

WIPP Library

ENTERED

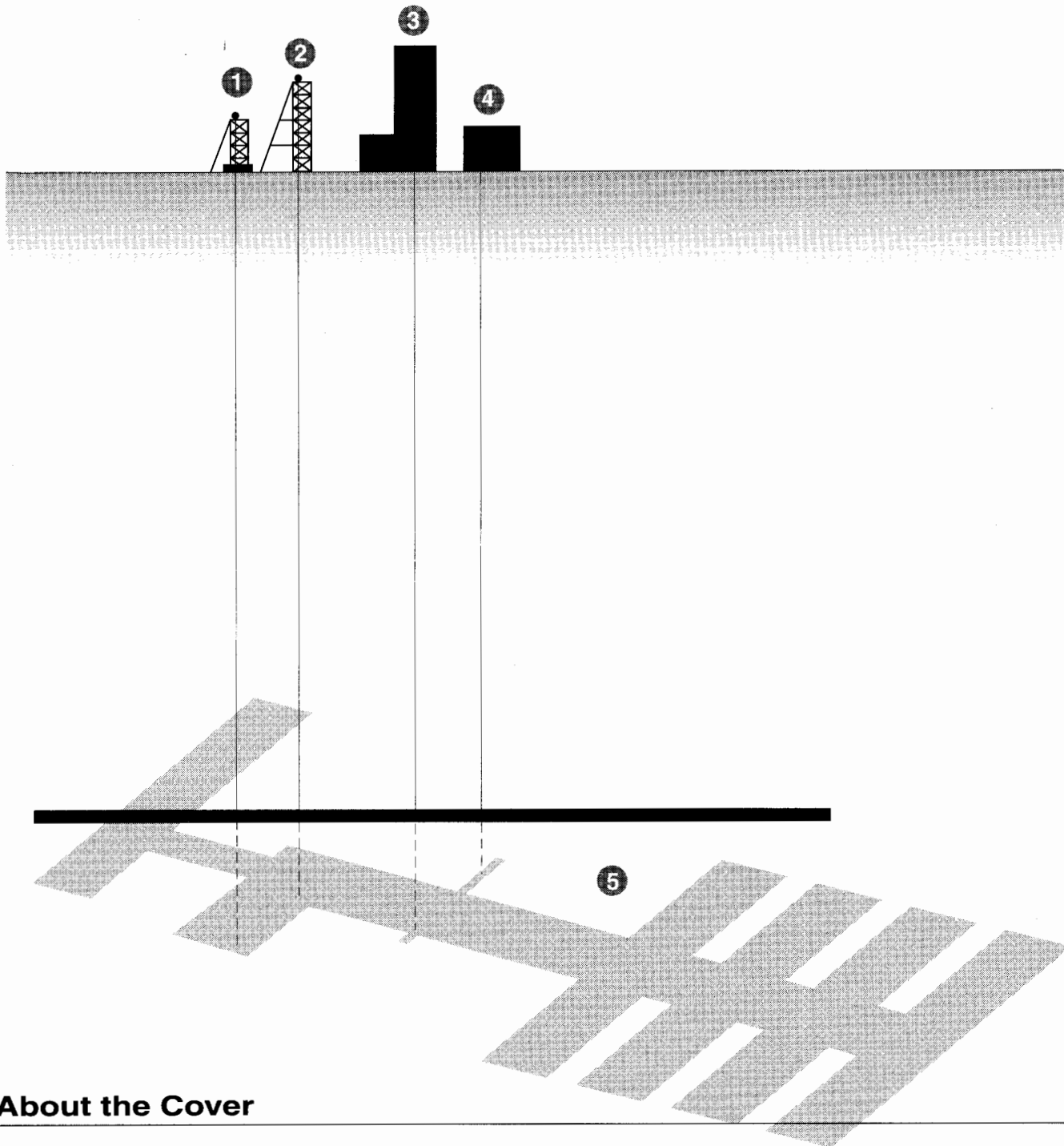
Bentley
Bentley
WIPP

KS

WASTE ISOLATION PILOT PLANT

FY 1993 Annual Report

940100.6

About the Cover

The artwork used on the front and back of this annual report represents major features of the WIPP facility, both above and below ground.

