The U.S. Department of Energy's Waste Isolation Pilot Plant mission is to demonstrate the safe disposal of transuranic (TRU) waste. This waste originates from numerous Department of Defense facilities. The Department of Energy employs two major contractors to carry out WIPP projects:

Westinghouse Electric Corporation

Sandia National Laboratories

Badge Requirements

You must wear your security badge at all times while on the WIPP site. The badge will be worn per the instructions in the video that you have seen. This course allows contracted employees unescorted access to the WIPP site during normal working hours. (Monday through Friday 7:15 a.m. to 4:45 p.m.) It also allows new facility employees unescorted access during normal working hours up to 30 days (New facility employees must complete GET-101 within 30 days). The badge will be picked up each morning at the Security office. It is to be returned to Security at the end of the day. If, access is required outside of normal working hours the employee will require an escort.

Safety

Safety is our first priority at the WIPP site. You must ensure that you follow posted requirements and wear the proper protective equipment.One specific area that needs explanation is a "Hard Hat Area". The equipment required to enter a Hard Hat area is:

Hard Hat
Safety shoes (Steel toed shoes)
Safety glasses

Remember, that the equipment you wear is protective. It does not make you invulnerable. You need to be conscious of the hazards in the area you are working.

WIPP Site operations are regulated by the Mine Safety and Health Act, the Occupational Safety and Health Act, the Resource Conservation and Recovery Act and other federal, state and local regulations. Personnel working on the site must operate within the scope of these regulations as appropriate for this federal facility. Technical assistance to ensure compliance is provided by the Environment, Safety and Health Department.

These issues may include worker safety, access to the underground, and operations with hazardous chemicals or hazardous waste by-products. Operations requiring the use of hazardous chemicals require that a Material Safety Data Sheet be provided to the Environmental Analysis and Compliance Department prior to the start of actual operations.

Locations

The map in this pamphlet shows the locations of offices and structures throughout the site. Some specific areas of concern are:

The area around the Salt Handling Shaft and the Air Intake Shaft. These areas are designated as Hard Hat Areas.

The area underneath the exhaust ducting around the Exhaust Filter Building is designated as a Hard Hat Area.

The Hazardous Material Storage Area in the southwest corner of the site.

The area directly to the east of the Maintenance Building which requires safety glasses for entry.

There are several areas around the site where Radioactive material may be or is stored. The Waste Handling Building, the fenced in area to the South of the Waste Handling Building and counting labs in the Safety , Support and Waste Handling buildings.

The Site substation is a limited access area to prevent personal injury.

Controlled Documents

Controlled documents prescribe activities affecting quality or safety of operations at WIPP. They have been assigned a controlled document number. They provide for WIPP compliance to federal, state or local laws and contain site-specific instructions.

Controlled documents are stored in:

The Support Building

Safety Building

Quality Assurance, Technical Training, Maintenance and Technical services Trailers

Westinghouse Operations and Information Center in Carlsbad

WIPP underground

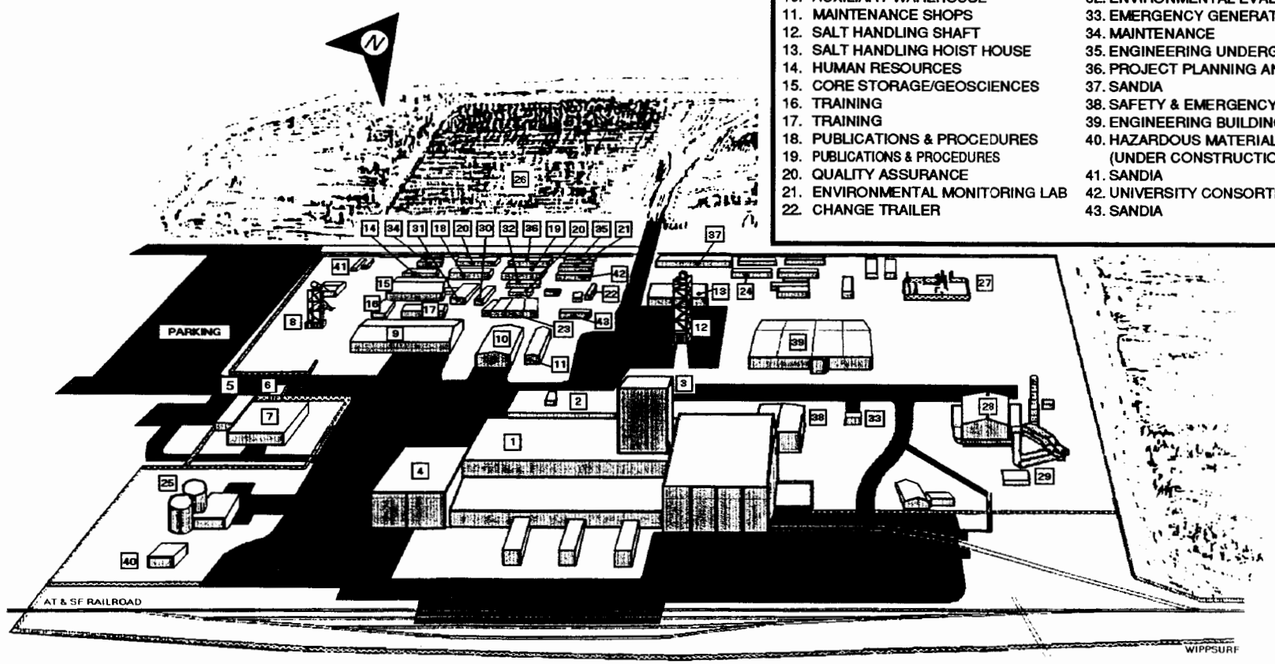
Radiation and Hazardous Material Safety

Questions most often asked by visitors deal with radiation. Radiation is a normal part of nature; it is with us no matter where we go or what we do. Natural radiation is emitted by earth, water, food, buildings, air, the sun, stars and our own bodies. Radiation also comes from human-generated sources such as color TV sets, medical procedures, electrical generation, and nuclear weapon production. Radiation and other hazardous materials here at WIPP are closely monitored and controlled. All areas where you could be exposed to radiation are marked with yellow and magenta caution signs and have physical barriers. Chemical packages and containers are clearly labeled to indicate the contents and the associated hazards. Do not enter a radiation or hazardous material area or work with any hazardous materials without specific authorization and training.

911104

If, you have any questions about the video you have seen or the information in this pamphlet. You may direct your questions to the instructor presenting this course.

WIPP SURFACE



LEGEND

1. WASTE HANDLING BUILDING
2. SUPPORT BUILDING
3. WASTE HANDLING SHAFT
4. TRUPACT MAINTENANCE FACILITY
5. VEHICLE TRAP
6. GATEHOUSE
7. GUARD AND SECURITY BUILDING
8. AIR INTAKE SHAFT
9. WAREHOUSE
10. AUXILIARY WAREHOUSE
11. MAINTENANCE SHOPS
12. SALT HANDLING SHAFT
13. SALT HANDLING HOIST HOUSE
14. HUMAN RESOURCES
15. CORE STORAGE/GEOSCIENCES
16. TRAINING
17. TRAINING
18. PUBLICATIONS & PROCEDURES
19. PUBLICATIONS & PROCEDURES
20. QUALITY ASSURANCE
21. ENVIRONMENTAL MONITORING LAB
22. CHANGE TRAILER
23. MAINTENANCE/EXPERIMENTAL PROGRAMS
24. SANDIA
25. WATER STORAGE TANKS AND PUMPS
26. SALT PILE
27. MAIN SUBSTATION
28. EXHAUST FILTER BUILDING
29. EXHAUST AIR SHAFT
30. AS-BUILTS
31. SANDIA
32. ENVIRONMENTAL EVALUATION GROUP
33. EMERGENCY GENERATORS
34. MAINTENANCE
35. ENGINEERING UNDERGROUND OPERATIONS
36. PROJECT PLANNING AND CONTROL
37. SANDIA
38. SAFETY & EMERGENCY SERVICES BLDG.-EOC
39. ENGINEERING BUILDING
40. HAZARDOUS MATERIAL STORAGE BUILDING (UNDER CONSTRUCTION)
41. SANDIA
42. UNIVERSITY CONSORTIUM
43. SANDIA

WELCOME TO THE WASTE ISOLATION PILOT PLANT

WASTE ISOLATION PILOT PLANT WIPP

CORE GENERAL EMPLOYEE TRAINING COURSE
GET-200
REV.-1
11/25/91

1 TRUPACT-II Containers are Proven Strong and Safe

They have to be. U.S. Nuclear Regulatory Commission (NRC) safety requirements for radioactive waste shipping containers are extremely rigid. The TRUPACT-II meets them all.

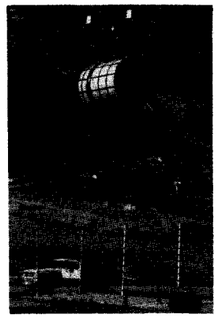
The strength and safety of the TRUPACT-II containers was demonstrated through an extensive testing program required for NRC certification. In those tests, TRUPACT-II containers were subjected to a brutal series of conditions to see if they would maintain their leak-tight integrity during a highly improbable—but nonetheless possible— highway accident scenario. The TRUPACT-II tests involved the following elements:

- First, the 19,000-pound loaded TRUPACT-IIs were dropped from a height of 30 feet (three stories) onto a hard, unyielding surface constructed of 25-foot-thick concrete that was covered with an eight-inch steel plate. This unyielding test surface was used to create a very severe accident situation by causing all of the impact to be absorbed by the TRUPACT-II. Each test TRUPACT-II container was oriented so that its most vulnerable areas would receive the greatest impact. ***The TRUPACT-II containers did not leak.***

- Next, the same TRUPACT-II containers had to survive puncture tests to further prove their engineered integrity. They were repeatedly dropped from a height of about three feet onto a six-inch diameter steel punch. In some of the drops the punch penetrated through the outer skin of the stainless steel TRUPACT-II container and into the 10-inch polyurethane foam layer. However, it did not penetrate either of the two containment vessels inside the TRUPACT-II container that protect the cargo. ***The TRUPACT-II containers did not leak.***

- Finally, it had to be demonstrated that the TRUPACT-II could survive a highway accident fire. Each battered TRUPACT-II container was placed over an 8,000-gallon pool of jet fuel and set ablaze. The TRUPACT-II containers were engulfed in a 1,475 degree Fahrenheit inferno for a minimum of one-half hour. ***And, again, the TRUPACT-II containers did not leak.***

Altogether, three different TRUPACT-IIs were tested over a wide range of temperatures and orientations. These tests conclusively proved that the TRUPACT-II containers are indeed built to provide extra margins of safety under extraordinary accident conditions. Nonetheless, the ultimate safety of TRUPACT-II transportation system rests with those who will move the TRUPACTs to the WIPP.



TRUPACT II containers were subjected to brutal tests to meet U.S. Nuclear Regulatory Commission requirements and to assure they will maintain leak-tight integrity during any highway accident.

2 Highly Trained and Skilled WIPP Drivers

Each driver will be required to attend the same emergency response course that will be offered to firemen, law enforcement personnel and ambulance crews along the transportation routes. Each driver must be recertified each year and will be subject to severe penalties for safety violations. All tractors are equipped with speed governors, and any WIPP driver charged with a moving violation or accident will be fired. Deviating more than once from the designated transportation route is also cause for termination. So is failure to maintain adequate records or failure to maintain constant surveillance of the WIPP cargo.

WIPP drivers will be seasoned veterans who have gone through stringent screening including drug and alcohol testing. WIPP driver qualifications exceed not only those recommended by the U.S. Department of Transportation but also the DOE's own exacting requirements.

WIPP drivers must meet these minimum qualifications:

- The driver must be at least 25 years old, a U.S. citizen and must submit to substance abuse tests, a driver profile examination and a tough road test.

- A minimum of 100,000 miles of tractor-trailer driving experience is required. The driver must have garnered two years of uninterrupted experience as a tractor-trailer driver within the past five years.

- WIPP drivers must have a clean driving record. No driver who has received a traffic violation or who is found to be at fault in an accident within the past three years will be qualified to move WIPP waste.

Drivers meeting these minimum requirements will attend the DOE's Transportation Safeguards Academy, where they will be trained annually by driving an actual WIPP tractor-trailer fully loaded with a nonradioactive WIPP payload. Each driver must demonstrate skillful handling of the vehicle over varied terrain driving daylight and nighttime hours. The training is specially tailored to cover traditional safety considerations as well as unusual events, including sabotage.

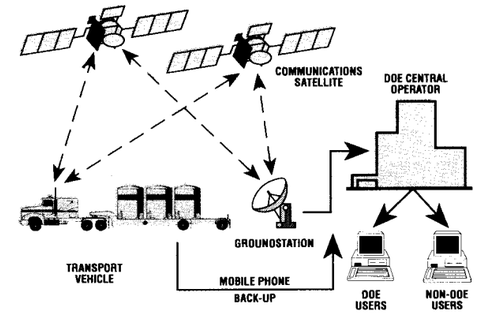
All WIPP tractors will carry properly-calibrated radiation detection instruments. As part of their training, drivers become skilled in the use of radiation detection instruments.

In summary, WIPP drivers will be proven safe drivers. They will be trained to tackle all shipment contingencies with an uncompromising approach to public safety. They will be among the safest, most highly trained drivers on America's highways.

3 WIPP Shipments Will Be Continuously Monitored for Added Safety

A state-of-the-art, computer-linked and satellite-based tracking system, called TRANSCOM, will monitor the movement of each and every WIPP shipment. The highly integrated system will provide streamlined communications to a Central Monitoring Room at WIPP. Involved states and Indian tribes also will receive the

TRACKING SYSTEM



TRANSCOM system software and will be able to follow TRUPACT-II shipments on the way to WIPP.

At any given time, TRANSCOM will provide digital communication and the location of each WIPP vehicle anywhere along the transportation route. TRANSCOM will let key decision makers know when a shipment is approaching the jurisdiction of a neighboring state.

Communication between the WIPP Central Monitoring Room and WIPP drivers will provide a constant source of information about changing weather conditions or any abnormal event that might occur. Safe packing areas have been designated for inclement weather. Tractors are also equipped with a mobile telephone for back-up communications.

4 Emergency Responders Will Be Trained and Ready

Before the first WIPP shipment moves, thousands of emergency responders along the WIPP routes will be trained and ready to respond quickly and safely to any contingency involving hazardous waste, not just WIPP-related shipments. So will medical personnel in selected hospitals along the routes. Already, nearly 5,900 emergency responders have been trained. More than 85 percent of them rated their training as "excellent." They are ready. Regular refresher training will keep them ready.

It All Adds Up

Sound, leak-tight TRUPACT-II shipping containers. A cadre of superbly trained drivers with top safety records. A sophisticated tracking system to watch each and every move of each and every WIPP shipment. Thousands of emergency responders, trained and ready to act in case of a WIPP transportation accident. All of this adds up to four excellent reasons why the WIPP transportation system is safe.

At WIPP, transuranic waste will be stored 2,150 feet underground in salt beds that have remained stable and free of groundwater for 225 million years. Scientists have long advocated and investigated the safe disposal of such waste in deep geologic formations.

4

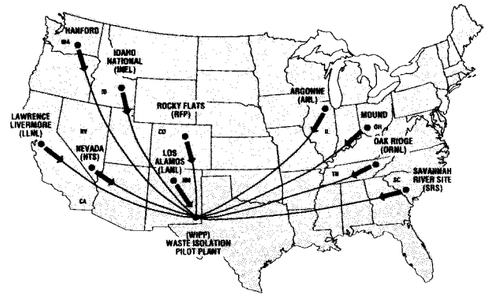
EXCELLENT REASONS WHY THE WIPP TRANSPORTATION SYSTEM IS SAFE

When the United States Department of Energy's (DOE) Waste Isolation Pilot Plant (WIPP) begins the experimental phase specially-designed shipping containers will begin bringing transuranic (TRU) nuclear waste to the WIPP site near Carlsbad, New Mexico. TRU waste—consisting of rags, discarded clothing, and tools that have become contaminated with radioactive elements like plutonium-239 will be shipped to WIPP in Transuranic Package Transporters, or TRUPACT-IIs.

The long half-lives of the wastes to be shipped require safe transportation, handling and disposal. At WIPP, TRU waste will be stored 2,150 feet beneath the earth's surface in the middle of a bedded-salt rock formation ***that has remained stable and free of groundwater for 225 million years***. Scientists have investigated and advocated the safe disposal of radioactive waste in bedded-salt formations for many years.

Transportation issues associated with shipping TRU waste to WIPP are of understandable concern to the public along transportation routes to WIPP. TRU waste shipments will move from 10 DOE sites located throughout the United States and the transportation routes will cover more than 7,000 miles of highway in 23 states. TRU waste shipments to the WIPP must be carefully monitored and safely conducted at all times. To assure this, the prestigious National Academy of Sciences (NAS) reviewed the WIPP transportation plan.

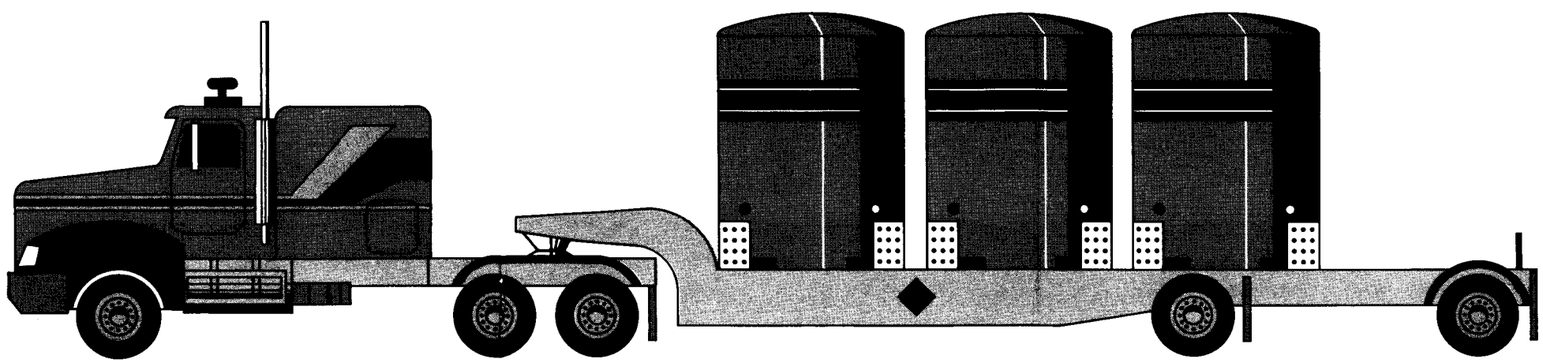
TRU DEFENSE WASTE GENERATING AND STORAGE SITES



The transportation plan was developed in full compliance with Department of Transportation (DOT) regulation 49 CFR 177.825, which allows individual states to designate primary and alternate in-state transportation routes for WIPP shipments. In June 1989, the NAS released its findings on the plan. It concluded:

> ***" 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. "***

There are many reasons behind the safety of the WIPP transportation system. These can be grouped in four broad categories.



