 6 billion |
| Televisions in use in the U.S. | 42 million | 99 million |
| First-class postage stamp | \$0.03 | \$0.33 |
| Pinto beans (10 lbs) | \$0.89 | \$6.59 |
| Movie ticket | \$1.50 | \$5.50 |

*Prices are not adjusted for inflation.

December 3, 1976
Energy Research & Development Administration applies to the U.S. Bureau of Land Management for the withdrawal of 17,200 acres of land in Eddy County for the WIPP.

December 1978
The New Mexico Environmental Evaluation Group is established to provide full-time, independent technical assessment of the WIPP.

1979
New Mexico Interim Legislative Radioactive and Hazardous Materials Committee and the Radioactive Waste Consultation Task Force are established.



its findings were presented in advance of research and development, and it did not have some essential data.

The WIPP as a neighbor

While nearly everyone recognizes the need for waste disposal, many communities have a “not in my backyard” attitude about accepting hazardous or radioactive waste facilities. The city of Carlsbad, New Mexico is an exception.

Since the early 1970s, city leaders and residents have supported the idea of siting the WIPP near Carlsbad, and they have built a relationship of cooperation with the DOE. The community has benefitted from the people and organizations that now consider Carlsbad their home. The DOE has been welcomed into a community where people are willing to do their part to solve a national problem.

Carlsbad and the state have also enjoyed economic benefits from WIPP-related employment and funding. Below are some examples of cooperative efforts between the DOE and the community.

- The Carlsbad Environmental Monitoring & Research Center monitors for any potential radiological effects of the WIPP on people and the environment.
- The Southeast New Mexico Environmental Technology Training Center was launched to offer technical training programs for employees of the National Transuranic Waste Program and now provides computer software, industrial, and professional development training across the U.S.
- The Advanced Manufacturing & Innovation Training Center’s mission is to enhance the competitiveness of area manufacturers and diversify the area economy through the support of new business development.

Members of an Academy committee further narrowed disposal options to salt beds in a 1970 report. The panel that issued the report favored a site near Lyons, Kansas.

The site near Lyons had 250-million-year-old salt beds, a low probability of an earthquake, and a simple, flat bedding structure. Erosion was not expected to reach the disposal site in fewer than 15 million years. These favorable characteristics of the Lyons site are even more applicable to salt formations near Carlsbad, New Mexico.

In 1972, the Atomic Energy Commission abandoned the Lyons site because of concerns about the many holes that had been drilled through the site, the risk of salt dissolution, and political opposition.

Community leaders suggest Carlsbad as the site for the WIPP

Carlsbad’s involvement with the WIPP began in the fall of 1971 when State Senator Joe Gant, Jr. learned that the Atomic Energy Commission had rejected the Lyons, Kansas salt mine for a proposed nuclear waste disposal site. Gant called his friend, Congressman Harold Runnels, and asked, “Why not Carlsbad?”



December 29, 1979
Congress passes the *DOE National Security and Military Applications of Nuclear Energy Authorization Act of 1980* (Public Law 96-164) authorizing the WIPP.

January 28, 1981
DOE issues a Record of Decision (based on the first Environmental Impact Statement) to proceed with the WIPP’s construction.

May 14, 1981
New Mexico Attorney General Jeff Bingaman files suit in U.S. District Court against the DOE and the Department of the Interior (DOI), alleging violations of federal and state law.

Gant enlisted the support of Carlsbad Mayor Walter Gerrells and other community leaders. In October 1971, N. William Mueller, president of Continental American Royalty Company, the parent company of U.S. Potash, wrote to Frank Pittman of the Atomic Energy Commission and proposed that a soon-to-be abandoned U.S. Potash mine would make a good site to store high-level radioactive waste.

Nuclear waste disposal deep in salt formations seemed a likely prospect for Carlsbad. Potash mining had been the economic backbone of the town for decades. It seemed only logical to use the vast network of mines to dispose of nuclear waste. As it turned out, the Atomic Energy Commission selected federally owned land to create a mine specifically for disposing of radioactive waste.

Community leaders had been working tirelessly to pull the town out of a disastrous economic downturn. In 1967, the largest local employer, U.S. Borax and Chemical, had closed, eliminating 1,000 jobs. The schools lost more than 2,000 students during the next several years. Hundreds of homes went on the market; some were abandoned as families left town to find work.

Over the years, city leaders had built strong ties with state officials. When the opportunity for a large, new federal project came to the community's attention, Carlsbad worked vigorously for the WIPP. Local leaders frequently traveled to Washington to work on other issues. They added the WIPP to their agenda.



Construction of the WIPP

After nearly a decade of study, the DOE decided in January 1981 to proceed with construction of the WIPP. An exploratory shaft reached a depth of 2,305 feet. Ten months later, while deepening a previously drilled test borehole near the WIPP (a mile from the current storage area), the DOE struck a large pressurized brine reservoir. The DOE relocated the proposed repository's transuranic waste area approximately 6,000 feet south of its original location.