- ① Air Intake Shaft
- ② Salt Handling Shaft
- ③ Waste Handling Building and Waste Hoist
- ④ Exhaust Shaft
- ⑤ Proposed underground disposal areas, 2150 feet below the surface

A NOTE FROM THE MANAGER

As an American citizen, I am eager to see a safe, cost-effective solution to the nationwide nuclear waste disposal problem. That will be important to each of us and to many future generations.

Thus, I am honored to be a part of the team (U.S. Department of Energy and contractors) working to get the Waste Isolation Pilot Plant (WIPP) certified by the regulatory authority, the Environmental Protection Agency (EPA), and open for waste disposal.

To be successful, we must encourage everyone to participate in making the decisions on how to achieve that objective. Led by DOE Secretary Hazel O'Leary, we took extra steps last year to develop meaningful stakeholder relationships and to demonstrate our commitment to developing a safe, environmentally sound disposal system.

The input of our stakeholders and the conclusions of the scientific community support our new focus on showing regulatory compliance at the WIPP, while postponing waste receipt until we make a disposal decision in a few years.

This WIPP Annual Report for FY 1993 outlines the many activities that led to our new focus in which radioactive tests will be conducted at national laboratories while geologic as well as other scientific tests will continue at the WIPP. We are working to meet all regulations and to comply with standards established by the EPA. Our goal is to obtain a disposal decision in 1998. All this effort is directed towards meeting the need of this and all future generations for a safe, environmentally responsible disposal system for transuranic waste.

George E. Dials

George E. Dials, Manager
Carlsbad Area Office
U.S. Department of Energy



CONTENTS

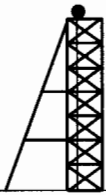
A NOTE FROM THE MANAGER	
INTRODUCTION	4
ENVIRONMENTALLY RESPONSIBLE	6
Land Withdrawal Act	
Test Phase Plan and Waste Retrieval Plan	
New Mexico Permit	
Land Management Plan	
Disposal Standards	
Stakeholders and the Public	
Safety Culture	
Sandia National Laboratories	
Facility Operations	
GEOLOGICALLY STABLE	13
SAFE, RELIABLE TRANSPORTATION	14
Locations of Generator and Storage Sites	
TRUPACT-II Container	
Transportation	
Emergency Response Training	
PROLOGUE	16
WIPP READING ROOMS	18



ACRONYMS

The following acronyms are used in this report:

DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FY 1993	Fiscal Year 1993 — October 1, 1992, to September 30, 1993
WIPP	Waste Isolation Pilot Plant
TRUPACT-II	Transuranic Package Transporter, Model 2
TRANSAX	Transportation Accident Exercise
WIPPTREX	WIPP Transportation Exercise



INTRODUCTION

Employees of the Waste Isolation Pilot Plant offer this FY 1993 WIPP Annual Report to the public — our stakeholders — as a review of last year's progress.

The need for permanent disposal of transuranic waste is the driving force behind the WIPP; the WIPP Land Withdrawal Act of 1992 is its guide.

Transuranic waste results from the testing, manufacture, and dismantling of nuclear weapons. Most of it is ordinary refuse contaminated with radioactive particles that are heavier than uranium.

On October 30, 1992, the long-discussed Act became law and influenced the direction of WIPP activities for the year.

The Land Withdrawal Act

- Transferred control of the federal land on which the WIPP is located from the U.S. Department of the Interior to the DOE. This transfer was required before waste could be shipped to the site.
- Established a set of environmental, safety, and health requirements that must be met before waste can be shipped to the site.
- Required the Environmental Protection Agency to establish disposal standards for transuranic waste.

The U.S. Department of Energy will demonstrate that the Waste Isolation Pilot Plant will comply with all regulations before deciding whether to dispose of some radioactive waste deep below the desert surface in southeastern New Mexico.



The DOE and its contractors continued to press for excellence while fulfilling requirements of the Act. In the final analysis, three aspects of the project represent the central concepts behind demonstrating the safe disposal of transuranic waste.

- The WIPP is responsible for the integrity of the environment as well as the safety and health of employees and the public. The WIPP's environmental responsibility guides much of the activity within the project, including scientific experiments, facility engineering, public education, and site readiness.
- Geologic stability is tested, monitored, and confirmed as a routine part of the WIPP's operation. Confidence in the ability of the salt formations to permanently entomb hazardous and radioactive waste grows with successful completion of each experiment. Meanwhile, federal mine safety experts expressed confidence that the rooms designed for long-term testing would remain safe for the duration of any experiments performed there.
- Safe, reliable transportation is assured for the day that transuranic waste is shipped to the WIPP. Training sponsored by the DOE for state, local, and tribal emergency response personnel along the WIPP transport routes is part of that transportation system.