For More Information, Please Contact:

WIPP Public Information
P.O. Box 2078
Carlsbad, NM 88221

WASTE ISOLATION PILOT PLANT

A Research and Development Facility of the U.S. Department of Energy

COMMONLY ASKED QUESTIONS

WHAT IS THE PURPOSE OF THE WASTE ISOLATION PILOT PLANT?

In establishing this unique project, Congress authorized its construction as a defense activity of the U.S. Department of Energy. The Waste Isolation Pilot Plant (WIPP) was defined as a research and development facility to demonstrate the safe disposal, in natural bedded salt formations, of radioactive transuranic by-products resulting from the defense activities and programs of the U.S. Government.

As its primary mission, the WIPP is to consist of a repository area to demonstrate the safe disposal of transuranic (TRU) wastes that had been generated during U.S. defense programs at other Department of Energy sites.

Secondly, the WIPP is designed to include an underground area for research and development activities involving all types of radioactive defense wastes. Both of these goals are reflected in the underground structures developed at the WIPP.

WHAT DOES THE WIPP FACILITY CONSIST OF?

The WIPP site includes both surface and underground structures in a remote area 26 miles east of Carlsbad, on a 10,240-acre location.

The Support and Waste Handling Building is the principal surface structure. It is 160 feet wide, 430 feet long, and 50 feet high, and it also features a 125-foot-high hoist tower. The building is equipped to handle both contact-handled (CH) and remote-handled (RH) TRU waste from the time the waste is initially unloaded until it is lowered through the waste shaft for emplacement underground.

Additional structures on the WIPP surface include an Exhaust Filter Building, Technical and Maintenance Support Operations, Administration Building, Security and Visitor Center, and a Safety and Emergency Operations Center.

Underground facilities include vertical shafts, underground maintenance and storage areas, plus rooms specifically designed for experiments on rock mechanics and mine design. The underground structures are at one mined level 2,150 feet below the surface.

HOW MANY MILES OF TUNNELS HAVE BEEN MINED AT WIPP?

By late-1990, over 10 miles of underground structures had been excavated. This includes four deep shafts extending 2,150 feet below the surface, and the horizontal length of the tunnels and rooms at that depth. The 10 miles is the linear total.

In addition, more than 10 miles of vertical holes were drilled earlier to characterize the site geologically.

HOW MUCH OF THE PLANNED MINING IS NOW COMPLETE?

Mining crews have excavated approximately 800,000 tons of rock from beneath the WIPP site. This is about one-half of the planned total.

WHAT REMAINS TO BE MINED? WHY ISN'T EVERYTHING BEING COMPLETED NOW?

Throughout the duration of the WIPP Project, 1,600,000 tons of mined materials will be excavated. Most of the areas still to be excavated will become the storage rooms for the transuranic wastes. Plans call for such excavation to begin just before the wastes arrive on site.

WHAT HAPPENS TO THE SALT BEING MINED? CAN IT BE USED?

The salt rock being excavated from the WIPP does not have a commercial value or use at the present time. It is being stockpiled and leveled on the surface where it solidifies rapidly because of natural overnight condensation and dew. The mined rock is stored on a 30-acre area north of the site.

HOW BIG IS THE AREA YOU'RE MINING UNDERGROUND?

Storage areas are arranged in eight sections or panels. There are seven rooms in each panel. The room size has been established based on the structural stability and ease of use by underground equipment needed to place the waste material canisters. Rooms will be excavated as needed.

Rooms and connecting passageways are 13 feet high and 33 feet wide. Access to the panels is provided by a four-entry ventilation system extending about a mile horizontally, which in turn connects with other rooms where experiments are conducted. All underground areas are connected to four vertical shafts waste handling, fresh air intake, exhaust, and transport of people and materials. All of these activities are within a one-square mile area.

WHAT ARE THE WASTES THE WIPP PROJECT WILL BE STORING?

Primarily the WIPP will demonstrate the safe disposal of defense-generated transuranic wastes. These will arrive from other U.S. Department of Energy sites in two forms:

- CH TRU are contained in metal drums or metal standard waste boxes in specially designed shipping containers, called a TRUPACT-II. About 97% of the waste to be stored at the WIPP will be CH TRU. The radiation level on the outside of the drums and boxes is low enough that they can be safely managed in a hands-on manner.

After arrival at the WIPP site, the shipping containers will be inspected, then the contents will be removed, inspected, and placed on pallets before being lowered underground to be placed in storage.

- RH TRU will have high enough radiation levels at the surface of their containers that they will require handling by remotely controlled equipment for maximum protection to workers.

These wastes will be housed in shielded shipping casks transported by truck. The casks will be opened in the WIPP Waste Handling Building's shielded hot cell by the use of large manipulators, cranes, and grapples. The actual waste canisters will be remotely surveyed for surface contamination, inspected, and transferred into a special shielded cask designed to transfer the RH TRU waste between surface and underground facilities at the WIPP. Underground cask transporters and emplacement machines will transfer the casks to horizontally drilled boreholes in the salt storage areas.

WILL THE WASTES BE THERE FOREVER?

The WIPP Project is designed to allow retrieval of all TRU waste emplaced for experimental use during the Test Phase. The U.S. Department of Energy has announced that a decision regarding retrieval will be made after the successful completion of the Test Phase. After five years, retrieval from the underground facility is still possible.

Would your Club or Organization like to hear a talk on this subject?
Call now to take advantage of our Exhibit Program, Speakers Bureau, Video Productions and Visitor Program.
Telephone (505) 885-7219

Additional information can be obtained by contacting:

U.S. Department of Energy
Office of Public Affairs
WIPP Project Office
P.O. Box 3090
Carlsbad, NM 88221
Telephone (505) 885-7337

Westinghouse Waste Isolation Division
Public and Technical Communications
WIPP Project
P.O. Box 2078
Carlsbad, NM 88221
Telephone (505) 885-7215

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WASTE ISOLATION PILOT PLANT

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GAS GENERATION IN TRU WASTES

As with all organic material, organic components of the waste buried at the Waste Isolation Pilot Plant (WIPP) will be decomposed by the action of bacteria. The drums that contain the waste also will decompose due to rust or corrosion. The decomposition process produces gases as by-products. Although the gases that may be generated are not radioactive, the effect of gas on the surrounding salt needs to be analyzed. An experimental program is planned to study the behavior of gases. The test data will help predict the long-term effect of gas generation on the underground environment.

What Gases are Generated and How are They Generated?

Much of the transuranic (TRU) waste certified for emplacement at the WIPP consists of paper, rags, clothing, plastics, and other organic materials. Organic materials are composed largely of molecules containing carbon, hydrogen, and oxygen. These organic materials carry bacteria from the general environment that may cause them to decompose. This bacterial action can produce gases such as oxygen, hydrogen, carbon dioxide, and methane.

Another large fraction of the wastes, as well as the drums in which the wastes are contained, are made of metals. These metals will corrode releasing gases.

A third way gases are produced is from the interaction of radioactive particles with the surrounding materials. The radiation can break chemical bonds and liberate sometimes gaseous components.

Are the gases radioactive?

The generated gases are virtually nonradioactive. In July 1989 report, the WIPP Panel of the National Academy of Sciences stated:

"The gases generated by the emplaced wastes will be so low in radioactivity as to be considered nonradioactive. The process by which gases are generated under repository conditions, including corrosion and radiolysis, do not produce radioactive isotopes. The repository gases should include only trace amounts of noble gas fission products released from the wastes."

How is Gas Generation Handled During Storage at Generator Sites and During Transportation?

The wastes that will be shipped to the WIPP are now temporarily stored in well-ventilated above ground areas and shallow burial chambers at ten generating sites. The package which contains the waste is required to be vented so as not to allow internal build-up of pressure. The vents are filtered to ensure that no radioactive waste particles could be released. Because of this and the fact that the gases are nonradioactive, gas generation does not pose a storage hazard in the well ventilated areas at generator sites.

When shipped to the WIPP, waste packages are enclosed in U.S. Nuclear Regulatory Commission (NRC) certified TRUPACT-II shipping containers. The TRUPACT-II container is sealed and will not allow gas to escape during transportation. Because the gas generation process is slow and transportation time to the WIPP is brief (a matter of days), gas buildup within the TRUPACT-II is minimal.

Once at the WIPP, engineers using specialized equipment can sample gas levels before opening TRUPACT-II. The equipment allows controlled venting of any gas pressure inside of the container.

How will Gas Generation Affect Operations and Long-term Performance at the WIPP?

Several engineered possibilities are being studied that will work to accommodate any gas buildup during the 25-year operating life of the WIPP. Once operations are complete and the underground areas have been backfilled and sealed, the gas generation process will take place in a closed environment. The effects of generated gases such as carbon dioxide, hydrogen, nitrogen and small amounts of methane must now be considered.

The WIPP Project has planned an experimental program to determine the long-term effect of gas generation on the mine environment. The experiments take place in underground bins and alcoves designed to simulate underground disposal conditions. The studies will evaluate:

- type and amounts of gases generated
- gas pressure calculations
- effect of the pressure on the salt rock
- plugging and sealing materials
- engineered solutions to accommodate gas generation if necessary

While gas generation experiments are expected to continue for many years, the data collected in the first two years will help to identify specific types and amounts of generated gases to determine if any waste treatment or facility modifications are needed to ensure compliance with applicable environmental standards. The data will allow the WIPP scientists to predict the long-term behavior of gas generation in the underground salt environment.

Would your Club or Organization like to hear a talk on this subject?
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WASTE ISOLATION PILOT PLANT

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WASTE HANDLING BUILDING

The Waste Handling Building at the Waste Isolation Pilot Plant is considered the most significant surface construction endeavor of the Waste Isolation Pilot Plant. All facets of the waste handling operation will take place in this building. Both contact-handled (CH) and remote-handled (RH) waste will be processed in this building before being moved underground for storage.

Significant design and operating features of this 92,000 square foot facility include:

- A 45-ton capacity waste hoist used to carry waste, equipment, and personnel to the underground facility.
- Operation at negative pressure (vacuum). Air that exits the facility is first routed through ultra high-efficiency particulate air (HEPA) filters.
- Maintenance on the Transuranic Package Transporter (TRUPACT-II) transportation fleet.
- Two separate facilities within the building to support CH and RH waste handling activities:

  Contact-Handled (CH)

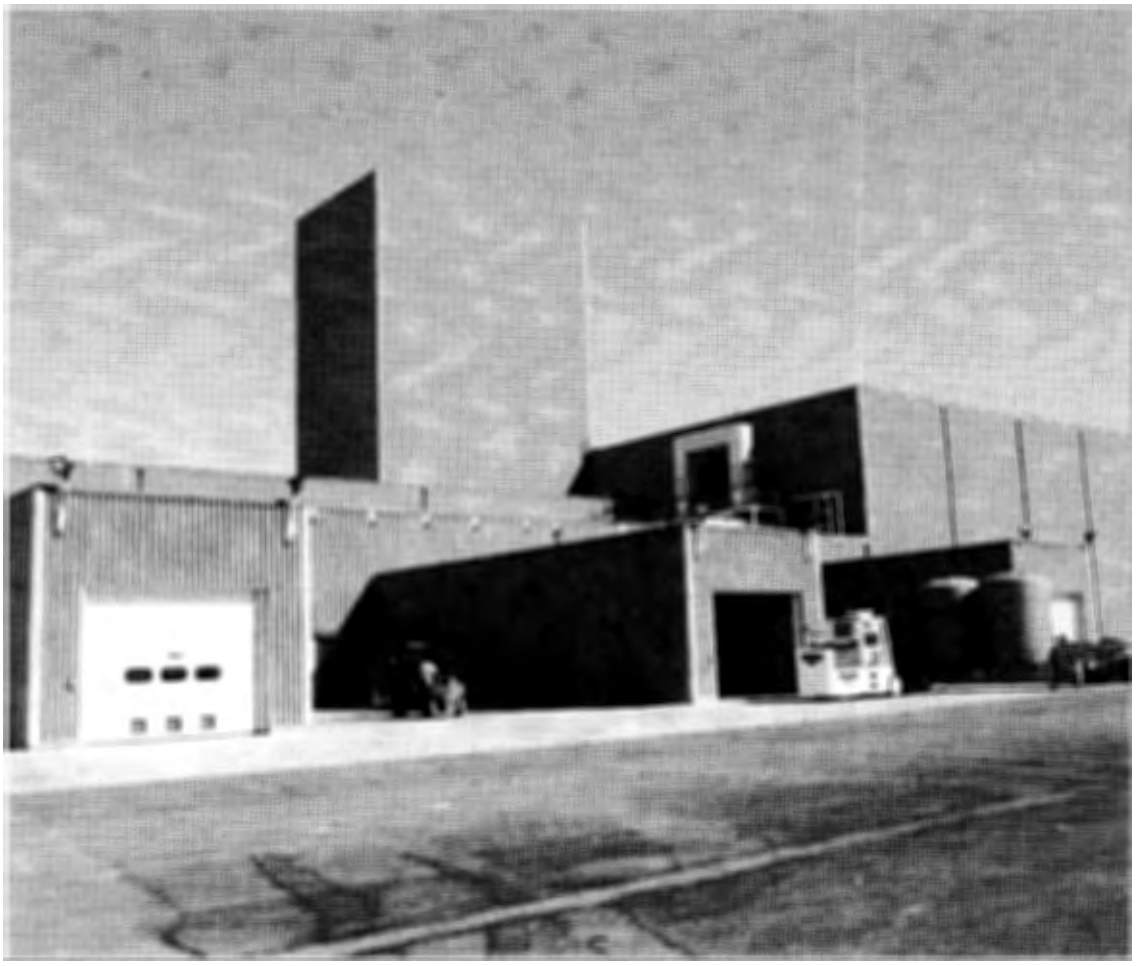
  - Includes a four-dock receiving area featuring two 5-ton overhead cranes. The waste packages are removed from the TRUPACT transporters and prepared for underground storage in this area.
  - An overpack and decontamination room is used to process waste packages should damage or surface contamination be detected during inspection.

  Remote-Handled (RH)

  - Includes a receiving area featuring a 140-ton crane where RH transportation casks are processed and prepared for underground storage.

- A "Hot Cell" chamber is used to process waste packages into the facility. The waste packages are removed from the transportation casks, inspected, overpacked if necessary, and prepared for underground storage.

All waste handling operations will take place in the Waste Handling Building, emphasizing the safety and protection of operating personnel, the public, and the environment.



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Revised 2/92

WASTE ISOLATION PILOT PLANT

A Research and Development Facility of the U.S. Department of Energy

PUBLIC LAW 96-164

OVERVIEW

The Waste Isolation Pilot Plant (WIPP) is a research and development project of the Department of Energy (DOE) that is designed to demonstrate the safe geologic disposal of transuranic radioactive waste. This unique project was authorized by the U.S. Congress in response to the national need for long-term, safe methods for disposing of radioactive by-products from our defense programs. Public Law 96-164 appropriated funds for the WIPP activities and defined the mission of this important project.

The official title of Public Law 96-164 is "Department of Energy National Security and Military Applications of Nuclear Energy Authorization Act of 1980." At the time that it was enacted its principal purpose was to specify the dollar amounts authorized to fund defense nuclear activities such as those at Hanford, Washington and Oak Ridge, Tennessee. It also appropriated funds to support the WIPP Project activities for fiscal year 1980.

Congress included language in the act that described the role of the WIPP Project. This language established three significant aspects of the Project: (1) it defined the Project in such a fashion as to exclude the WIPP from Nuclear Regulatory Commission licensing, (2) it defined the Project's mission, and (3) it provided for consultation and cooperation between the DOE and the state of New Mexico.

OUR "DEFENSE" ROLE

The defense nuclear activities of the federal government have operated independent of civilian licensing authorities for more than 40 years. In fact, the defense activities existed well before the commercial nuclear power industry was established. To maintain this policy, Section 210 of the Act is entitled "Restriction on Licensing Requirement for Certain Defense Activities and Facilities." The Section reads:

> None of the funds authorized to be appropriated by this or any other Act may be used for any purpose related to licensing of any defense activity or facility of the Department of Energy by the Nuclear Regulatory Commission.

Subsequently, Paragraph (a) of Section 213 states, "Notwithstanding any other provision of law, the Waste Isolation Pilot Plant is authorized as a defense activity of the Department of Energy . . ." This language and the fact that the WIPP authorization was included in the act clearly denote Congress' intent that the WIPP Project was not subject to NRC licensing.

WIPP MISSION

The mission of the WIPP Project also is described in Paragraph (a) of Section 213. The WIPP would have ". . . the express purpose of providing a research and development facility to demonstrate the safe disposal of radioactive wastes resulting from the defense activities and programs of the United States . . ."

The Project has carried out this mission by designing and implementing a two-fold program. One major activity is the conduct of an integrated research program designed to study the characteristics of the host salt rock and how it could interact and safely contain the canisters of radioactive wastes. The other is a production-scale program to demonstrate, for a period of five years, that transuranic (TRU) wastes can be safely packaged, certified, load-managed, transported, processed, and stored in a deep bedded salt formation. During this period, the TRU wastes will be stored in a manner that they can be retrieved and removed from the WIPP. Following a satisfactory test period, and a showing of compliance with all applicable regulations and DOE Orders, the facility could continue to operate as a disposal facility for defense TRU wastes.