Construction of the WIPP began in 1981. Disposal operations were expected to begin in 1988.

In May 1981, New Mexico Attorney General Jeff Bingaman filed suit against the DOE and the Department

July 1, 1981

DOE, DOI, and New Mexico enter into *Stipulated Agreement and Consultation and Cooperation Agreement* to address Bingaman's concerns. These agreements are modified in 1983, 1984, and 1989.

October 1982

Underground excavation at the WIPP begins.



of the Interior (DOI), alleging that continued development of the WIPP violated federal and state law. The federal agencies and the Attorney General entered into a “stipulated agreement” that required the DOE to perform additional geotechnical studies at the WIPP site, provide the results to the state of New Mexico, and address “off-site concerns” such as emergency response and highway improvements. Laws and regulations that were to govern the WIPP began to take shape.

The WIPP Land Withdrawal Act

In 1992, Congress passed and President George Bush signed the WIPP Land Withdrawal Act. The title of this crucial legislation underscores that Congress “withdrew” from public use the area devoted to the site. Congress transferred jurisdiction of the site from the DOI to the DOE.

The Act also established an array of regulatory conditions and standards covering everything from limits on the kinds and quantities of waste the DOE could place in the repository to transportation safety. The Act set requirements for oversight and regulation of the WIPP by federal and state agencies, for publication of information and documents, and for provision

of economic assistance to the state of New Mexico. The 1992 Act established the U.S. Environmental Protection Agency (EPA) as the WIPP’s primary regulator.

The Act limited the waste sent to WIPP to the DOE’s defense-related waste. It also prohibited the disposal of high-level radioactive waste and spent nuclear fuel.

In 1996, Congress amended the Act, deleting requirements that the WIPP obtain a “no-migration” variance from the EPA. This meant that the DOE would not need to submit a lengthy application showing why it should be exempt from land disposal restrictions under the Resource Conservation and Recovery Act. The rationale for this amendment is that the WIPP is not a shallow landfill of the kind typically used for waste containing toxic chemicals or metals, and that the requirements imposed on radioactive waste transport and disposal are more than sufficient for containing any hazardous constituents of waste disposed of at the WIPP.

In addition, the 1996 amendments confirmed a 1993 decision by the Secretary of Energy to cancel tests using radioactive waste at the WIPP. Instead, national laboratories conduct-

The full text of the WIPP Land Withdrawal Act can be accessed on the Internet at www.emnrd.state.nm.us/wipp/lwa.htm



- December 28, 1982**
DOE and New Mexico enter into the *Supplemental Stipulated Agreement Resolving Certain State Off-site Concerns over WIPP* (amended in 1987).
- 1983**
Mining of the WIPP’s first underground rooms completed.
- May 1986**
DOE redesigns its shipping container, the TRUPACT, adding double containment and eliminating a venting feature.

ed this research in existing labs, rather than underground at the WIPP.

The Act is a landmark in the legal history of the site. It serves as a concise record of the essential steps required to establish the WIPP, the major institutions involved, and the basic requirements for disposal and decommissioning activities.

Certification by the EPA

Since 1992, the EPA has been the WIPP’s primary regulator, responsible for evaluating and verifying that the WIPP will safely isolate transuranic waste and protect human health and the environment. To carry out this responsibility, the EPA issued regulatory standards for waste containment during handling and after disposal (40 CFR 191).

Then, to determine whether the WIPP would meet these containment standards, the EPA formulated a set of WIPP-specific criteria (40 CFR 194) that required the DOE to provide certain kinds of information to show that the WIPP would meet the containment standards.

These standards had to address several crucial aspects of the WIPP and the waste that would be placed in it.

- The longevity and potential dangers of transuranic waste require any permanent disposal facility to be highly reliable.

The nation’s responsibility toward future citizens, who have no say in decisions made before their time, means that containment standards must be particularly rigorous.



- The WIPP is the world’s first deep geologic disposal site designed specifically for transuranic wastes, and it is one of a very small number of permanent repositories in salt beds for any type of waste. People have had no opportunities to observe such a site for more than a few decades. Therefore, EPA regulation could not be based upon actual measured performance over the short term. Instead, the DOE performed research, simulation, and independent reviews to demonstrate that the WIPP can satisfy containment standards.

Stakeholders participated in public hearings and meetings. Many views for and against the WIPP have been expressed over the years.



September 13, 1988
The DOE announces that the WIPP will not open in October.

June 27, 1989
DOE Secretary James Watkins indefinitely delays opening the WIPP.



In late 1996,
the DOE
submitted its
WIPP
Compliance
Certification
Application
to the EPA

- The EPA and the DOE must be very confident that the facility will perform as expected, because removing wastes from the salt bed becomes more difficult and costly as time passes.