ENVIRONMENTAL RESPONSIBILITY

Land Withdrawal Act

The WIPP Land Withdrawal Act of 1992 was so named because it withdrew 16 square miles of land from the direct supervision of the Interior Department's Bureau of Land Management and transferred it to the custody of the DOE. Public use of more than 80 percent of the surface of that land remains unchanged.

More notably, the Act established specific guidance to the DOE with reference to the WIPP's research and development, phased activities, milestones, and disposal decisions. Again with a view to environmental responsibility, Congress assigned regulatory oversight to the EPA. Among other obligations, the EPA was required to issue final regulations that will assure safe disposal of the waste.

In addition, passage of the Act allowed payment, to the state of New Mexico, of \$43 million that had been held until Congress could complete land withdrawal legislation. The Act also authorized payment of \$20 million a year to New Mexico for 15 years after first waste receipt.

Test Phase Plan and Waste Retrieval Plan

The DOE first published a draft Test Plan in April 1990, which discussed the department's intent to perform experiments with transuranic waste underground at the WIPP site. Computer models indicated the degree of safety that would exist if waste were stored in the salt beds, but tests in place were believed important as a secondary line of data to support those models. The WIPP Land Withdrawal Act required that the underground test phase be performed only if scientists could demonstrate that the tests were directly relevant to compliance with regulations and if the EPA approved the WIPP's Test Phase Plan and a Waste Retrieval Plan. The Test Phase Plan specified experiments to be performed while the Waste Retrieval Plan detailed removal of waste if removal were shown to be necessary.

In March 1993, DOE told the National Academy of Sciences' WIPP panel that tests with transuranic waste at the site were not necessary to show compliance with EPA regulations, but were desirable. Reiterating the relevance of those tests, the DOE submitted the Test Phase Plan and the Waste Retrieval Plan to the EPA, calling for the equivalent of 1,100 drums of transuranic waste, or 0.13 percent of the WIPP's capacity, to be used in underground tests.

The National Advisory Council on Environmental Policy and Technology recommended that the EPA not approve the Test Phase Plan until the DOE specified where waste would be shipped if it had to be retrieved. Idaho Governor Cecil Andrus, in a letter to DOE Secretary Hazel O'Leary, offered to resolve the issue by returning the waste to his state, from which most would have come, if necessary.

Both the EPA and New Mexico's Environmental Evaluation Group issued reports that questioned the Test Phase Plan's relevance. DOE Assistant Secretary Thomas P. Grumbly said that the DOE would resubmit parts of the Test Phase Plan to the EPA, but delayed submission of revisions to allow further review of the materials.

The EPA said the WIPP opening could be pushed into the spring or summer of 1994 because of the time required for the DOE to provide additional information for the Test Phase Plan.

In a notice to the DOE on August 17, 1993, following an Operational Readiness Review, Westinghouse Electric Corporation's Waste Isolation Division, the WIPP management and operating contractor, declared the facility ready to receive waste for a test phase. After department review, the DOE acknowledged readiness on September 30, 1993.

New Mexico Permit

Before waste can be transported to the site, the DOE must obtain a permit from the state of New Mexico. The permit would be issued under provisions of the Resource Conservation and Recovery Act that applies to the WIPP because most of the transuranic waste destined for the WIPP is mixed with hazardous waste, such as cleaning solvents or lead.

The New Mexico Environment Department conducted public meetings in November 1992 to discuss the WIPP's application for a permit, while the DOE submitted responses to state requests for more information. Following another round of questions and answers, the DOE transmitted a revision of its permit application in January 1993. The state requested further information and the DOE responded, after which the EPA issued comments.

The state issued a draft permit in August 1993, setting a public comment period for August 30 to November 1, 1993. The state estimated that a final permit necessary for waste receipt for the test phase might be issued in 1994.

Land Management Plan

The DOE conducted public meetings in Carlsbad and Hobbs, New Mexico, in January and July 1993 to discuss use of the 10,000 acres of land transferred to the agency from the Bureau of Land Management, and to draft a land management plan. The draft plan, distributed before the July 1993 round of meetings, made only minor changes in land use, while allowing ranching and recreation to continue, except in a buffer zone created for safety and security reasons. This plan was submitted to Congress in November 1993.