CONSULTATION AND COOPERATION

The provision for consultation and cooperation between the DOE and the state of New Mexico is described in Paragraph (b) of Section 213. This section requires that the DOE and the state of New Mexico cooperate to resolve any concerns the state may have about public health and safety. Both parties are further required to execute a written agreement which specifies: procedures and time limits for the DOE to receive, resolve, and act upon recommendations made by the state of New Mexico, and procedures for periodic review and modification of the agreement. The original agreement was signed in July 1981. Under the terms of agreement, the Chairman of the Radioactive Waste Consultation Task Force is the principal representative of the state for maintaining liaison with the state and for the consultation and cooperation process. The day-to-day interface regarding technical and regulatory issues with the WIPP Project is conducted by the New Mexico Environment Department.

ENVIRONMENTAL EVALUATION GROUP OVERSIGHT

The Environmental Evaluation Group (EEG) was established in the fall of 1978 to provide an independent technical appraisal of the WIPP Project. Composed of 18 scientists, engineers, and supporting staff, EEG is conducting an analysis of the potential environmental and public health impacts. In 1988, through Section 1433 of Public Law 100-456, the Congress directed the DOE to fund the EEG through a contract with the New Mexico Institute of Mining and Technology. Pursuant to Public Law 100-456, the director of the EEG reports directly to the President of the New Mexico Institute of Mining and Technology.

To accomplish oversight of the WIPP, EEG evaluates and comments on relevant documentation published by DOE and its contractors, and performs independent research, including an Environmental Monitoring Program for background radioactivity in air, water, and soil. The results of the analyses and measurements of the EEG are provided to appropriate federal, state, and local government entities and interested citizens. About 50 major reports have been published to date.

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TRANSPORTATION - THE WIPP TRU WASTE CARRIER

The Department of Energy (DOE) has developed an integrated transportation system to transport transuranic waste from the generator sites to the Waste Isolation Pilot Plant (WIPP). The system includes the TRUPACT-II container, a specially designed trailer, a light weight tractor, the DOE TRANSCOM satellite - based vehicle tracking system, and uniquely qualified and highly trained drivers. The DOE has been sensitive and responsive to public concerns and the the need for safety in the transport of transuranic waste to the WIPP site. The DOE has proven that this system is ready to transport the TRU waste to the WIPP site efficiently and in the safest manner possible.

Driver qualifications exceed Department of Transportation (DOT) requirements and the penalties imposed for violations are stiff. One moving violation or chargeable accident results in termination, as does failure to keep the vehicle under constant surveillance. Deviation from the prescribed route or failure to maintain adequate records results in two weeks without pay for the first offense, termination for the second. A driver peer review system is part of the hiring process. A 90 day probationary period has been added.

Each driver is required to complete a certified North American Standard Commercial Vehicle Safety Alliance vehicle inspection course. Drivers now have the same credentials as inspectors at weigh stations and ports of entries. The mechanic that inspects the vehicle at the maintenance facility before departure is also highly qualified.

The tractor/trailer is maintained in a high state of readiness. The tractor is replaced at 300,000 miles or three year intervals, whichever comes first. A vehicle inspection is conducted before each trip, at two-hour/100-mile intervals while en route and after completion of the trip. The carrier maintains an en route tractor replacement capability to ensure the continuity of shipments. Each tractor carries a certificate showing the speedometer calibration date. The tractor is equipped with a governor that limits speed.

To minimize transit time, each shipment is made with two drivers driving non-stop in five hour shifts. A satellite tracking system monitors all shipments en route, 24 hours per day, and provides location accuracy within 1,000 feet. To further ensure safety, shipment monitors at the WIPP site provide hourly updates of weather along the TRU waste route. The DOE has entered into an agreement with the Department of Defense to allow safe parking areas if the situation merits.

In the unlikely event a TRUPACT-II becomes dislodged from the trailer, the driver is trained in procedures for recovery. The tractor also carries calibrated radiation detection instruments to detect radiation in the unlikely event a TRUPACT-II is breached.

The WIPP Central Monitoring Room operator can talk with the driver on either of the trucks' two mobile phones or through the digital communication capability of the tracking system.

Based on a recommendation made by the Oregon-Hanford Advisory Committee reflective placards are on all WIPP trailers. The placards improve visibility.

The DOE is exploring the use of load sensors with a tractor cab read-out capability. This will enable the driver to find out if he is still within the legal 80,000 pound limit before departure. It also facilitates load management with respect to maximizing payload by showing that perhaps more weight can be added, reducing the number of trips required, and thus enhancing transportation safety.

The components of the system were put in place in November 1988. The system is constantly being upgraded and enhanced incorporating additional safety measures. The DOE will continue to explore the transportation world and incorporate those features that contribute to safety.

In June 1989, the National Academy of Sciences reviewed the transportation system and concluded 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."

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HIGHWAY ROUTE SELECTION

By U.S. Department of Transportation (DOT) guidance contained in 49 Code of Federal Regulations, Part 177.825, the choice of the highway routes used for the transportation of radioactive materials has been the prerogative of the carrier. The carrier is directed to consider available information on accident rates, transit time, population density and activities, time of day, and day of week during which transportation will occur.

Due to the perceived risks associated with the transport of radioactive materials, various local governmental units began a random process of limiting the movements of radioactive materials through their jurisdictions. Since there are many such local units, the nation was faced with a potential breakdown of the transport system.

To forestall such an occurrence, the DOT, which is the cognizant federal agency, undertook a rule making action to examine the relative roles of federal, state, and local agencies in establishing the routes to be used in transporting placarded shipments of radioactive materials. An Advance Notice of Proposed Rule Making was published on August 17, 1978. The final rule was published on January 19, 1981. The content of the final rule can be summarized as:

(1) The primary safety mechanism imposed on the transport of radioactive materials is the strict demands on packaging requirements. Properly packaged radioactive materials can be moved around the country with the same degree of safety as other hazardous materials, liquid propane, explosives, chlorine, gasoline, etc.

(2) Recognizing the increased safety features inherent in the federal Interstate Highway System, movement of radioactive materials should be routed on Interstate Highways, including Interstate bypasses around population centers, as the reference choice.

(3) If a different route choice provides a demonstrated added degree of safety, the individual state may make that determination and enforce the use of the designated preferred route. The DOT has chosen the state government for this role because it results in a reasonably small number of government units (there are some 23,000 county and local government units), and because the state is sufficiently large to achieve an overall approach to routing determinations.

(4) However, the DOT recognizes that highway safety considerations can be and are highly local concerns. Therefore, the DOT specifically requires that the process of designating preferred routes be designed to involve participation by local government representatives and members of the general public.

(5) Finally, reflecting the position expressed on Item 1, state and local governments must not interfere with the movement of radioactive material shipments from points of origin along direct access to Interstate Highways, or from the Interstates to specific destinations. Similarly, normal use of non-Interstate roads for purposes of refueling, rest stops, repairs, etc. may not be denied.

As a result of the above stated DOT policies, the WIPP transportation routes have been chosen to make maximum use of the Interstate Highway System. The WIPP shipments, either full or empty will be restricted to these routes.

Transportation within the state of New Mexico has been routed using unique considerations. The routes were originally identified in the Supplemental Stipulated Agreement between the DOE and the state of New Mexico. The Agreement recognized that movements between incoming Interstate Highways and the somewhat remote WIPP facility site would realistically involve significant stretches of conventional highways. A corollary consideration was that, as host state, these highways would see relatively concentrated service. Therefore, the DOE agreed to support the state in efforts to obtain from Congress the funds necessary to repair and upgrade the routes designated in the Agreement. In the face of stiff national economy measures, limited Congressional representation, and high inflation, the projected funding was obtained.

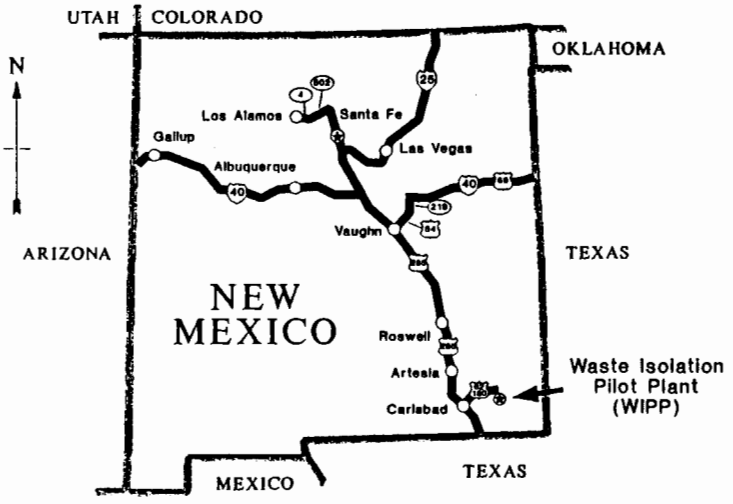
In 1991, as a result of changes in federal regulations, the New Mexico Highway Commission went through procedures specified by the DOT prior to designating routes in New Mexico for the transportation of waste to the WIPP. The procedures required reanalysis of the routes considering population density, traffic density, accident rates, and other factors. In addition, hearings were held along the routes to inform the public and receive the public views.

On August 14, 1991, the New Mexico Highway Commission designated highway routes for the transport of radioactive materials according to New Mexico State Highway and Transportation Rule 91-3.

In summary, the WIPP Project has planned the use of transportation routing in strict accordance with DOT regulations and the legally binding Supplemental Stipulated Agreement. In addition, the WIPP Project operates a Governmental Affairs function which is tasked to maintain continuing effective contacts with affected state and tribal governments.

WIPP SHIPMENT ROUTES

Designated by the State of New Mexico



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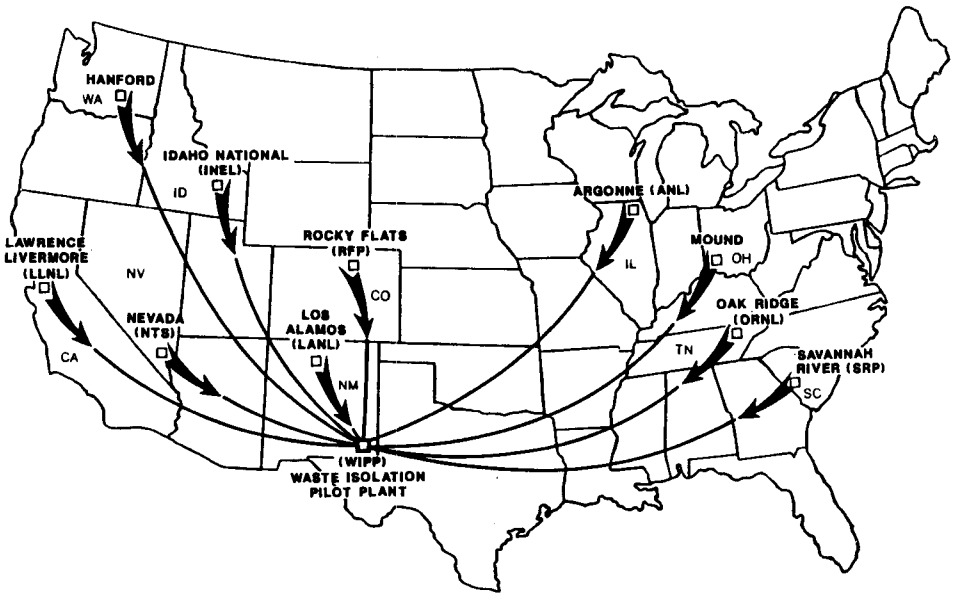
WHERE WILL WASTE COME FROM?

Numerous Department of Energy (DOE) defense facilities throughout the United States produce and store transuranic (TRU) radioactive wastes, which are a by-product from defense production activities. Many TRU wastes consist of everyday items such as metal tools, rubber gloves, cloth lab coats, shoe covers, and rags. These items become contaminated during ordinary laboratory operations and must be discarded. Currently, ten DOE facilities store TRU wastes.

In 1970, the federal government determined that radioactive wastes should be categorized, and that TRU wastes should be treated as a separate category due to its very long decay time (thousands of years). Consequently, since 1970, these wastes have been stored in a manner that they can be easily retrieved and shipped to a permanent repository. For example, at DOE's Rocky Flats Plant outside Golden, Colorado, workers pack TRU wastes in metal drums or corrugated metal boxes, and then ship them to Idaho National Engineering Laboratory (INEL) where processing and storing of solid radioactive waste generated in national defense and research programs is stored. Here the drums or boxes are stacked on asphalt pads and covered with a removable layer of soil. This storage method allows them to be easily removed for transport to the permanent disposal site.

TRU DEFENSE WASTE GENERATING AND STORAGE SITES



The other DOE facilities storing TRU wastes perform a variety of tasks that support research, development, and production of defense materials. Los Alamos National Laboratory, Lawrence Livermore National Laboratory, and Argonne National Laboratory provide basic research, design, and development for other laboratories.

Several facilities perform tasks that are directly related to the production of weapons. The Mound Facility at Miamisburg, Ohio, assembles and ships detonators and explosive timers to Texas, where final weapons assembly takes place. Oak Ridge, Tennessee and Rocky Flats, Colorado are both involved in the production of atomic triggers called pits. At Hanford, near Richland, Washington, plutonium and other special nuclear materials are produced which are used in nuclear weapons.

Since 1970, all of the TRU wastes have been packed in drums or boxes and placed in temporary storage at DOE laboratory sites. These temporary storage pads are under continual surveillance by site personnel to assure that damage does not occur and that natural phenomenon, such as wind and rain, do not cause a release of radioactive materials.

Once the Waste Isolation Pilot Plant (WIPP) is operational, all temporary storage sites may ship only waste certified as complying with the WIPP Waste Acceptance Criteria to the WIPP facility. This waste will be shipped in special TRUPACT-II containers by either rail or truck. There, the TRU wastes will be placed 2150 feet underground where their protection depends not upon human vigilance but upon carefully chosen natural characteristics of the host salt geology. The WIPP will become an essential part of the nationwide DOE support team for the production and handling of defense materials and the long-term safe disposition of their wastes.

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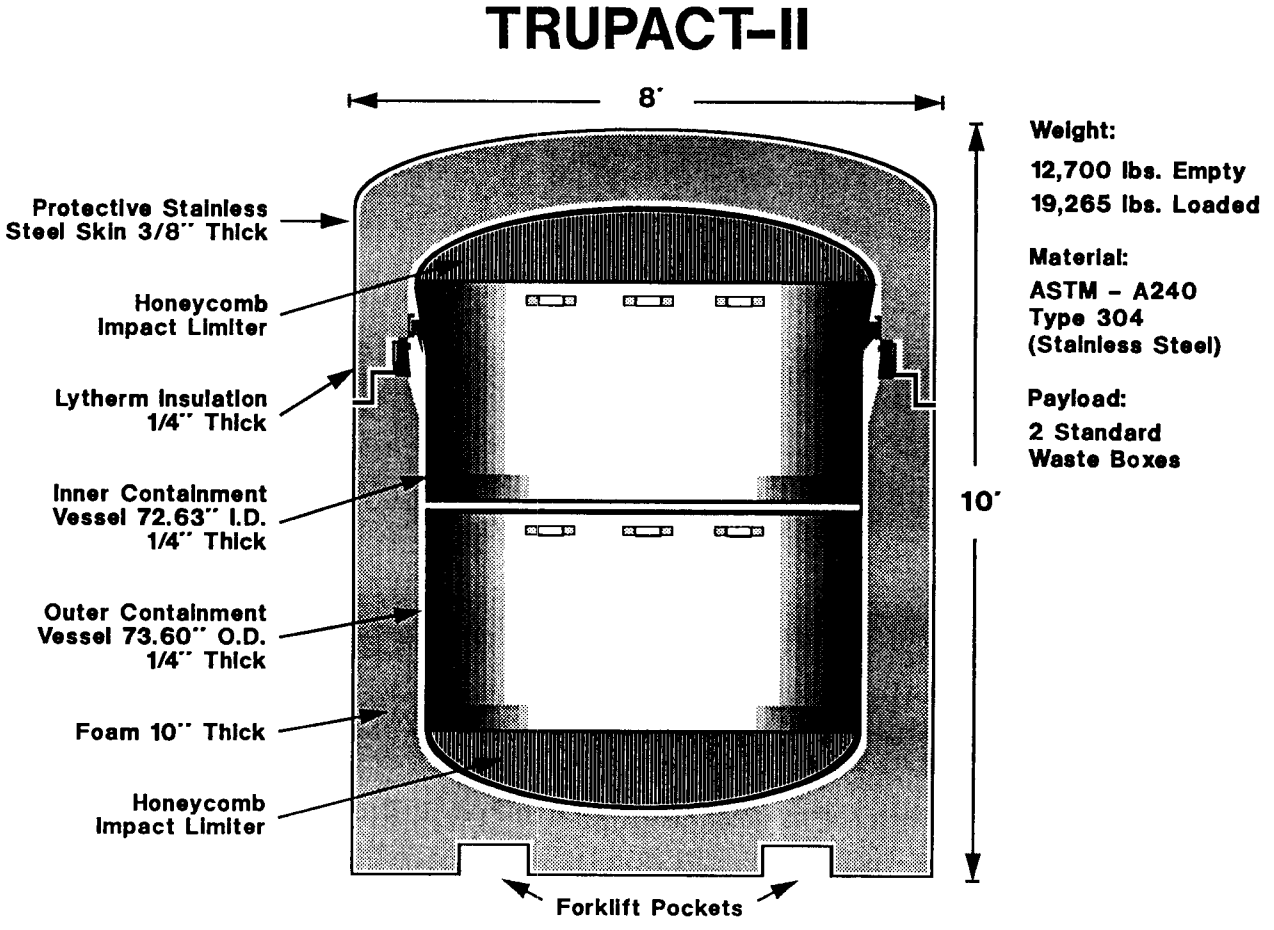
TRANSPORTATION: TRUPACT-II

The TRUPACT-II (TRansUranic PACkaging Transporter) is a container that will be used to ship CH TRU (Contact-Handled TRansUranic) waste to the WIPP site, located near Carlsbad, New Mexico. The TRUPACT-II will comply with all applicable federal regulations, including certification by the Nuclear Regulatory Commission (NRC) for meeting the requirements for "Packaging and Transportation of Radioactive Material." The NRC will issue a Certificate of Compliance to the U.S. Department of Energy (DOE) to use the TRUPACT-II after a review of analysis and rigorous testing for both "normal" and "hypothetical accident" conditions including the ability to survive a 30-foot drop test, puncture tests, behavior during fire tests, and submersion under an equivalent of 50 feet of water.