In late 1996, the DOE submitted its WIPP Compliance Certification Application (CCA) to the EPA. This document, consisting of more than 80,000 pages, contained the results of decades of research, review, and public comment. The EPA evaluated whether the application demonstrated that the WIPP could comply with the stringent containment requirements for transuranic waste. On May 18, 1998, the EPA certified that the repository system would meet the standards.

The EPA's certification of the repository, followed by the Secretary of Energy's decision to proceed with waste disposal, completed one of the major steps in opening the WIPP.

Every five years during the disposal phase, the EPA will review whether to continue or modify its certification of the WIPP.

The National Environmental Policy Act

The National Environmental Policy Act requires government agencies to

analyze the environmental impacts of any proposed project. The DOE has made decisions about the WIPP based on the results of three extensive environmental analyses of the WIPP facility and its environment.

The first study, in 1980, was called the *Final Environmental Impact Statement for the Waste Isolation Pilot Plant*. The DOE decided, in a document called a Record of Decision, to begin surface and underground construction of the facility.

After constructing most of the WIPP facility, the DOE prepared another environmental study to assess impacts of proposed underground research using radioactive materials. In its 1990 decision based on this study, called the *Final Supplement Environmental Impact Statement for the Waste Isolation Pilot Plant*, the DOE chose to proceed with a test phase using radioactive materials at the facility. This research, however, was never conducted at the WIPP. Instead, national laboratories performed the tests.

In its 1990 Record of Decision, the DOE committed to prepare another study before deciding whether to dispose of waste at the WIPP. The new

Continued on page 12

August 21, 1989
Idaho Governor Cecil Andrus halts further shipments of radioactive wastes to Idaho.



August 29, 1989
Nuclear Regulatory Commission certifies the TRUPACT-II shipping container.

June 22, 1990
DOE issues Record of Decision to continue with phased development of the WIPP.

From the beginning:**National Academy of Sciences provides independent oversight**

In 1978, the National Academy of Sciences (NAS) formed a panel of WIPP experts that has continued to provide independent advice and analysis to the DOE, carrying on the work that began with the search for radioactive waste disposal methods. The two NAS studies described below offer an independent perspective on transportation and on the WIPP's ability to isolate waste for 10,000 years.

1989: *Review Comments on ... DOE Draft Plan for the [WIPP] Test Phase: Performance Assessment and Operations Demonstration*

This brief evaluation of the DOE's proposed research plans focused on the philosophy behind "performance assessment"—computer modeling of how the repository would perform under a wide range of possible future events. The panel also examined the DOE's transportation and emergency preparedness programs, concluding that:

The system proposed for transportation of TRU waste to WIPP is safer than that employed for any other hazardous material in the United States today and will reduce risk to very low levels. ... In the Panel's view, the Department is being exemplary and responsible in giving a high level of attention to TRU waste transport.

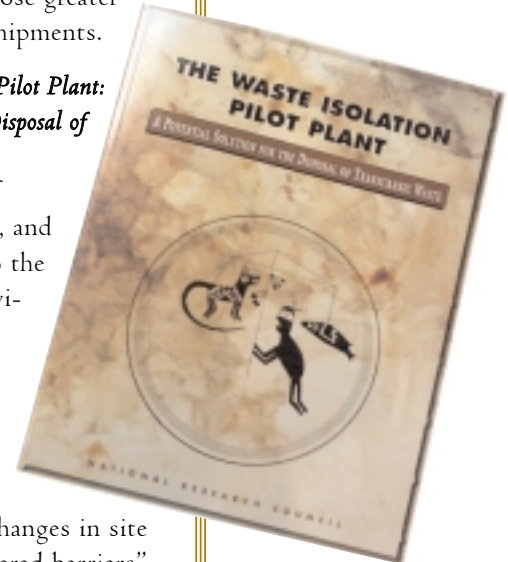
Such attention is appropriate for shipment of all hazardous materials, almost all of which pose greater risk than the TRU shipments.

1996: *The Waste Isolation Pilot Plant: A Potential Solution for the Disposal of Transuranic Waste*

After assessing a range of environmental, regulatory, and technical issues related to the site, the WIPP panel provisionally endorsed several aspects of the repository.

The report recommended that DOE consider measures that might be practical without major changes in site design, including "engineered barriers" and "pre-emptive mining" of nearby resources. However, the panel noted that some regulatory requirements and DOE assumptions were overly cautious and could lead to excessive costs. The committee concluded:

Provided the WIPP repository is sealed effectively and undisturbed by human activity, the committee knows of no credible or probable scenario for release of radionuclides.



June 30, 1990

DOE purchases mineral rights at WIPP from the International Minerals and Chemical Corporation for \$25.8 million.

October 9, 1991

New Mexico Attorney General Tom Udall files suit against the DOE and the DOI to stop the shipment of wastes to WIPP under an administrative land withdrawal issued by the DOI.

January 31, 1992

District Court Judge John Garrett Penn grants the state's motion for an injunction.