Disposal Standards

Another Land Withdrawal Act milestone was met when the EPA published proposed disposal standards in the Federal Register in February 1993. Public hearings were conducted in Carlsbad, Albuquerque, and Santa Fe, New Mexico.

Stakeholders and the Public

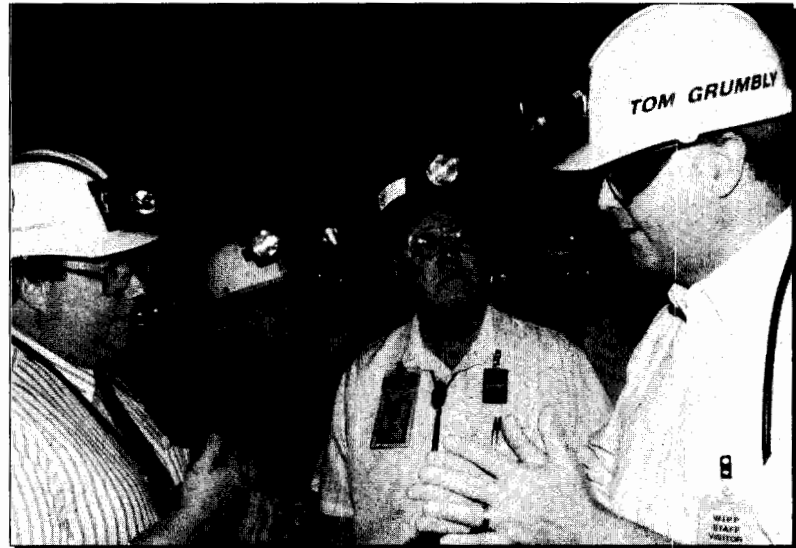
The DOE is committed to stakeholder participation. The importance of stakeholder involvement and understanding is reflected in a report that the New Mexico Associated Press rated WIPP-related stories in 1992 second only to the presidential election.



The WIPP's concern for environmental integrity reaches into every aspect of the northern Chihuahuan Desert, including birds of prey indigenous to the area like these peregrine falcons.

Stakeholder activities in FY 1993 included the following:

- An Educators Day site tour in November 1992 drew about 160 principals, teachers, and other educational professionals from southeastern New Mexico schools.
- The DOE announced in November 1992 that a \$2 million award had been approved for the Carlsbad Environmental Monitoring and Research Center to establish a baseline and monitor local residents for radiological effects of the WIPP's operation. The center is an arm of the Waste-management Education and Research Consortium.
- In May 1993, the DOE awarded a seven-year, \$20 million contract to the Waste-management Education and Research Consortium to monitor the environmental effects of the WIPP.
- An environmental radiochemistry laboratory was opened to the public by its operator, the Environmental Evaluation Group, in July 1993.
- The DOE sponsored a Washington, D.C., summit of WIPP stakeholders in late July 1993.
- Assistant Secretary Grumbly affirmed his and the DOE's commitment to the WIPP with local stakeholders in a September 1993 meeting held in Carlsbad.



DOE Assistant Secretary Thomas Grumbly visited the WIPP on June 23, 1993. He described the facility as "amazing" and "phenomenal," and expressed confidence that WIPP will be a success story.

Safety Culture

Industrial safety excellence at the WIPP site during FY 1993 remained unmatched as inspectors praised compliance efforts, professional groups awarded honors, and nearly a thousand employees approached one million man-hours of safe work.

The National Safety Council presented the WIPP an Award of Honor in 1993 for improved safety records. This honor followed a "Best Record" award in 1991 and 3.2 million hours worked without a worktime-loss injury in 1992. Meanwhile, the New Mexico Inspector of Mines tapped the WIPP management and operating contractor as the Mine Operator of the Year for the seventh consecutive year.

The WIPP's mine rescue teams maintained their reputation as the country's benchmark for excellence in national contests that demonstrated their skill.

Five inspections by the federal Mine Safety and Health Administration, examining both surface and underground workplaces, resulted in only one notice of an issue that was classified as insignificant and was immediately rectified. The annual inspection conducted by the New Mexico Inspector of Mines resulted in no notices.



Area youth continue to gain scientific insight as they work with WIPP employees to learn about the environment.