CH TRU waste is radioactive material that has been contaminated with alph-emitting transuranic radionuclides with half-lives greater than 20 years and concentrations greater than 100 nanocuries per gram of waste material. Shipments will be from DOE generator sites to the WIPP.



The TRUPACT-II is a light cylinder with a flat bottom and a domed top. The TRUPACT-II package consists of an inner sealed, non-vented, stainless steel containment vessel inside another sealed, non-vented, stainless steel containment vessel. Each containment vessel is capable of withstanding 50 pounds of pressure per square inch (psig). The inner containment vessel cavity is approximately six feet in diameter and six feet tall, with a capacity of fourteen 55-gallon drums. The vessels have removable lids held in place by lock rings and retainers. The outer containment vessel is surrounded by approximately ten inches of polyurethane foam that act as both as a thermal insulator and an energy-absorbing cushion. On the outside of the foam is a stainless steel shell that act as a protective structure as well as an impact limiter. This sandwich-like method of construction increases the package strength and safety to withstand postulated accidents associated with transport.

Three TRUPACT-IIs will be carried on a flat-bed trailer transported by a conventional tractor. The payload for each trailer will be 21,000 pounds. Shipments will be monitored by a tracking system to ensure location, status, and to provide emergency response if needed. The fleet, consisting of 17 trailers (51 TRUPACT-II containers), is currently estimated to make over 15,000 shipments to the WIPP over the next 25 years.

The TRUPACT-II provides a safe and reliable method for transporting CH TRU waste. The TRUPACT-II design is a crucial element in the WIPP waste transportation system, and it provides assurance that waste shipments to the WIPP will occur efficiently, safely, and on a schedule that supports the WIPP mission.

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OVERSIGHT GROUPS FOR THE WIPP

A number of external groups and agencies provide scientific and technical reviews of the Waste Isolation Pilot Plant (WIPP) facility. These groups and agencies are follows: (1) Advisory Committee on Nuclear Facility Safety (ACNFS) (Ahearne Committee), (2) Blue Ribbon Panel (BRP), (3) Defense Nuclear Facility Safety Board (DNFSB), (4) Environmental Evaluation Group (EEG), (5) State of New Mexico Environmental Improvement Division (EID), (6) Environmental Protection Agency (EPA), and (7) National Academy of Sciences (NAS). In addition, transportation activities are subject to Nuclear Regulatory Commission and Department of Transportation requirements. The review groups, and examples of their activities are as follows:

(1) Advisory Committee on Nuclear Facility Safety -- The ACNFS was established by the Secretary of Energy to provide technical information, advice and recommendations concerning the safety of the DOE's facilities such as the WIPP.

(1) The secretary requested the ACNFS conduct a comprehensive review of the WIPP. The committee prepared a report dated December 11, 1989 which assessed the elements of the project that relate to health and safety and identified potential safety concerns. The key areas included in the report are long-term environmental performance, safety issues related to conduct of operations, and the Final Safety Analysis Report. Other key areas reviewed include technical issues, WIPP management, organization and staffing policies, and practices.

(2) Blue Ribbon Panel (BRP) -- The BRP consists of one member selected by the governors of Idaho, Colorado, and New Mexico and two members selected by the Secretary of Energy. Formation of the five-member panel emphasizes the role of outside reviews in all of the department's planning processes and enables each governor of affected states to provide input on the key WIPP issues.

(2) The BRP members provide their individual reviews on three WIPP issues: the validation of the certification of the waste at the Rocky Flats Plant (RFP), including recommendations on ways to evaluate RFP waste and RFP-generated waste stored at the Idaho National Engineering Laboratory; the examination of the concept and timing for the Performance Assessment and Operations Demonstration Test at the WIPP; and relative benefits of a Performance Assessment and Operations Demonstration Test Plan.

(3) Defense Nuclear Facility Safety Board -- The DNFSB was established to review and evaluate the content and the implementation of DOE standards relating to the design, construction, operation, and decommissioning of defense nuclear facilities. The board has made a recommendation to the secretary that the DOE identify the specific standards applicable to the design, construction, operation, and decommissioning of a number of DOE defense nuclear facilities, including the WIPP. Specific information requested includes: standards adequacy -- DOE's views on adequacy of identified standards to protect public health and safety; and standards implementation -- determination of the extent the identified standards have been implemented at the WIPP.

(4) Environmental Evaluation Group -- The EEG has been established to conduct an independent technical evaluation of the potential radiation exposure from the WIPP in order to protect the public health and safety and minimize environmental degradation. The EEG has conducted independent technical reviews and published over 40 major reports on: site suitability, repository design and operation, transportation, operations and long-term integrity. The EEG conducts independent environmental radiation surveillance both on-site and off-site.

(5) Environmental Improvement Division -- The EID, within the Health and Environment Department of the state of New Mexico, regulates solid waste, mixed hazardous waste, air quality, and water quality. In addition, the deputy director of the EID serves as the point of contact between the WIPP Project and the state of New Mexico regarding several agreements between the DOE and the state of New Mexico. The EID regulates the WIPP's activities under the New Mexico Hazardous Waste Act, the New Mexico Water Quality Act, and the New Mexico Air Control Act. State permits for various activities are issued by the EID.

(6) Environmental Protection Agency -- The EPA is a federal regulatory agency. Under the Resource Conservation and Recovery Act (RCRA), and the authority provided by the EPA, the state of New Mexico will issue the DOE a permit to operate the WIPP as a hazardous waste management facility. Under the Clean Air Act, the EPA will evaluate the DOE's notice of facility start-up and compliance with the National Emission Standards for Hazardous Air Pollutants. The EPA has established radiation protection standards for the management and storage of transuranic (TRU) waste at disposal sites, 40 CFR 191, and is undertaking rule-making to establish standards for the disposal of TRU waste. The WIPP must be in compliance with this standard prior to becoming a disposal facility.

(6) The EPA is responsible for reviewing the no-migration variance petition that covers the storage/disposal of hazardous wastes that are included in the land ban restrictions in 40 CFR 268. The EPA approved the no-migration petition for the Test Phase on October 31, 1990.

(7) National Academy of Sciences -- The NAS Panel on the WIPP was formed to review the scientific and technical aspects of the WIPP Project. The panel consists of scientists and technical experts from various fields such as geochemistry, geohydrology, statistical modeling, health physics, public safety, facility engineering, and systems engineering. Originally involved in site selection and site characterization, the NAS WIPP Panel continues to provide quarterly technical reviews, as appropriate. Subject matters of the reviews cover: repository performance assessment, pre-operational test activities, geotechnical issues, and hydrological issues. The WIPP Panel reports to the NAS Board on Radioactive Waste Management, which makes recommendations to the DOE regarding the WIPP. The NAS WIPP Panel also provides comments to Congress.

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WASTE ISOLATION PILOT PLANT TEST PHASE PLAN: PERFORMANCE ASSESSMENT

INTRODUCTION

The mission of the Waste Isolation Pilot Plant (WIPP) Project, established by Public Law 96-164, is to provide a research and development facility to demonstrate the safe disposal of transuranic (TRU) waste resulting from United States defense programs.

The next step in fulfilling the WIPP's mission is to implement the Test Phase. The purpose of the Test Phase is to collect additional technical data to determine whether to proceed into the Disposal Phase.

There are two primary programs planned for the Test Phase: (1) Performance Assessment; and (if needed) (2) Operations Demonstration. The recently issued The WIPP Test Phase Plan: Performance Assessment addresses only the Performance Assessment program, which consists of a large number of activities including data collection, modeling, and calculations leading to a performance assessment.

PERFORMANCE ASSESSMENT

The Performance Assessment process will evaluate the long-term performance of the waste disposal system. The results will be compared to Subpart B of the vacated Environmental Protection Agency (EPA) Standard, 40 CFR 191, to determine whether the WIPP will meet these requirements.

The Standard establishes limits on the amount of radioactive materials allowed into the environment for a period of 10,000 years and the amount allowed to the public and certain sources of groundwater for 1,000 years. The Test Phase will provide scientific data needed to assure that limits established by the EPA Standards will be met.

Subpart B of the EPA Standard has been returned by the courts to the EPA for revision. However, DOE has committed to the state of New Mexico to comply with the existing standard until a revision is available. The WIPP will also comply with the new standard.

The performance assessment process will be using data collected from four study areas: (1) the interaction of the salt storage room environment with waste containers and backfill material; (2) the method for sealing different areas in the underground; (3) the rate at which the salt creeps to surround the waste containers and the rate of brine movement; and (4) scientific studies of the Rustler formation located approximately 1,100 feet above the underground facility.

Included in the first study area will be the evaluation of the amount of gas generated by the decomposition of the waste and the corrosion of waste drums. These tests will be performed on a small scale in a laboratory as well as in the underground mine in bins and large rooms called alcoves. An alcove is about one-fourth the size of a typical storage room. A storage room measures 300 feet long, 33 feet wide, and 13 feet high.

Current plans call for 0.5 percent by of the total waste disposal capacity of the WIPP to be used for these experiments. Additional storage needs are being evaluated for further bin-scale experiments

that may utilize two full-scale rooms requested by the EPA. The Operations Demonstration, also may require an additional waste storage area, up to 1.5 percent of the WIPP total storage capacity.

In conjunction with the performance assessment, potential engineered alternatives to the current waste disposal system design will be examined. This examination will prepare the Project to implement any necessary changes to the design in a timely manner as a contingency if performance assessment results have a high degree of uncertainty or are unsatisfactory. Examples of alternatives under consideration are waste processing, alternative backfill materials, changes in the storage room or panel configuration, and passive markers.

OPERATIONS DEMONSTRATION

The purpose of the Operations Demonstration Program would be to demonstrate the safe and effective emplacement of certified waste at the WIPP facility. A separate document will be developed to describe the needed objectives of an Operations Demonstration that supports future performance assessment tests.

All waste emplaced during the Test Phase will be fully retrievable.

TEST PLAN REVIEW

The WIPP Test Phase Plan: Performance Assessment was issued on April 19, 1990. It is a living document and will be reassesed and revised periodically based on review comments and the future needs of the Project.

Comments on earlier drafts of this plan were provided by various oversight groups, such as the EPA, the National Academy of Sciences, the Environmental Improvement Division of New Mexico, and the Environmental Evaluation Group. As these groups continue their reviews, further refinements and changes will be made to the Plan as appropriate.

The performance objective for the WIPP disposal system is to adequately and permanently isolate transuranic waste from the accessible environment. When the evaluation of the Test Phase data is completed, the WIPP's ability to comply with all applicable environmental regulations can be evaluated. The decision can then be made whether or not the WIPP can be designated a repository.

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CONGRESSIONAL TESTIMONY REGARDING LAND WITHDRAWAL

THE HONORABLE PETER H. KOSTMAYER - CHAIRMAN, ENERGY AND ENVIRONMENT SUBCOMMITTEE - APRIL 16, 1991 TESTIMONY

"Beginning in 1970, the federal government recognized the need for a change in the way it was disposing of transuranic wastes generated during the production of nuclear weapons. Up until that time, wastes had simply been buried in shallow trenches near the facilities where they were produced. Now it was decided to pursue a more environmentally sound approach."

THE HONORABLE RICHARD H. STALLINGS - CONGRESSMAN FROM THE STATE OF IDAHO - APRIL 16, 1991 TESTIMONY

"Further unnecessary delays in the opening of the WIPP facility will undermine public confidence in the program and seriously hamper waste management efforts."

"In addition, I have a letter from Idaho Governor Cecil Andrus that I would like to submit for the record. The Governor expresses his thanks for scheduling this hearing and urges the Congress to act expeditiously to pass a land withdrawal bill."

"The five-year test phase during which experiments will be conducted on site is critical to provide valid information and data."

"I truly believe this facility is an appropriate and safe location to serve as a nuclear waste repository."

"In closing, I strongly believe the WIPP facility offers the best long-term hope this nation has in resolving this nuclear crisis."

THE HONORABLE JOE SKEEN - CONGRESSMAN FROM THE STATE OF NEW MEXICO - APRIL 16, 1991 TESTIMONY

"I will introduce the Department's land withdrawal legislation, by request, because I believe it will serve a useful purpose, that is, to get Congress moving in the right direction," Skeen said."

"I disagree with who say these experiments should be conducted in a laboratory. WIPP is that laboratory."

"While WIPP is being designed and built primarily for the disposal of defense-generated transuranic wastes, it will also be one of the world's premier research and development facilities to study the safe disposal of nuclear waste. WIPP will provide invaluable data needed to determine how to safely handle, transport, and dispose defese wastes, here in the United States and around the world."

DR. TOM BAHR - MEMBER, BLUE RIBBON PANEL OF THE SECRETARY OF ENERGY - APRIL 16, 1991 TESTIMONY

"In situ testing is important and necessary and should begin as soon as possible. Results of bin and alcove testing should increase significantly the confidence of predictions undertaken in the performance assessment. A limit of approximately 1 percent of the WIPP waste capacity is reasonable. A limit of a 0.5 percent may be too restrictive by precluding the opportunity to undertake resulting from Phase III bin testing of different waste forms resulting from different engineered modifications under evaluation."

"The longer we wait to find a permanent solution, the more acute today's problems become. Time is simply not on our side."

"The sooner WIPP is opened to begin the test phase, the sooner we will be able to determine its suitability as a permanent repository. Should it prove to be suitable, we have solved a critical national problem. Should it prove not to be suitable, we need to know this as soon as possible so other solutions can be found before the waste in temporary storage begins to cause irreversible harm to people and the environment. DOE understands this and is trying to do the right thing. We have found them to be very responsive to our suggestions."

MICHAEL H. SHAPIRO - DEPUTY ASSISTANT ADMINISTRATOR, OFFICE OF AIR AND RADIATION, - U.S. ENVIRONMENTAL PROTECTION AGENCY

"The Agency has reviewed DOE's draft plans for the Test Phase and generally supports the range of laboratory-scale and alcove-scale tests planned at the WIPP facility. The Agency believes that the proposed tests will provide data and information which will be useful in making determinations of compliance with EPA's radioactive and hazardous waste requirements."

C. FAIRHURST - CHAIRMAN, WIPP PANEL, BOARD ON RADIOACTIVE WASTE MANAGEMENT, - NATIONAL ACADEMY OF SCIENCES, NATIONAL RESEARCH COUNCIL - APRIL 16, 1991 TESTIMONY

"The WIPP Panel believes that the risk to human health presented by disposal of transuranic waste at WIPP will be very small compared to many other hazards, some of which the public now routinely accepts with equanimity. It is important that this information be developed and conveyed to the public, as part of an effort to ensure that the nations limited resources are allocated appropriately."

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WASTE ISOLATION PILOT PLANT

A Research and Development Facility of the U.S. Department of Energy

WHY SALT? WHY SOUTHEASTERN NEW MEXICO?

The Waste Isolation Pilot Plant (WIPP) is a research and development project of the Department of Energy (DOE) that is designed to demonstrate safe disposal of defense-generated radioactive waste. The project is located in southeastern New Mexico, 26 miles east of Carlsbad.

The WIPP site was chosen through a selection process that started in the 1950's, when the National Academy of Sciences conducted a nationwide search for geological formations stable enough to contain wastes for thousands of years without releasing them into the environment. In 1955, after extensive study, salt deposits were recommended as a promising medium for the storage of radioactive wastes. Since that time, bedded salt has been one of the leading rock candidates for the permanent storage of radioactive wastes.

In 1962, the U.S. Geological Survey reported that the Permian Basin, which includes salt beds in southeastern New Mexico, parts of west Texas, Oklahoma, Colorado, and Kansas was one of the most likely locations for such a repository. The portion of the Permian Basin in New Mexico near Carlsbad was selected as the location best meeting site selection guidelines, based upon this report and salt bed experiments conducted by Oak Ridge National Laboratory.

WHY SALT?

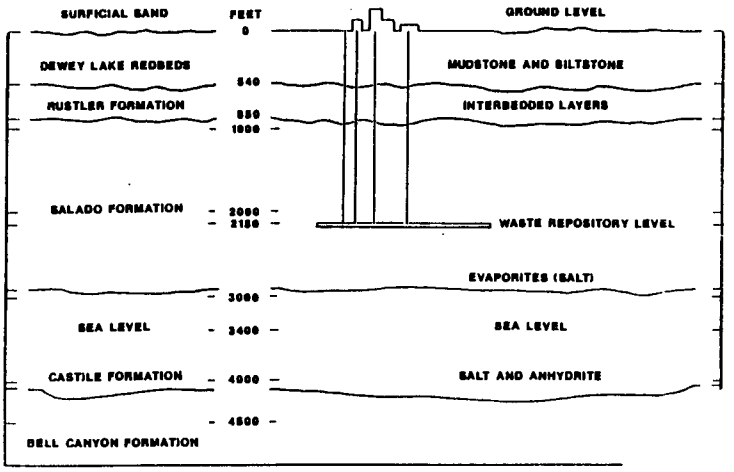
Since the National Academy of Sciences recommendation in the mid-1950's, salt deposits have been recommended as one of the leading candidates for the permanent disposal of radioactive nuclear wastes. The principal advantages of salt include the fact that (1) most deposits of salt are found in stable geological areas with very little earthquake activity; (2) salt deposits demonstrate the absence of flowing fresh water, because water would have dissolved the salt beds had it been present, (3) salt is relatively easy to mine, and (4) it has the ability to heal fractures because of its plastic quality and the presence of minute amounts of saturated brine. That is, salt formations will slowly and progressively move in to fill a void or seal a waste repository.

The WIPP will demonstrate the safe geologic disposal of transuranic wastes generated from defense programs of the United States. The salt formations at the WIPP were deposited in thick beds by the evaporation of an ancient ocean. These formations consist mainly of sodium chloride in the form of thick rock salt a half-mile underground.

The 3,000-foot-thick deposits of salt in this region were formed approximately 225 million years ago, and are an excellent repository rock. The large expanse of uninterrupted salt beds provides a predictable environment free from the disturbances of large earthquakes.

Salt, while easy to mine, is stable and provides good shielding from radioactivity. At the 2150 foot depth of the repository, the salt will very slowly "flow" and eventually encapsulate the buried waste in stable rock. The saturated ground water in the salt has been in the formation for millions of years, and it will assist in the recrystallization process that will encapsulate the waste in salt naturally.

GEOLOGIC PROFILE



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WHY SOUTHEASTERN NEW MEXICO?

Searches for petroleum and potash in the southeastern portion of New Mexico have led to extensive data concerning the geology of this area. The characteristics of the salt beds in the vicinity of the WIPP have been extensively studied for more than 50 years. The WIPP site contains salt beds that are nearly 3000 feet thick, some of the thickest in the United States. The 225-million-year-old salt rock has remained essentially stable and virtually unaffected by earthquake or faulting activity in that period. This site contains no boreholes resulting from probes for oil or minerals.

Furthermore, the remote location of the WIPP makes it an excellent choice for a nuclear waste repository. Salt beds in the vicinity are accessible without disturbing established communities or residences and the area is removed from any potentially disruptive geological features. These and other characteristics, as confirmed by scientific data collected from geologic tests, identified the present 10,240-acre site as the most favorable location for the WIPP. Salt is an excellent storage medium, and in the carefully designed and highly controlled environment of the WIPP repository, defense nuclear wastes can be permanently isolated from future generations.

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CERTIFICATION REQUIREMENTS

The U.S. Department of Energy has successfully completed a vigorous testing program for its radioactive waste transportation package and has received a Certificate of Compliance from the Nuclear Regulatory Commission (NRC).

The package, called TRUPACT-II, will be used to transport contact-handled transuranic waste to the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico.

The tests were designed to meet the federal requirements of 10 CFR 71 which covers the shipment of nuclear waste. The test sequence resulted in the TRUPACT-II being subjected to accident conditions more severe than any anticipated in use.

The test series included multiple drops from 30 feet onto an unyielding surface (a 25 foot thick concrete, and steel pad covered with an 8-inch steel armor plate) and from a height of 40 inches onto a six-inch diameter blunted steel puncture spike, followed by a 30-minute burn test at 1475 degrees F. To successfully complete the series, a post test evaluation was conducted to assure both the inner and outer containment vessels remained leak tight. Leak tight means less than one cubic inch of air (about the size of a ping pong ball) would escape in a four year period. The containment vessels serve as barriers between TRUPACT-IIs contents and the outside environment.

Between the sealed containment vessels (not visible from the outside) are 10 inches of polyurethane foam and an outer protective skin of stainless steel. Both the foam and the outer skin serve a energy absorption materials. Testing caused damage to the outer skin which showed energy from the impact of the drops was absorbed as designed. About 30 percent of the weight of a fully-loaded TRUPACT-II is solely present for energy absorption. Over two tons of material is in place outside the containment vessels of each container to provide protection. During operation, the seal will be checked each time the container is loaded or unloaded.

The Certificate of Compliance issued by the NRC addresses limits of operation, as well as weight, number of watts, and number of grams of fissile material allowed. In addition to verifying the design, a plan is in place to maintain the integrity of the container throughout its operational lifetime.

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WASTE HANDLING PROCEDURES AT THE WIPP

The waste handling program addresses all on-site radioactive waste handling activities that will be in place well before the first radioactive wastes arrive. They include the physical receipt of transuranic waste and its examination and inspection, surface and underground waste handling and transfer, physical emplacement of waste, and waste retrieval capability. Primary emphasis is placed on the safe and efficient handling of waste including the protection of working personnel, the public, and environment.

OPERATION PHILOSOPHY

The major operating philosophy at the WIPP is to "start clean and stay clean." Specific criteria must be met by all defense waste storage sites to ensure their shipments are properly packaged and contained from the start. At the WIPP site, waste handling operations will be discontinued in case of contamination and the area thoroughly decontaminated before operations resume. This ensures that the Waste Handling Building, the waste storage rooms, and general areas are clean and do not require anticontamination clothing for access.

By following this "stay clean" philosophy, any isolated contamination occurrence will be prevented from spreading throughout the facility. This philosophy further extends into the underground, where the ventilation system is designed to prevent excavation activities from becoming contaminated in the event of an accidental breaching of a waste container.

TYPES OF WASTE

Just as people create trash and garbage in their daily lives, and fireplaces leave ashes to be carried out, nuclear facilities create radioactive waste. A sizable portion of this waste consists of everyday things used by people working at facilities that support research, development, and production of defense materials--things like rags, rubber gloves, and tools. As these thing are used in nuclear operations, they become contaminated with transuranic elements. The word transuranic refers to elements that are heavier than uranium. Because this waste is contaminated with radioactive materials, it is handle and disposed of under carefully controlled conditions prescribed by Federal regulations.

The waste received at the WIPP will be safely encased in special containers that prevent release of any radioactivity. The waste is composed of two basic types: (1) Contact-handled transuranic waste, which has sufficient restrictions on the radioactive content and subsequent packages such that personnel can operate in the immediate vicinity without requiring shielding; and (2) Remote-handled transuranic waste, which requires personnel to be shielded from its radiation field. Specialized handling equipment and a hot cell have been provided to conduct those operations while protecting the workers.

WASTE HANDLING OPERATIONS

General waste handling operations at the WIPP are conducted basically as outlined below:

(1) Receive waste shipments at the WIPP site by the either truck or rail transport system.

(2) Perform an external inspection of shipping containers as they are received.

(3) Move the shipping container to the Waste Handling Building.

(4) Open the shipping container and off-load its contents.

(5) Perform an inspection of the waste package to verify compliance with documentation. This inspection includes a survey for radioactive contamination external to the packages.

(6) Inventory, verify, and record required data.

(7) Prepare the waste for emplacement by loading in facility cask or palletizing waste containers in an array that can be handled underground.

(8) Lower the waste through the waste shaft to the underground facility area.

(9) Remove the waste containers from the shaft conveyance and position them on the underground transport system.

(10) Transport the waste to the final storage area.

(11) Document the waste storage location.

(12) Retrieve the waste if required.

WASTE HANDLING TRAINING

Waste handlers at the WIPP receive extensive training on waste handling operations and equipment. The handlers will be certified on each type of handling procedure as training is complete.

All waste handling systems undergo operational testing and checkout as personnel become fully trained on each system. Emplacement/retrieval demonstrations are conducted as part of "cold" waste operations using non-nuclear simulated waste loads. As all checkouts, testing, training, mock emplacement, and retrieval demonstrations are completed for each waste type, the facility is considered ready to begin receiving radioactive waste of that type. Thus, a progressive schedule can be followed demonstrating receipt of one waste type while training and related activities are going on for the other waste types.

Extensive training is well under way to ensure safe and efficient handling when "hot operation" begin for the actual radioactive waste shipments arriving at the WIPP. As the nation's first repository, the WIPP project is gearing up to be an impressive demonstration of advanced nuclear technology and safe operations.

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WASTE SHAFT AND HOIST CERTIFICATION

The waste hoist at the Waste Isolation Pilot Plant (WIPP) is the world's largest-capacity hoist of its kind operating in the world today. This unique piece of equipment has been tested, inspected, and certified ready for use. The waste shaft and hoist are designed for the express purpose of moving transuranic waste packages to the underground horizon, located 2,150 feet below the surface.

The 45-ton friction hoist will be used to lower more than six million cubic feet of contact-handled transuranic waste and about 5,000 canisters of remote-handled waste to the underground storage area during the projected 25-year operating life of the WIPP facility. The hoist travels in the waste shaft, which is 19 feet in diameter. The shaft opening at the surface, or ground level, and hoist headframe are housed within the Waste Handling Building.

SAFETY FEATURES

The waste hoist is specially designed and installed to operate safely under the most unlikely conditions. Safety features include a number of backup systems to ensure protection in the event of a mishap. The waste hoist, with its conveyance or elevator, carrying a full cargo of 45 tons, transports materials in accordance with requirements for hoisting workers. The federal and state safety requirements for hoisting workers are stricter than those for transporting materials. The conveyance, weighing over 34 tons, provides an upper deck for up to 75 workers and a lower platform for cargo.

The hoist is powered by a 600-horsepower motor which provides normal stopping. The hoist is stopped by four brake assemblies, any two of which can stop a fully loaded descending conveyance. The brakes have a fail-safe design so that loss of power or hydraulic pressure automatically activates them.

Six steel rope cables, each 1-3/8 inches in diameter, suspend the conveyance in the waste shaft. Any one cable alone has the capability to lift and lower a full 45-ton load. The six cables provide over 750 tons of rope strength, once again providing backup protection for all operations.

CERTIFICATION

Certification of the waste hoist involved 83 separate tests performed by the Brinderson Corporation, the construction contractor, and witnessed by staffs of Westinghouse Waste Isolation Division, the management and operating contractor, the U.S. Army Corps of Engineers, the construction manager, Bechtel National, engineering design and the U.S. Department of Energy personnel.

During the initial course of testing, the hoist, carrying a full 45-ton load, was lowered at full speed of about six miles per hour. The operational staff stopped the conveyance several times in the shaft, testing the hoist's standard braking system and the emergency brake assemblies.

The demonstration included scrutinizing all 17 built-in safety features, as well as loading and unloading of equipment at both surface and underground stations.

After testing, a checkout and acceptance team conducted inspections and tests in accordance with a pre-established test plan. In addition, a WIPP task force and the hoist manufacturer issued 48 maintenance instructions covering both mechanical and electrical systems. Personnel from the hoist's manufacturer conducted seven days of training for the WIPP operating and maintenance personnel.

USE IN OPERATIONS

Subsequent to the completion of the waste shaft and hoist, all underground waste handling equipment was lowered to the 2,150-foot level. Waste handlers, who are trained and qualified to operate this equipment on the surface, worked underground to assemble the equipment for operation. The waste hoist capabilities play an important part in mock-waste retrieval demonstrations. These "mock demos" verify equipment and operator readiness before waste receipt.

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EXPERIMENTAL PROGRAMS

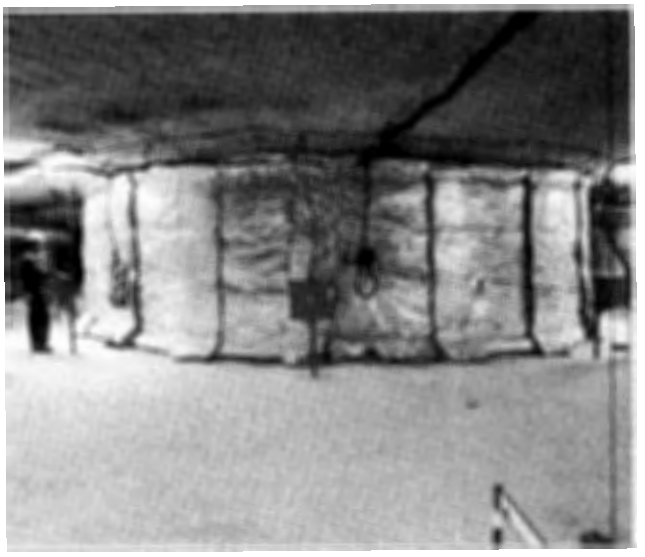
Scientific experiments and test programs are underway to address the research and development mission of the Waste Isolation Pilot Plant (WIPP). These experiments are helping us to learn how to safely handle and dispose of three types of nuclear wastes that are generated by national defense activities: (a) contact-handled transuranic wastes; (b) remote-handled transuranic wastes; and (c) defense high-level wastes.

The current program of experiments is focused on four areas: (a) the available materials and techniques for backfilling and sealing the underground openings; (b) the stability of both heated and unheated underground openings over long periods of time; (c) the corrosion and effect of the underground salt pressure on various waste-package materials; and (d) the migration of brine in the presence of heat sources.

Experiments are conducted underground away from the proposed storage areas. Certain rooms have complex instrumentation to gather a wide variety of data from testing.

REPOSITORY PLUGGING AND SEALING STUDIES

Plugging and sealing of boreholes and underground mined openings have long been considered important "engineered barriers" since moving fluids have the potential to transport radioactive materials that have been leached from the waste. The plugs and seals prevent the escape of radioactive particles from the storage area by limiting the flow of fluids through the storage area.



To date, plugging and sealing studies have centered on identifying suitable sealing materials. In addition to having low permeability, the materials must be relatively strong and have a chemical composition that will not degrade for very long time periods. At present, salt-based concretes and bentonite are being studied as potential materials to seal boreholes, shafts, and tunnels after waste disposal at the WIPP is completed and the site is decommissioned.

THERMAL STRUCTURAL INTERACTION STUDIES

Considerable effort has been expended to date investigating the behavior of salt and other rocks at the WIPP both at ambient and elevated temperatures. Usually referred to as "Thermal-Structural Interaction" (TSI) tests, these studies provide data on the response of salt to various conditions. As part of the TSI studies, a large cylindrical pillar was mined within a circular

room deep in the WIPP salt formation. The response of this structure at both normal and elevated temperatures will be used to develop and evaluate repository design models. The tests at elevated temperatures accelerate data response with respect to time and therefore provide data for assessing the long-term performance of underground openings in salt.

Experiments using high-level defense wastes are planned for the WIPP, although high-level defense wastes will not be permanently stored at the WIPP. These experiments have the dual purpose of increasing knowledge related to behavior of salt formations and of evaluating computer models that are used for repository design.

WASTE PACKAGE AND MATERIALS TEST

To confirm the safety of waste drums that would hold contact-handled transuranic wastes, drum performance and proposed room backfills, materials such as salt and clay mixtures are being studied in two experiments at the WIPP. In one instance, standard U.S. Department of Transportation drums were placed in three stacks: (1) one stack with crushed salt backfill; (2) one stack with a salt/bentonite clay backfill; and (3) one stack with no backfill. The room is sealed and the temperature is controlled at about 105 degrees F. Relative humidity is in the range of 60 to 70%. In addition, some drums are partially submerged in saturated brine and brine is trickled over other portions of the stacks to produce extremely corrosive conditions.

BRINE MIGRATION STUDIES

Small quantities of brine have been observed to accumulate in boreholes and to seep to the excavated surfaces of underground openings. The amounts are small and are believed to be limited to the presence of naturally occurring moisture in the salt. Information on the amount of brine and its chemistry will be used: (1) in assessing the overall ability of the site to effectively isolate nuclear wastes for long periods of time; and (2) in evaluating the potential corrosion of waste containers.

Brine inflow rates and chemistry are being determined on the surfaces of the underground openings and from boreholes drilled outward from the underground openings. Plans for the measurement of brine inflow to a storage room are also underway to confirm the limited extent of the seepage.

Data from the studies of varying temperatures and brine solutions will be used to develop computer-based models to predict the long-term rates of accumulation and chemical characteristics of brines at the WIPP. Both the data and models will be used to help assess the compliance of the WIPP with federal environmental regulations governing disposal of nuclear wastes.

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ENVIRONMENTAL PROTECTION

Although the mission of the Waste Isolation Pilot Plant (WIPP) is to permanently dispose of hazardous radioactive waste materials, the WIPP is equally dedicated to the protection of the health and safety of the public and the quality of the natural environment. This protection begins on-site with a comprehensive program of operational safeguards and continuous facility monitoring. However, the ultimate effectiveness of these safeguards will be proven by long-term studies and detailed monitoring of the environment surrounding the WIPP. The role of the WIPP Environmental Surveillance Programs is to continually monitor key parts of the environment to verify the safe and environmentally sound operations at the WIPP. Two types of surveillance will be used: (1) radiological; and (2) nonradiological environmental surveillance.

THE RADIOLOGICAL ENVIRONMENTAL SURVEILLANCE PROGRAM

The function of this program is to monitor the environment for concentrations of radioactive elements. This program is divided into three phases. The first phase, which began in July 1985 and will continue until waste arrives at the WIPP, is called the Radiological Baseline Program. Because radiation is a natural part of the earth's environment and man-made radioactive elements are also present in all environments, it is important to measure the existing "background radiation" before the first arrival of radioactive waste at the WIPP.

The Radiological Baseline Program will measure the pre-existing levels of radioactivity in and around the site. The parts of the environment which will be measured for their content of radioactive elements include airborne dust particles, soil, surface water, ground water, lake sediments, natural vegetation, wildlife species, and locally raised beef. The measurements will provide a "baseline" for comparing and evaluating data after receipt of waste. Because even the natural levels of radiation in the environment are never constant, these measurements must be made over a period of time to determine the amount of local variability as well as the average levels.

The second phase will be the Operational Environmental Monitoring Program. This phase, beginning when radioactive waste arrives at the WIPP, will continue through the operational life of the facility. The Operational Environmental Monitoring Program will continue the radiological measurements at most of the locations used in the baseline program. Thus it will provide early detection of any significant changes from the baseline levels of radioactivity occurring during the WIPP operations.

The third phase of this long-term program will be the post-operational environmental monitoring. This phase will be initiated when the WIPP repository is decommissioned. This program will verify the continued safety of the WIPP beyond the time when operations cease.

THE NONRADIOLOGICAL ENVIRONMENTAL SURVEILLANCE PROGRAM

The WIPP's commitment to protecting the quality of the environment goes beyond concerns about radioactivity. Other types of environmental impact monitoring, such as air quality, water quality, and wildlife habitat are performed as part of the Nonradiological Monitoring Program. This type of monitoring was particularly important during construction at the WIPP when activities frequently involved heavy equipment use, high noise levels, and other effects. The WIPP continues to monitor the environment to ensure compliance with applicable state and federal standards. The WIPP is also committed to the reclamation of land disturbed by construction activities.

Special environmental studies will provide valuable information for future salt repositories in other areas. One program evaluates the environmental effects of the storage of mined salt in exposed saltpiles. If this salt were to be blown into surrounding areas, land productivity and value may be adversely affected. Careful investigations of salt transport and its effects on ecological processes, such as the germination and growth of plants and the cycling of nutrients, are being carried out. Findings from these studies thus far have revealed virtually no long-range windblown salt from the stockpiles. This is because the mined salt, although somewhat powdery when brought from the underground, quickly fuses into a solid mass when exposed to humidity or rainfall.