Meanwhile, the DOE Albuquerque Operations Office appraisals of the operation's safety also reported no findings, with areas inspected including industrial hygiene, radiation protection, fire protection, and firearms safety.

A DOE Headquarters Environmental Assessment resulted in the comment that the WIPP's "culture of environmental excellence is pervasive."

The safety mentality at the WIPP is so successful that the operation prepared an application to join the DOE's Voluntary Protection Program. Designation to the program is

reserved for only the safest work places in the country, and will reduce the number of federal safety inspections and reports.

Meanwhile the WIPP Final Safety Analysis Report was updated; the entire management team participated in the Supervisor Training in Accident Reduction Techniques program; and a first-rate medical program and employee newsletter promoted employee well-being.

Sandia National Laboratories

Sandia National Laboratories, the scientific advisor for the WIPP, continued a number of ongoing experiments during FY 1993.

The laboratory completed Preliminary Comparison Reports for the 1992 Performance Assessment and initiated the first Biennial Performance Assessment process in compliance with the Land Withdrawal Act.

In Short-Term Seal Materials Development and Small Scale Seal Performance Tests, a grouting demonstration involved a team effort with the Waste Isolation Division's Experimental Operations Section. Injecting microfine mortar into a marker bed decreased gas permeability of the bed until it was about a thousandth as permeable. Private industry has been asked to consider forming a Cooperative Research and Development Association to commercially produce this kind of significantly improved material.

In Column Experiments, Sandia performed the first multiple radionuclide retardation experiment with an actinide in the laboratory. These experiments are designed to measure retardation of dissolved actinides flowing through Culebra cores. The more actinides attach themselves to Culebra rock, the slower the migration of actinides, and the lower the actinide release over the next 10,000 years. The initial test seems to indicate that actinide adsorption onto the Culebra rock can reduce actinide transport through the rock to approximately one one-hundredth of the natural flow of groundwater.

Preliminary design calculations were completed in Non-Sorbing Tracer Field Tests. The initial focus for FY 1994 will be to complete a single well tracer test in an existing well at the WIPP site.

The Salado Threshold Pressure and Relative Permeability Program completed a test plan for the Two Phase Flow Laboratory Program for the Waste Isolation Pilot Plant. This study will develop experimental techniques to measure gas-threshold displacement pressure and brine/gas relative permeability for the Salado Formation.

A test plan for Large-Scale Seal Tests was begun in FY 1993, but budget cuts delayed the effort for one year.

Portions of Sandia's work on the Bin-Scale Tests, experiments that were canceled after the end of the fiscal year, will be transferable if the program is revived at another site. Transferable portions include analytical procedures, waste characterization procedures, and instrumentation and data system definitions.



As part of a non-radioactive experiment at the WIPP, an employee examines wires used in measuring minute changes in rock movement underground.



A Westinghouse employee adjusts a rod extensometer that measures rock-salt movement in one of many WIPP underground experiments.

Sandia completed a computer model capable of simulating how underground rock fractures. Fracture Modeling combines the deformation creep model with fracture development. Sandia used the model to predict the evolution of damage around the Site and Preliminary Design Validation test rooms, showing the formation of roof, floor, and rib failures over a predicted period.

The Actinide Source Term Program developed a plan for determining concentrations of actinides that could be released in the event of human intrusion into the repository. The WIPP needs technically defensible information to respond to sensitive assumptions about mobile actinide concentrations. The program consists of laboratory work and modeling work, as well as tests with real waste. Laboratory determinations of actinide chemical properties help develop numerical models to calculate mobile actinide concentrations and interactions with wastes. Confidence in the model will be generated through comparison with measured values of actual mobile concentrations of actinides in liter-scale and drum-scale tests.

Facility Operations

Base facility efficiency and safety were increased in 1993 as controls for the Air Intake Shaft were modified, Waste Hoist controls were enhanced, and a broken guide in the Salt Handling Shaft was replaced.

New ventilation doors were installed underground and controlled access areas were reduced.

A DOE Maintenance Management Program Review resulted in the operation receiving the first "very good" rating ever awarded by DOE's Albuquerque Operations Office. Operations maintained systems availability at outstanding levels near 100 percent, including surface ventilation, underground electrical, compressed air, fire suppression water distribution, and hoists.

An Operational Readiness Review was successfully completed on August 17 when the Westinghouse Waste Isolation Division said the site was ready to receive waste for a test phase.

GEOLOGICALLY STABLE

At the site, underground workers kept a number of nonradioactive experiments going, including rock movement measurements, and maintained the mined areas in a condition ready to accept the first shipment of test phase waste.

The draft "Test Room Stability Plan" for Room 1, Panel 1, of the WIPP underground was issued by the DOE in late January 1993, completing another Land Withdrawal Act milestone.

Also fulfilling a provision of the Land Withdrawal Act, the Mine Safety and Health Administration examined the state-of-the-art roof support in Room 1, Panel 1, and certified it safe for a test phase that had been planned for several years. That certification came early in 1993 and was supported later in a safety inspection by the New Mexico Inspector of Mines.

A scaling machine underground at the WIPP maintains the safety of walls and ceilings by removing loose rock.





SAFE, RELIABLE TRANSPORTATION

While maintaining the safest hazardous materials transportation system in the nation, WIPP personnel helped prepare test phase corridor states for any possibility of an accident. A side benefit to the states is that the training given to local emergency response providers helps the states respond to other hazardous material accidents, not just prospective accidents involving radioactive waste.

Locations of Generator and Storage Sites

Ten DOE sites around the country are expected to send waste to the WIPP for disposal.

California	Lawrence Livermore National Laboratory
Colorado	Rocky Flats Plant
Idaho	Idaho National Engineering Laboratory
Illinois	Argonne National Laboratory
Nevada	Nevada Test Site
New Mexico	Los Alamos National Laboratory
Ohio	Mound Facility
Tennessee	Oak Ridge National Laboratory
South Carolina	Savannah River Plant
Washington	The Hanford Site

TRUPACT-II Container

Containers built to Nuclear Regulatory Commission certification specifications for transporting transuranic waste to the WIPP are called Transuranic Package Transporters, Model 2, or TRUPACT-II.

All the TRUPACT-IIs the WIPP will likely need had been built before the beginning of FY 1993. Parts and equipment that remained from TRUPACT-II fabrication were transported to and stored at the WIPP site, and the TRUPACT-II Assembly Facility lease was formally terminated during the year.

With the DOE's endorsement, Westinghouse agreed to pay \$1.375 million to Nuclear Packaging, Inc., in settlement of a 15-month-old lawsuit over alleged contract deficiencies.

The Nuclear Regulatory Commission satisfied a milestone for the WIPP Land Withdrawal Act by auditing the WIPP TRUPACT program. The commission issued a positive report praising the effectiveness of the TRUPACT-II maintenance program.

Transportation

In January 1993, the DOE released \$43 million to the state of New Mexico for use in WIPP-related road projects. The funds had been withheld by Congress until after passage of the WIPP Land Withdrawal Act. The New Mexico Highway and Transportation Department used the funds on three WIPP-related highway projects.

Driving a TRUPACT-II transporter, a Dawn Enterprises, Inc. driver won first place in the flatbed division of a professional truck-driving contest in Albuquerque. His win served to enhance public perception of the WIPP waste transportation system.

Emergency Response Training

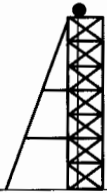
The WIPP Land Withdrawal Act required the Occupational Safety and Health Administration to review the WIPP's States Training and Education Program. The federal review and subsequent positive report resulted in DOE Headquarters issuing written authorization to Westinghouse to proceed with training in the test phase shipping corridor states.

The 1993 Transportation Accident Exercise, called TRANSAX '93, was conducted near Lamy, New Mexico, on September 1, 1993, resulting in a successful drill and high marks from evaluators.

The WIPP also participated in the first New Mexico-based WIPP Transportation Exercise (WIPPTREX). Previously conducted in other states, the WIPPTREX is a state-level drill that earned the WIPP a letter of commendation from Wyoming Governor Mike Sullivan. As part of the New Mexico exercise, the TRUPACT-II Accident Response Team was dispatched to Raton, New Mexico.



The Nuclear Regulatory Commission fulfilled one requirement of the WIPP Land Withdrawal Act when it reported that a review of the TRUPACT-II maintenance program showed the system in compliance with applicable regulations.



PROLOGUE

The WIPP, the solution to a critical national environmental problem, began FY 1993 with a congressional mandate to be sure any tests with waste underground were relevant to proving the project would comply with environmental regulations. That mandate was only one of more than 140 requirements in the WIPP Land Withdrawal Act of 1992. The WIPP ended FY 1993 technically ready to begin five to seven years of tests expected to support computer modeling to determine if the site would become the nation's first safe nuclear waste repository.