Environmental surveillance is an integral part of the WIPP Project throughout its operational life and beyond.

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TRANSURANIC WASTE

BACKGROUND

For more than 40 years, the U.S. Department of Energy has had the responsibility to design, develop, test and produce nuclear weapons for our nation's defense. These defense activities have created waste by-products known as transuranic, or TRU, wastes. TRU wastes are contaminated with radioactive elements heavier than uranium, thus the names trans (or beyond) uranic. Radioactivity in these elements persists for a long time, measured in thousands of years. For example, half of the plutonium in plutonium-239 made and used today will still be left 24,000 years from now.

WHAT IS TRANSURANIC WASTE?

Although most TRU waste is no more radioactive than many low level wastes, the long duration of its radioactivity puts those waste into special category and is a primary consideration in determining methods for safely handling, transporting and storing those wastes. Another consideration is the type of radiation emitted by TRU wastes.

The greatest percentage of TRU wastes emits only alpha radiation. These particles may be dangerous if inhaled or ingested but are not an external hazard. Alpha particles are stopped by air, a sheet of paper, or skin and are handled in wooden or metal containers that provide additional shielding. As long as TRU wastes remain in wooden or metal containers, they can be handled directly by workers without special protective clothing. These alpha-emitting forms of TRU waste are referred to as "contact-handled" transuranic (CH TRU) waste. Ninety-seven percent of the waste scheduled for the Waste Isolation Pilot Plant (WIPP) will be contact-handled waste.

A small percentage of TRU wastes emits beta and gamma radiation. Beta radiation can be stopped by a sheet of aluminum, but gamma radiation must be heavily shielded for safe handling and storage. This waste, emitting beta and gamma radiation, is referred to as "remote-handled" transuranic (RH TRU) waste. Remote-handled TRU wastes are

handled and transported in specially shielded containers which ensure that workers and the public are protected. Three percent of the waste scheduled for WIPP storage will be remote-handled waste. Many TRU wastes consist of everyday items used by workers at national defense facilities. Items such as rubber gloves, shoe covers, cloth lab coats, plastic bags, laboratory glass, and rags become contaminated in ordinary laboratory operations. When these items are discarded they become TRU wastes.

WHAT WILL HAPPEN TO TRU WASTE?

The wastes being produced at U.S. defense facilities are being stored temporarily at various Department of Energy locations throughout the United States.

TRU wastes, packaged in 55-gallon metal drums or other sturdy containers, will be placed in a specially designed transuranic package transporter, called a TRUPACT-II. The TRUPACT-IIs, carried either on trucks or railcars, will transport TRU wastes from generator sites to the WIPP.

At the WIPP the Department of Energy will demonstrate, for a period of five years, that TRU waste can be safely stored in a deep bedded salt formation, 2150 feet below the surface of the earth. During this period, the TRU wastes will be stored in a manner that they can be retrieved and removed from the WIPP. If, after this five-year demonstration, the decision is made to permanently stored the TRU waste at the WIPP, the facility will operate as a repository for an additional twenty years. The scientific knowledge that results from the WIPP will greatly add to U.S. technology for safe handling and permanent storage of radioactively contaminated wastes.

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SAFETY THROUGHOUT THE PROJECT

OVERVIEW

A major WIPP effort for the protection of the worker is a comprehensive industrial safety program that functions during all phases of construction and operation. The program contains intensive training programs, including a five-day safety training program for underground employees. Also, during construction particular attention is paid to the quality of workmanship, through a quality assurance program, to ensure that critical components are built properly and will operate as planned.

SAFETY TRAINING

All new WIPP employees receive a comprehensive introduction to his or her job on all aspects of safety before being permitted to start work. Several follow-up contacts are made during a probationary period to confirm that all regulatory standards are followed. Another program, job hazard analysis, examines each job by an individual sequence of steps required to perform the task. Each step is then examined to determine if there is a potential for personal injury, property damage, quality or production loss. In addition, the Safety Training Observation Program, instructs managers in techniques of observing, analyzing, correcting, and preventing unsafe acts in their group activities. These, and other programs, help to ensure the safety of the WIPP employees.

EMERGENCY PREPAREDNESS

In the interests of protecting both employees and people in nearby communities, the WIPP safety personnel have developed and practiced effective strategies for dealing with potential emergency situations, including floods, fires, tornadoes, or vehicle accidents. The WIPP is equipped with fire trucks for both the surface facilities and the underground. In fact, an underground ambulance is available which can provide emergency treatment and transportation for any workers injured in the underground workplace. The WIPP emergency team drills, on a regular basis, with neighboring organizations such as

surrounding fire departments. It also performs in cooperation with area law enforcement and emergency medical teams if needed.

OTHER SAFETY MEASURES

At the WIPP, investigations are performed on all accidents, especially those with the potential for a serious loss. This includes personal injury, occupational illness, fire, theft, vandalism, and radiation leaks. Every investigation is reviewed by top management to verify that the problem has been corrected to prevent recurrence. However, before beginning a complex project, all aspects are reviewed for safety and quality assurance.

A special kind of preparation for possible hazards is done to organize safe and efficient waste transport to the WIPP facility. Both normal transport and accidental conditions have been investigated. These evaluations indicate that the radiological risk of shipping transuranic waste containers to the WIPP is minimal.

Special design considerations for radiological safety have already been incorporated into the WIPP equipment, systems, operating plans, and procedures. Facilities, which include a specially shielded hot cell with large remote-controlled manipulators, will permit safe handling and examination of waste container contents before storage underground. Persons working in the radiological area will require special training and work permits for different tasks, which health physics personnel will oversee for safe operating procedures and individual exposures. Portable instruments and area monitoring devices will be used throughout the WIPP facilities to detect any contamination or radiation release and ensure constant protection of the environment and personnel.

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ROOM STABILITY PROGRAM AT WIPP

As part of an ongoing research and development program, scientists and geologists at the Waste Isolation Pilot Plant are gathering data on rock movement in the underground rooms, which are situated 2,150 feet beneath the surface.

To ensure stability and the safety of workers and operations in the more than seven miles of underground tunnels and rooms at WIPP, a number of engineering enhancements are used and rock movement is monitored. Mine roofs are bolted with steel rods and some surfaces are netted with wire mesh. As part of daily operations, a work crew constantly inspects and maintains the walls, floors, and sides of the mine tunnels called drifts, rooms, and roadways.

Through the site's geological monitoring program, WIPP's geotechnical engineers have been able to accurately predict when rock will fall from the ceiling of a room. One such predicted roof fall occurred February 4, 1991, in a section of the repository called the Site and Preliminary Design Validation (SPDV) area. The rooms in this area are set aside specifically for monitoring room closure.

SPECIAL ROOMS USED FOR GEOLOGIC MOVEMENT EXPERIMENTS

The SPDV area consists of four special rooms mined to the same dimensions (300 feet long, 33 feet wide, 13 feet high) as the rooms slated for test phase waste. Geological instrumentation and tests, used to measure movement of the salt over a period of time, will help determine how long it will take the salt formation to close in around a room full of waste.

Unlike the rest of the mine, these special rooms have practically no roof support. This deliberate lack of support ensures that the movement of the salt rock is not inhibited because the focus of the experiment is to monitor this natural movement. Access to these rooms is strictly controlled and several are physically barricaded to keep employees safe.

EXPERT PANEL RECOMMENDATIONS

The SPDV rooms are more than eight years old. Based on data analysis from the monitoring program, the Department of Energy and the Westinghouse Waste Isolation Division convened a panel of technical experts in April, 1991. Their job was to analyze the quality of the monitoring program, estimate the remaining useful life of the storage panels, and make recommendations to enhance underground room stability.

The panel's final report was released June 5, 1991. The report concluded that data provided by WIPP's monitoring program can predict a rock fall with ample time to ensure worker safety and techniques are available to extend the life of the rooms.

The panel's recommendations to enhance stability have been incorporated into a roof support design. Measures to enhance stability during the entire test phase include the following:

- Strengthen the test room ceiling with steel rods, called rock bolts, for additional support. These bolts will be anchored in resin that enhances the overall stability of the bolting system. These bolts are installed in a specific pattern in the ceiling of the test room. (See attached diagram.)

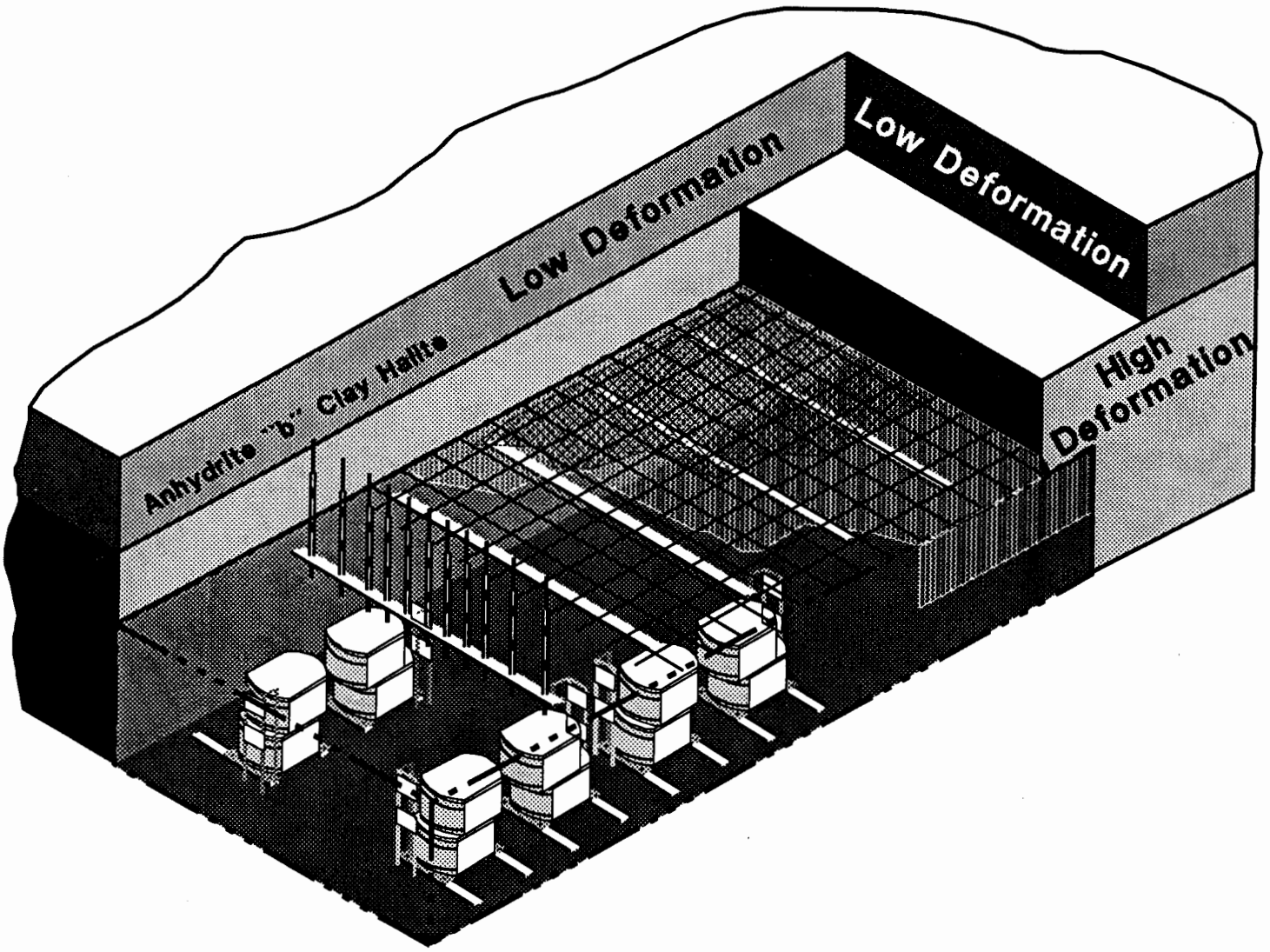
- Stretch wire mesh and cable lacing across the ceiling to contain and control small pieces of loose rock. (See attached diagram.)

- Build flexibility into the support design. Since the salt moves slowly, the additional support features must be capable of adjusting to the change in room size so the rock movement does not weaken the support materials.

- Upgrade the room support features when data from the monitoring program indicates it is appropriate. (Although the monitoring program does not yet indicate a need to upgrade, WIPP management has chosen to take an added measure of safety and upgrade the system now rather than wait for indications.)

The roof support design being implemented should extend the life of the rooms in Panel 1 to a total of 12 years, long enough to complete the WIPP test phase and ensure that routine maintenance can be carried out in a safe environment throughout the test phase.

ROOM 1, PANEL 1
CONCEPTUAL ROOF SUPPORT



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TRANSPORTATION: A SATELLITE TRACKING SYSTEM

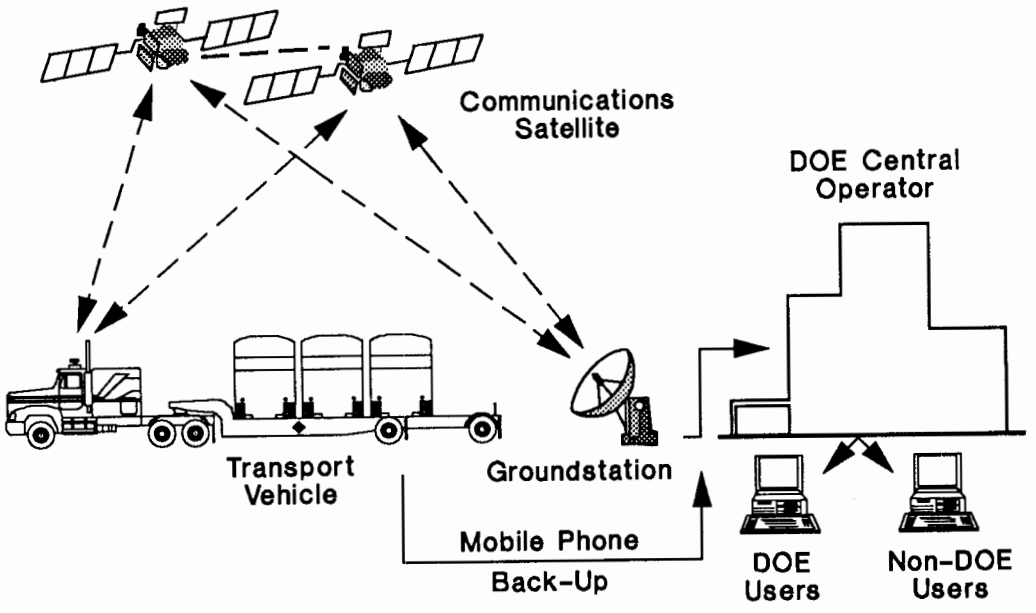
The U.S. Department of Energy (DOE) plans to ship transuranic (TRU) radioactive wastes from DOE facilities throughout the continental United States to the Waste Isolation Pilot Plant (WIPP) in southeastern New Mexico. These wastes will be packaged in containers meeting Department of Transportation (DOT) 7A, Type A Packaging Requirements. These DOT Specification 7A waste containers will be placed in specially designed TRU package transporters certified by the Nuclear Regulatory Commission (NRC) to meet the hypothetical accident conditions of the Code of Federal Regulations (10 CFR 71) on trucks.

Safe and efficient movement of the waste to the WIPP will be enhanced using a transportation tracking and two-way digital communication system (TRANSCOM). TRANSCOM combines dual satellite tracking, telecommunication, and computer network technologies to monitor the movement of DOE shipments in near real time. Two satellites use triangulation to locate each shipment and relay its location to the TRANSCOM Control Center (TCC), located in Oak Ridge, Tennessee. Two-way digital communication is also provided, with a transmission time of approximately 60-90 seconds. The Oak Ridge TCC has established a computer network and database that provide easy access to shipment information. The system is being designed to provide users (DOE, State government, Tribal government officials, etc.) with a TCC interface via personal computers.

COMPUTER TECHNOLOGY

TRANSCOM is comprised of several components which include tracking of shipments, advance shipment schedules, and numerous databases (e.g., DOT Emergency Guidebook data, emergency points-of-contact, etc.) These components are highly integrated and function as a single, streamlined communication system.

Hardware mounted on each vehicle provides the control center with bills of lading for each shipment and enables operators to communicate and know the location of each vehicle.



Computer software for the system provides the control center with current data on the fleet and automatically notifies system operators of any abnormal conditions that might occur. Information available to the control center includes the following data:

- Geographical location and route verification of each vehicle in the fleet
- Bills of lading for each shipment
- Emergency points of contact
- Emergency response information in the event of an accident
- Advance shipment schedules and notification as to when a shipment is approaching the jurisdiction of a neighboring state
- Longitude and latitude readings that will be used to automatically update existing maps

The WIPP will receive data on the movement and status of waste shipments from the TCC. Separately, the WIPP will use another software package to provide specific shipping site information on operations. Information on days and hours of operation, storage capacity, travel times, generating rates, and handling capacity will be made available. The quantity of waste is logged, including data on certification, total volume, and storage forms (drums or boxes).

SATELLITE TECHNOLOGY

Vehicle positioning information (latitude and longitude signals) and digital messages to and from the vehicle and TCC will be transmitted by satellite.

PROGRAM STATUS

The DOE is committed to the use of a 24-hour-per-day tracking and communication system that will enhance safe and efficient transport of TRU waste to the WIPP. The computer system software is complete.

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WASTE ISOLATION PILOT PLANT

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EMERGENCY RESPONSE TRAINING COURSE SYNOPSIS

Waste Isolation Pilot Plant (WIPP) training programs have been developed to provide emergency response personnel along waste transportation routes with the knowledge and skill to properly assess the impact of a potential transportation accident and to provide protection to the public and the environment. The WIPP Emergency Response Training courses are intended to enhance existing emergency response programs to include transuranic (TRU) waste and radiological materials response capabilities.

Five training courses will be offered to personnel in those states through which waste shipments will be transported to the WIPP. A synopsis of these courses is presented.

FIRST RESPONDER

The First Responder Course is eight hours long and has attracted the largest number of students. It is intended for the first arriving emergency units (fire, medical, law enforcement, and rescue) not particularly working under formal incident command system initially and without health physics professionals to guide them. Course topics include a basic WIPP overview, an explanation of radiation and radiation protection principles, transportation regulations, TRANSCOM, package design, emergency response, and cleanup role.