The new direction at the WIPP, announced soon after the end of FY 1993, draws on lessons learned, makes economic use of existing facilities, and focuses on regulatory compliance. As the operation steps down from years of continuous effort to achieve and maintain readiness to receive waste for testing, employees remain committed to safety, health, and the environment.

The WIPP will intensify activities that lead to a declaration of full compliance with all applicable laws and regulations. Meanwhile, the WIPP stepdown from full readiness is being accomplished in a fashion that will allow the DOE to gain readiness status quickly and in a cost effective manner when a positive disposal decision is reached.

The major events in FY 1993

- | | |
|---------------|---|
| October 1992 | Congress passed and President signed WIPP Land Withdrawal Act.

TRUPACT-II Assembly Facility closed. |
| November 1992 | The New Mexico Environment Department conducted public meetings to discuss WIPP's application for a state permit to handle mixed waste. |
| December 1992 | EPA demonstrated the beginning of its active role by visiting the WIPP site and conducting public meetings in Carlsbad and Santa Fe. |
| January 1993 | DOE released \$43 million of highway payments to New Mexico.

Westinghouse issued the draft "Test Room Stability Plan," completing a Land Withdrawal Act milestone. |
| February 1993 | EPA published disposal standards and conducted public hearings. |
| March 1993 | DOE announced that experiments with transuranic waste are not necessary, but are desirable, and presented the Test Phase Plan and the Waste Retrieval Plan to the EPA. |

- April 1993 WIPPTREX exercise conducted in Wyoming resulted in a letter of commendation from that state's governor.
- May 1993 National Advisory Council on Environmental Policy and Technology recommended the EPA not approve the Test Phase Plan until the DOE specified where waste would be shipped if it had to be retrieved.
- The Occupational Safety and Health Administration reviewed the WIPP's States Training and Education Program.
- EPA and the Environmental Evaluation Group issued reports questioning the adequacy of the Test Phase Plan.
- June 1993 DOE responded to state requests for more information for the Test Phase Plan, and set a deadline of August 20, 1993, for issuing a new draft.
- July 1993 DOE and the Bureau of Land Management conducted public hearings to discuss the draft Land Management Plan.
- August 1993 Westinghouse said the facility was ready to receive waste for the test phase.
- DOE delayed plans to submit a revision of the Test Phase Plan to EPA.
- The New Mexico Environment Department issued a draft permit to allow the WIPP to handle mixed waste.
- September 1993 TRANSAX '93 was conducted near Lamy, New Mexico, resulting in a successful drill and high marks from evaluators.
- DOE declared readiness to begin receiving waste for the test phase.
- October 1993 DOE announced that radioactive waste testing will be conducted in a national laboratory. Geologic stability testing and other scientific studies will continue at the WIPP.



WIPP READING ROOMS

The DOE provides documents pertaining to the Waste Isolation Pilot Plant for public review in these WIPP reading rooms:

DOE/Forrestal Building
Public Library Reading Room
AD-234.1
FOI - USDOE
1000 Independence Avenue S.W.
Washington, DC 20585

Defense Nuclear Facilities Safety Board
625 Indiana Ave. N.W. Suite 700
Washington, DC 20004

Office of Scientific and
Technical Information
Technical Information Center
P.O. Box 62
Oak Ridge, TN 37831

Thomas Brannigan Memorial Library
200 E. Picacho
Las Cruces, NM 88005

New Mexico State Library
325 Don Gaspar
Santa Fe, NM 87503

Pannell Library
New Mexico Junior College
5317 Lovington Highway
Hobbs, NM 88240

Carlsbad Public Library
101 S. Halagueno St.
Carlsbad, NM 88220

Zimmermann Library
Government Publications Department
University of New Mexico
Albuquerque, NM 87138

National Atomic Museum
U.S. Department of Energy
Albuquerque Field Office
P.O. Box 5400
Albuquerque, NM 87115

Sandia National Laboratories
Technical Library
Organization 3144
P.O. Box 5800
Albuquerque, NM 87185

Sandia National Laboratories
Waste Management and
Transportation Library
Organization 6332
P.O. Box 5800
Albuquerque, NM 87185

Martin Speare Memorial Library
New Mexico Institute of
Mining and Technology
Campus Station
Socorro, NM 87801

Raton Public Library
244 Cook Avenue
Raton, NM 87740

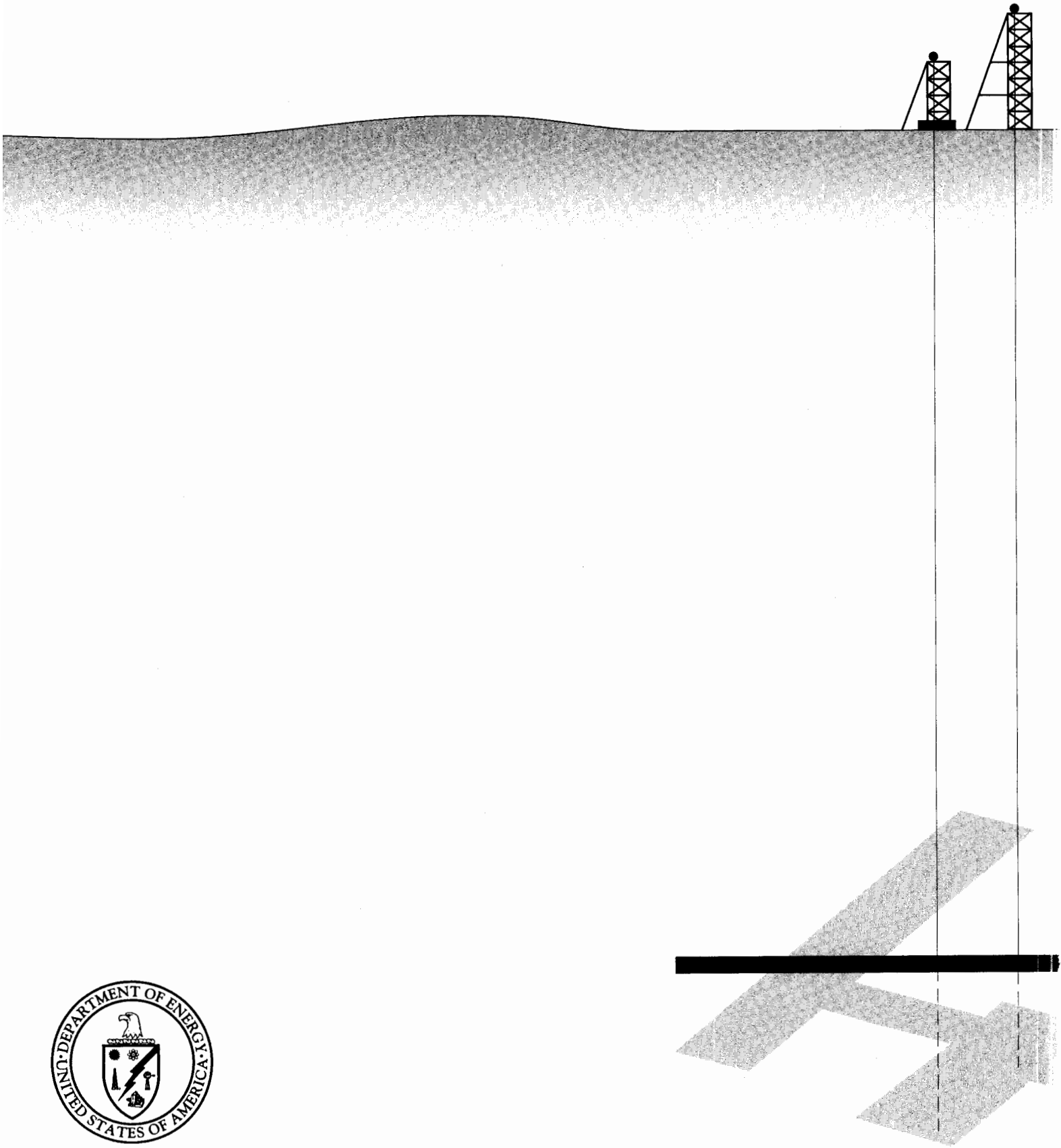
Notes

Notes

Copyright 1994 by U.S. Department of Energy
Carlsbad Area Office
The Waste Isolation Pilot Plant
1993 Annual Report



Printed on recycled paper



Carlsbad Area Office
U.S. Department of Energy
P.O. Box 3090
Carlsbad, NM 88221
(505) 234-7313