FIRST RESPONDER REFRESHER

The First Responder Refresher Course is four hours long. The target audience is First Responders who either attended the First Responder Course or the Command and Control Course. It is designed to reacquaint students with the WIPP project and to reinforce radiation protection principles. The course includes updated information about the project, such as draft Land Withdrawal Legislation, the standard waste box, TRUPACT certification, and shipping schedules. The main objective with the Refresher Course is to reinforce the students knowledge of emergency procedures.

COMMAND AND CONTROL

The Command and Control Course is sixteen hours long (two days) and is intended for those individuals who will be either overall or partially in charge at the scene of a WIPP-related accident. Course length may be extended, at the request of a State, to discuss specific application of a State response plan to a WIPP accident. Course topics include material discussed in the First Responders course plus a detailed discussion of the Incident Command System. Students work with scale models to practice responding to a simulated transportation accident involving TRU waste. Successful completion of this course will provide the incident or scene commander with knowledge to safely respond, establish command, and protect the public and the environment.

MITIGATION COURSE

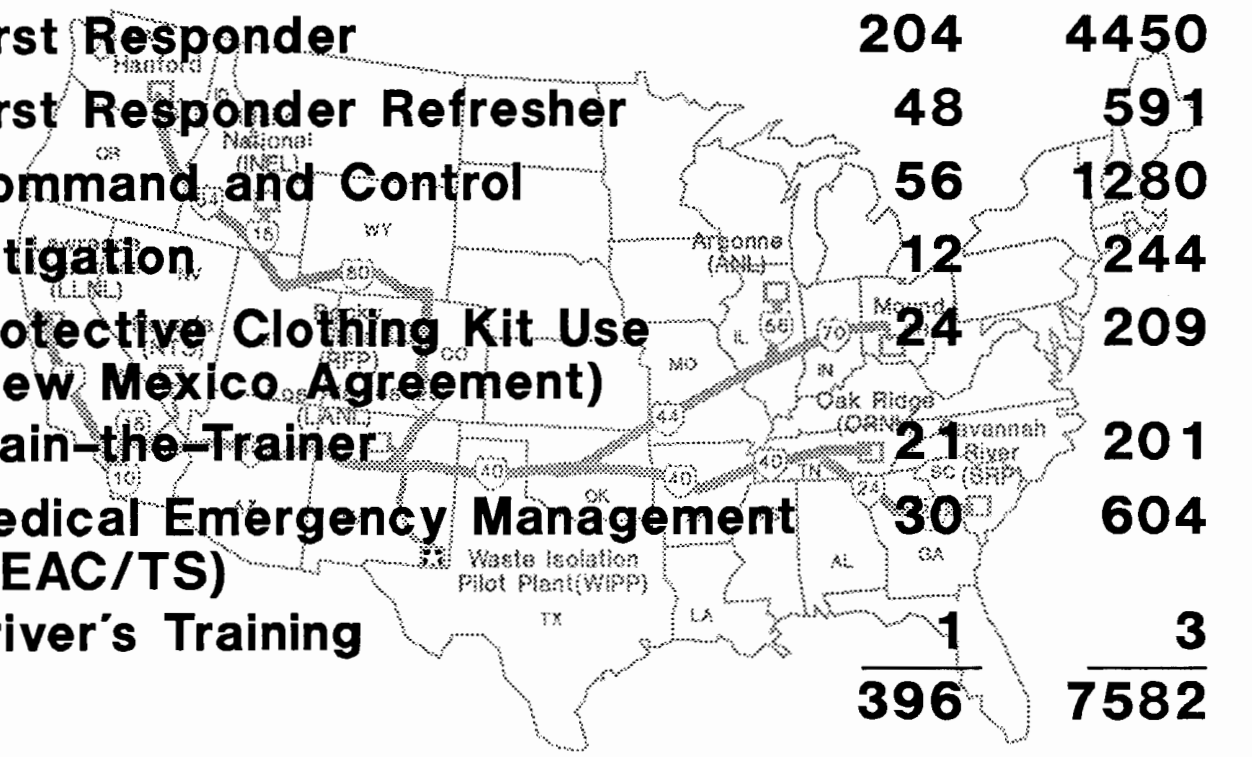
The Mitigation Course is designed for state health, safety, environmental, and radiological personnel with radiological monitoring and assessment responsibility. Students are taught actions that firefighters, law enforcement, and medical personnel have performed at the accident scene, based on the First Responder and Command and Control course curriculum. The coordination of local, State, and Federal resources is discussed with an emphasis on defining the roles and responsibilities of each of these groups. The specific resources of the DOE to supplement State and local government radiological monitoring and assessment activities is also discussed, as well as their role as the shipper. Other topics include a WIPP overview, hazards of transuranics, TRANSCOM, the package and its contents (by generator site), the role of the medical community, and alpha monitoring techniques.

TRAIN-THE-TRAINER

The 4 hour (1/2 day) Train-The-Trainer Course is presented to a class of ten to fifteen students. Students attending this course must be certified as instructors within their appropriate State or local jurisdiction. The First Responder Course is presented the first day. On the second day, the WIPP instructor will explain training materials and the lesson plan structure. In addition, answers to the most commonly asked questions will be provided. Each organization providing students will receive a copy of the First Responder course lesson plan and 35 mm slides about the WIPP that can be integrated into their existing radioactive/hazardous materials training program.

STATUS OF TRAINING IN CORRIDOR STATES AS OF DECEMBER 31, 1991

COURSE	NUMBER OFFERED	ATTENDEES
First Responder	204	4450
First Responder Refresher	48	591
Command and Control	56	1280
Mitigation	12	244
Protective Clothing Kit Use (New Mexico Agreement)	24	209
Train-the-Trainer	21	201
Medical Emergency Management (REAC/TS)	30	604
Driver's Training	1	3
	396	7582



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WASTE ISOLATION PILOT PLANT

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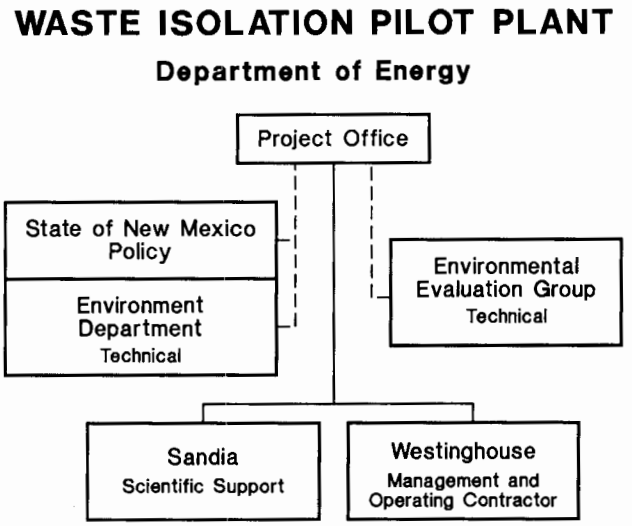
PARTICIPANTS/LINES OF COMMUNICATION

Since the beginnings of America's nuclear defense program in the 1940's, the federal government's nuclear defense activities have created radioactive waste by-products known as transuranic, or TRU, wastes. The long duration of the radioactivity in these waste materials is a primary consideration in shaping the disposal program established by the Department of Energy (DOE), which is now responsible for the safe handling, transporting, and storing of TRU wastes.

The Waste Isolation Pilot Plant's (WIPP's) demonstration phase and the prospect that the facility is designed to operate for many years as a TRU waste disposal facility make the WIPP Project an important site in New Mexico. Therefore, the Project was very carefully designed and constructed, even though the WIPP facility is exempt by Congressional decree from Nuclear Regulatory Commission (NRC) licensing.



As a federal agency, DOE activities fall under the direction of the President and the review of Congress. In the enabling legislation for the Project, Congress directed DOE to enter into an agreement for consultation and cooperation with the state of New Mexico. This agreement, signed by both parties in July 1981, constitutes a direct line of communication between the WIPP and the State. It establishes a system for exchange of pertinent information and gives the State an opportunity to voice its concerns about the Project's health, safety, and environmental protection aspects.

The Project also interfaces with numerous other federal agencies. The principal contacts are with the Environmental Protection Agency (EPA), the Bureau of Land Management

(BLM) within the Department of Interior, the Mine Safety and Health Administration within the Department of Labor, the Materials Transportation Bureau of the Department of Transportation, and the NRC.

The EPA is directly involved with the Project since the basic purpose of the WIPP is to develop an environmentally acceptable method for the disposal of radioactive wastes. The EPA has published standards defining "acceptable." No waste will be accepted for disposal unless it has met these criteria.

The relations with the BLM arise from the fact that the WIPP facility is sited on public lands, which belong to the federal government. Since BLM regulations provide that such lands will be open to multiple uses, it has been necessary to withdraw the site from normal accessibility and assign control of it to the DOE for restricted use. The Department of Transportation regulates the transportation of hazardous materials in interstate commerce, and the transportation of wastes to the WIPP site for emplacement falls under its jurisdiction. The NRC is responsible for certification of the containers used for shipping radioactive waste to the WIPP site.

Project relations with the state of New Mexico agencies parallel those with Federal agencies. State of New Mexico policy issues are addressed directly with the appropriate administrative offices within the State government. The Project is working with the New Mexico Department of Transportation on intrastate transportation and on highway route selection and upgrading. The WIPP provides emergency response training and supplies in coordination with State agencies such as the State Police and the State Fire Marshal's Office.

An Environmental Evaluation Group and the Environmental Improvement Division have been established at the State level to perform a technical review and comment function regarding the health, safety and environmental aspects of the Project's activities. In addition, the WIPP Project maintains a continuing dialogue with the State Legislature's Radioactive and Hazardous Materials Committee. The Panel on the WIPP, the Board on Radioactive Waste Management within the National Academy of Sciences, also is responsible to provide technical review and recommendations on the federal level. These agencies act as monitoring and oversight committees to ensure that the Project abides by all Federal and State regulations.

Widespread involvement by numerous agencies and activities is required to enable this first-of-a-kind facility to carry out its mission to demonstrate the safe and practical disposal of this nation's radioactive wastes produced from defense program activities.

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QUOTABLE QUOTES

The Waste Isolation Pilot Plant (WIPP) has an active visitor and community outreach program which emphasizes an open exchange of information between the WIPP and the general public. Tours of the WIPP site are available for community organizations, students, government officials, business groups, and others.

"Once you've seen WIPP it is clear that the original concept of geologic isolation of these wastes is the only rational option."

TOM BJERSTEDT - PHYSICAL SCIENTIST

"The WIPP site is an excellent example of community and government working together to solve a complex technical and political problem. I was impressed with the safety precautions observed by EVERYONE there and the dedication of the employees."

DR. JEANNE L. COOPER - PHYSICAL SCIENTIST

"I have toured the WIPP three times. Each time I leave more impressed than the last. What particularly impresses me is the intense commitment to health and safety and the professionalism and courtesy of the staff. Everyone I've encountered at WIPP is genuinely proud of their work and eager to show it off."

MIKE RAUDENBUSH - PRESIDENT, SM STOLLER, WESTERN DIVISION

"I was impressed! Our tour was first class. The facility is unbelievable and safety is a #1 concern. Everyone underground was very safety conscious."

C. W. BYRON - GEOLOGIST - BYRON OIL COMPANY - HOBBS, NM

"We have just completed a most provocative and informative tour. Our questions and concerns were adequately answered. In all, the public can be assured that the safety and health issues are prominent in the minds of all concerned with this project."

RICHARD SWEDBERG - HEALTH PHYSICIST, FEDERAL HIGHWAY ADMINISTRATION

'In my opinion, there has been nothing spared to make every attempt to properly store some of the nuclear by-products of a technology which helped maintain the freedom and strength of this nation."

GARRY OWEN - PRESIDENT, 1st FEDERAL SAVINGS - ROSWELL, NM

"The tour that I took on February 21, 1992, of the above and underground facilities at the site, further convinced me that the facility and employees are ready. The test rooms, with all the monitoring devices, plus the extra measures taken to ensure safety are some of the indications that the facility is now ready to receive waste and start the testing."

HAROLD ROBERTSON - SENM AREA MANAGER, GAS COMPANY OF NM - CARLSBAD, NM

"Every part of your organization is very safety conscious and safety seems to be your number one priority. Your operation appears to be a reasonable solution for the storage of radioactive waste."

JAMES J. REEVES - PH. D., UNIVERSITY OF TEXAS OF THE PERMIAN BASIN, ODESSA, TX

R & D TEST PHASE IS THE BEST WAY TO DEMONSTRATE COMPLIANCE WITH EPA STANDARDS

The WIPP is ready to implement a comprehensive test program to support determination of repository viability through its ability to meet EPA regulatory requirements.

Recent scientific tests on a 1991 flight of the space shuttle Columbia produced invaluable information for the scientific and medical community. Five years had elapsed from design of the tests to actual demonstration.

Carlsbad's first astronaut, and Columbia crew member, Dr. Drew Gaffney, has this to say about the importance of performing actual tests.

"You cannot be sure of your results until you actually do the experiment."

Proponents of the WIPP project could not agree more. The geologic isolation concept was developed in the 1950s. The WIPP mission was established by Congress in 1980. Operational readiness was declared in August 1991 and remains in effect. It is time to conduct the Test Phase at the Waste Isolation Pilot Plant so everyone can be sure of the results.

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WASTE ISOLATION PILOT PLANT

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VISITOR INFORMATION

OVERVIEW

The Waste Isolation Pilot Plant (WIPP) is a research and development facility of the U.S. Department of Energy that is designed to demonstrate the safe disposal of defense-generated radioactive waste. The project is located in southeastern New Mexico, 26 miles east of Carlsbad.

The WIPP has an active visitor and community outreach program which emphasizes an open exchange of information between the WIPP and the general public. The program includes the following:

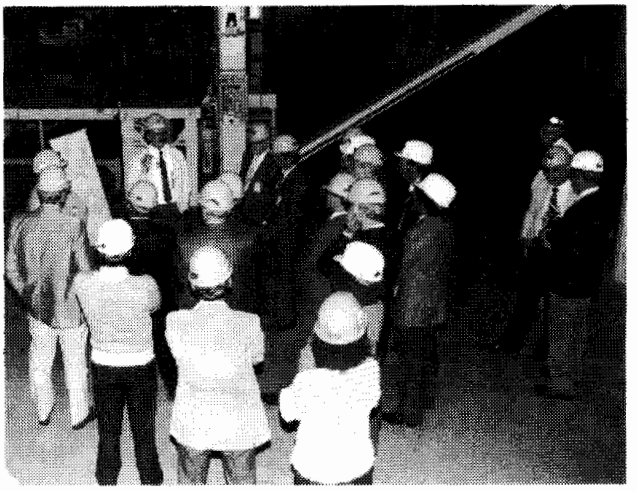
(1) Tours of the WIPP site for visiting groups and community organizations.

(2) A Speakers Bureau which offers free informational presentations on a variety of topics.

(3) Publications (brochures, pamphlets) prepared for the public about the WIPP.

VISITOR TOURS

Visitor tours of the WIPP site are available for community organizations, students, government officials, business groups, and others. Groups wishing to visit can request tours of surface facilities, tours of the underground repository including experimental areas, and presentations by engineers, scientists, and others on programs of interest. A visitors information center contains exhibits and models, lunch facilities, and an auditorium for presentations.



Since the WIPP Project is a major industrial site, there are special safety requirements for all tour groups. Visitors must be age 18 or older, wearing slacks and no loose clothing. Shoes must be flat, with a sturdy leather structure. No tennis shoes or open-toed sandals are allowed. People wearing eyeglasses should have clear lenses, not photo-gray tints. Visitors must carry picture identification such as a drivers license or student-body card.

Requests for visits to the WIPP can be made verbally or in writing to the Public Affairs offices listed below. Three weeks advance notice is usually required for U.S. citizens, and more for non-citizens. When making a request for a WIPP visit, include the following information: (1) date of visit; (2) time of arrival and departure; (3) name, title, organization and citizenship of visitors; (4) purpose of the visit; (5) whether or not an underground tour is desired; (6) area of particular interest; and (7) name and phone number for a point of contact.

SPEAKERS BUREAU

The WIPP has an active Speakers Bureau which will make presentations to community organizations or other groups in the region. The talks are offered free and may be arranged through the Public Affairs offices listed below. The presentations last about 25 minutes and include the following topics: (1) Overview of the Waste Isolation Pilot Plant; (2) Transportation of Waste to the WIPP; (3) Waste Operations; (4) Environmental Programs; (5) Experimental Programs; (6) the Safety at the WIPP; (7) and special "WIPP Overview" talks aimed at elementary and secondary school groups.

GENERAL INFORMATION

A variety of publications describe this unique project for the public. "Waste Isolation Pilot Plant" is a seventeen-page brochure which presents an overview of the WIPP for the general public. Fact sheets are available on specific technical topics such as waste handling and waste transportation. Publications are available by writing or telephoning the offices below.

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RAPTOR STUDIES AND THE WIPP ENVIRONMENT

"Raptor" is a general term for a bird-of-prey which seizes its prey with its feet, which have long, sharp claws or talons. Raptors include such groups as hawks, owls, eagles, and falcons. Many of these species are sensitive to human disturbance and man-caused changes in their environment. Some, such as the bald eagle and peregrine falcon, have been put on the federal threatened-and-endangered species list, giving them special legal protection from further encroachment by humans.

RAPTORS OF THE WIPP AREA

The Waste Isolation Pilot Plant is located on a sandy, almost treeless plain in southeastern New Mexico known as Los Medanos ("The Dunes"). In 1975, an intensive biological research program was set up to assess the possible impacts of the then proposed WIPP project on the surrounding natural environment. A significant finding from the WIPP Biology Program was the presence of large numbers of raptors, particularly hawks and owls, breeding and wintering in the Los Medanos area.

A total of 20 species of raptors have been recorded in the Los Medanos area. Two of these, the Harris' hawk and the Swainson's hawk, were found to breed here in unusually high numbers. This was an important finding since both of these species are rare in the United States and are thought to be declining in numbers over most of their natural range. Also common here are great-horned owls, burrowing owls, ferruginous hawks, red-tailed hawks, and northern harriers.

THE LOS MEDANOS COOPERATIVE RAPTOR RESEARCH PROGRAM

Increasing human activities including the construction and operation of the WIPP facility, oil and gas development, and range improvement projects, all present potential threats to future raptor habitat. In 1985, with this concern in mind, the U.S. Department of Energy, the Bureau of Land Management, which manages most of the land in the Los Medanos area, and the Living Desert State Park in Carlsbad entered into a cooperative

agreement to establish and support a research program to study the raptor population. Drs. J. David Ligon and James C. Bednarz of the University of New Mexico were awarded the research grant.

The goals are:

- To determine the number of nests and breeding success of raptor species in the Los Medanos study area and to determine habitat requirements.

- To determine the current levels of human impact in the area, particularly those related to the development of the WIPP, the use of herbicides for range improvement, and oil and gas recovery activities on the raptor populations.

- To make recommendations for preventing adverse impacts by any of these activities.

The research has entailed intensive searches for raptor nests, monitoring the nesting successes, banding of several hundred birds for individual identification, the use of radio transmitters on adult hawks to monitor their daily activities and behavior, the study of feeding habits and food availability, and the use of man-made platforms as alternative nest locations to improve habitat quality in more remote locations.

CURRENT FINDINGS

In the first two years of the Cooperative Raptor Research Program, several interesting findings were made. The density of raptor nests in the study area (i.e., the number of nests per square mile) was found to be one of the highest recorded anywhere in the world. Nesting success was found to be lower in areas of heavy human activity and in areas treated with herbicide. However, it was found that nesting success was improved near the WIPP site by modifying work schedules in field locations to avoid disturbance to active nests. Ten man-made nest platforms were placed around the WIPP site in the spring of 1986. In the first year, seven of these were used by ravens, but in 1987 researchers were pleased to discover a family of great-horned owls at one platform site and Harris hawks at another. Both successfully fledged their chicks.

The Los Medanos Cooperative Raptor Research Program has resulted in the collection of data critical to the protection of a unique natural resource. The U.S. Department of Energy is proud of the part it has played in these studies.

Additional information can be obtained by contacting:

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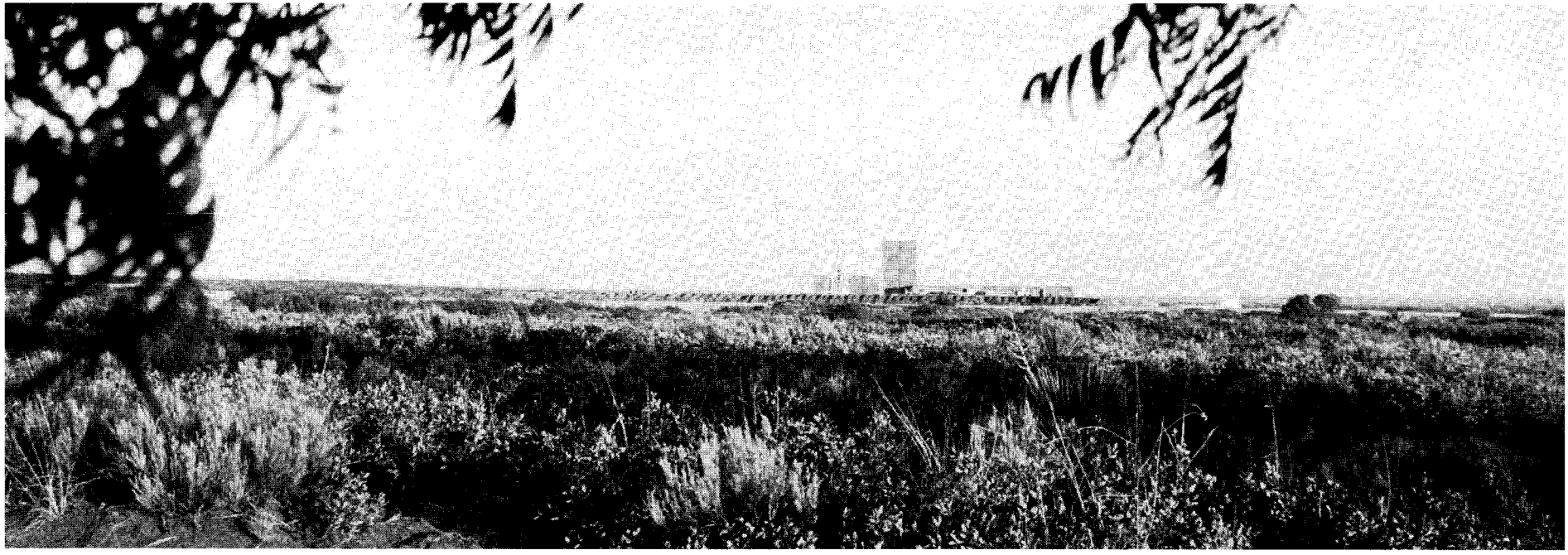
Revised 2/92

WASTE ISOLATION PILOT PLANT—1991

Waste Isolation Pilot Plant --WIPP



United States
Department of Energy

The Marietta 3612 continuous miner was delivered to the WIPP site in October 1987. This addition to the WIPP mining fleet provides an increase in mining capability of 700 tons per shift, bringing WIPP's total capability to 974 tons per shift of full operation.

Waste Isolation Pilot Plant (WIPP)

The WIPP Mission

The United States Department of Energy's (DOE's) Waste Isolation Pilot Plant, or WIPP, is an important part of America's effort to provide a practical, long-term solution to a complex problem: how can we safely and permanently dispose of radioactively contaminated waste resulting from America's national defense programs?

Up to the present, such materials have been stored using a variety of above-ground and shallow-land burial methods. Although safe, these methods were not intended as long-term solutions. For over 35 years scientists have investigated the feasibility of radioactive waste disposal in deep geologic repositories.

After years of research into possible sites for permanent waste disposal, Congress mandated Public Law 96-164 for the construction and development of the WIPP as a research and development project. The WIPP is located approximately 26 miles east of Carlsbad, New Mexico.

The Waste Isolation Pilot Plant (WIPP) is located approximately 26 miles east of Carlsbad, New Mexico, in a semi-desert environment.

Background

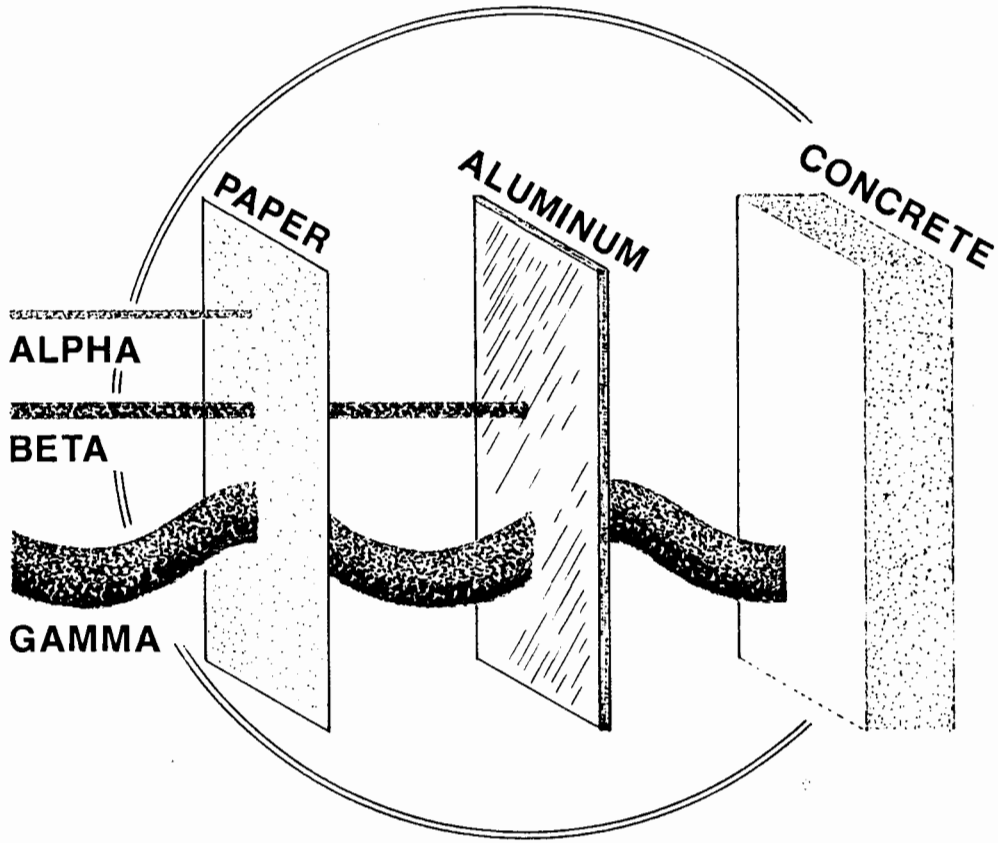
Since the beginning of America's nuclear defense program in the 1940s, the federal government's nuclear defense activities have created waste by-products. These wastes are contaminated with radioactive elements heavier than uranium; thus, the name trans- (or beyond) uranic (TRU). TRU wastes take a very long time to decay. For example, half of the plutonium in the plutonium-239 that is made and used today will still be active 24,000 years from now.

The long half-life of TRU wastes is a primary consideration in shaping the decisions of the Department of Energy (DOE), which is responsible for safely handling, transporting, and disposing of TRU wastes. Another consideration is the type of radiation emitted by TRU wastes.

TRU wastes may emit alpha, beta, or gamma radiation. Alpha radiation particles may be dangerous if inhaled or ingested, but it is not an external hazard. It will not penetrate even the outer layer of the skin and can be stopped completely by a sheet of paper.

Beta radiation is more penetrating than alpha radiation and may also be dangerous if inhaled or ingested. A thin sheet of aluminum can stop it.

Gamma radiation is highly penetrating and must be heavily shielded for safe handling and storage. Dense material such as concrete and lead are often used to provide shielding against gamma radiation.



This diagram shows the relative penetrating power of alpha, beta, and gamma radiation.

TRU wastes with alpha radiation are packaged in metallic containers, like 55-gallon drums; these containers provide sufficient shielding for safe handling and storage.

The majority of TRU waste is categorized as contact-handled (CH) TRU. This category of waste has minimal gamma radiation levels. The container itself provides sufficient protection, and no extra shielding is required. A small volume of TRU wastes emit significant amounts of gamma radiation. This waste is referred to as remote-handled (RH) TRU waste. RH TRU is distinguished from CH TRU on the basis of the higher level of gamma radiation that RH TRU emits.

Transuranic Waste

Almost all of the transuranic (TRU) waste that must be transported to and disposed of at the WIPP consists of everyday items used by people working at national defense facilities. Examples of these items are rags, rubber gloves, shoe covers, cloth lab coats, plastic bags, and discarded laboratory glass and metalware. Pumps, valves, motors, hand tools, and some machine tools (such as lathes and milling machinery) must occasionally be discarded after they become contaminated during routine operations.

In 1970, the federal government strengthened policies for strict management and confinement of TRU wastes, which encouraged the development of a permanent geologic repository. The Department of Energy Albuquerque Operations Office (DOE-AL) has the responsibility for management of defense-generated TRU waste, including its safe and permanent disposal in a deep geological repository. This management includes assurances that all applicable regulations will be met.

TRU waste consists of items such as rags, rubber gloves, shoe covers, lab coats, plastic bags, tools, and machinery.

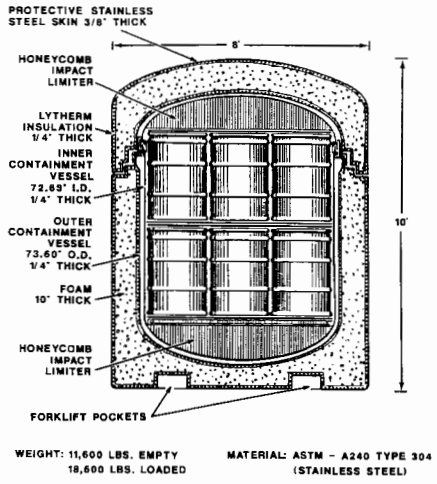
Contact-Handled Experimental Transuranic Waste

At the WIPP, the Department of Energy (DOE) will demonstrate that transuranic (TRU) wastes can be permanently and safely disposed of in a deep bedded salt formation that has been geologically stable for more than 225 million years. When the initial Test Phase is concluded, a final decision will be made regarding permanent disposal of TRU wastes at the WIPP.

Current projections call for the opening of the WIPP for the Test Phase in 1991. Prior to shipment to the WIPP, all wastes will be certified to ensure they are suitable for emplacement. The WIPP Waste Acceptance Criteria (WAC) specify the requirements that TRU waste and its containers must meet prior to disposal at the WIPP. The DOE has established a committee of experts to audit every generating site, to certify procedures are being followed that will meet all WAC specifications. Only contact-handled (CH) waste will be shipped to the WIPP during the Test Phase.

The WIPP Bin-Scale Test Program involves the testing of CH TRU waste drums contained within separate test bins. A test bin is a metal box specifically designed to safely contain the waste and allow for the periodic sampling according to the Test Phase. The test bin is not intended to be a transportation or waste disposal container. It will be

TRUPACT-II



This diagram of a TRUPACT-II shows its dimensions. It is a double containment vessel.

placed inside a standard waste box (SWB) and will then be shipped to the WIPP site inside the TRUPACT-II shipping container. During the Test Phase, the test bins will remain inside a modified SWB to provide the additional containment required for the safe implementation of the test.

The bin tests will provide data on gas generation and composition resulting from TRU waste degradation under WIPP repository conditions. Gas and liquid samples will be taken periodically from each test bin for analyses. The data will be linked with related laboratory and alcove-scale tests and will serve as input for the WIPP Performance Assessment study.

The handling process for CH experimental waste begins when the CH experimental waste packages arrive at the WIPP site in specially designed transuranic package transporters called TRUPACT-IIs. The TRUPACT-IIs will hold either 55-gallon metal drums banded together in "seven-packs" or metal SWBs. The TRUPACT-IIs have been designed and extensively tested to ensure they meet Nuclear Regulatory Commission requirements. They were certified by the Nuclear Regulatory Commission in August 1989.

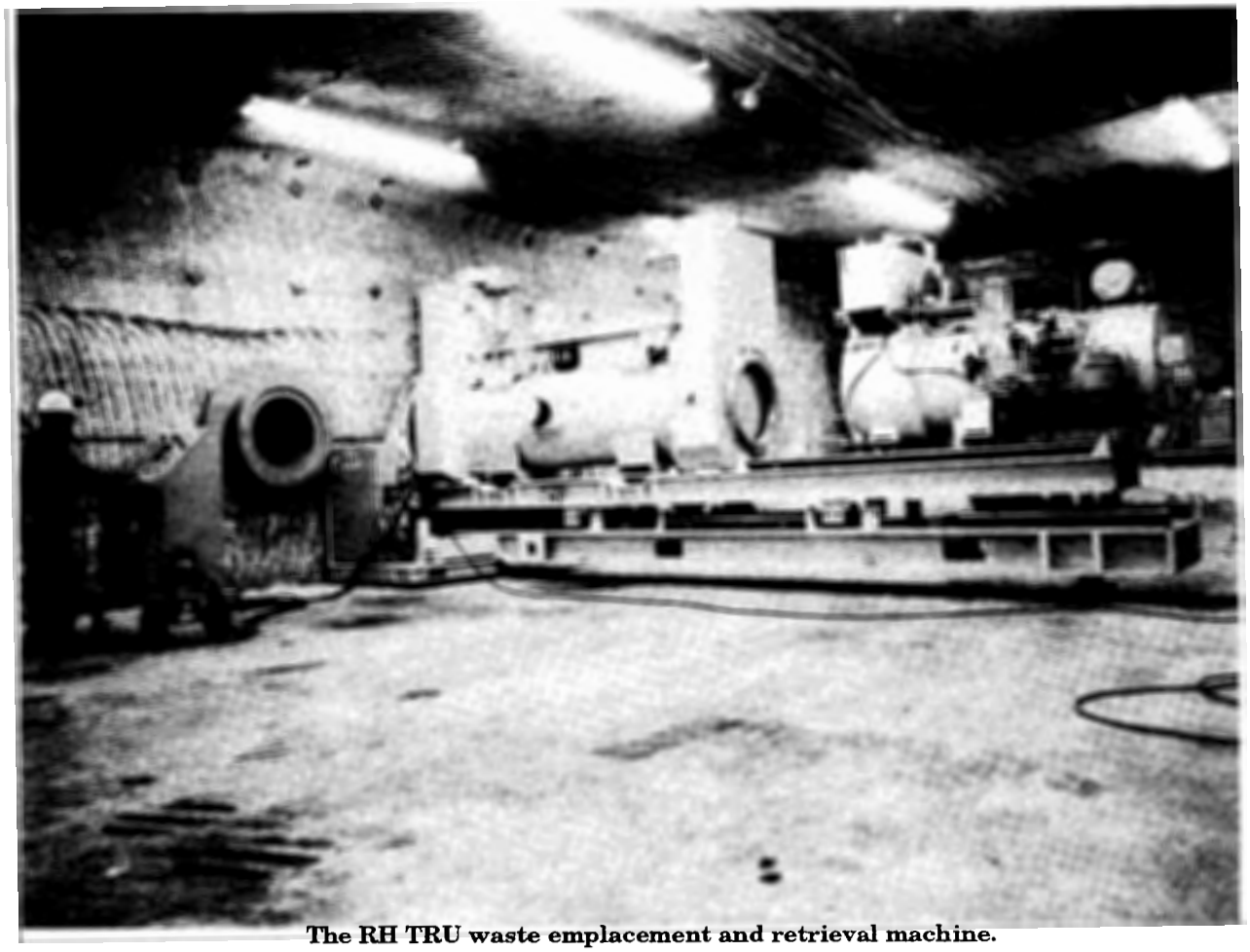
When the TRUPACT-II arrives at the WIPP it will be inspected for damage and contamination. Then the TRUPACT-II will be taken to the CH area of the Waste Handling Building through an air lock. The TRUPACT-II will have its internal atmosphere sampled to ensure that no contamination is present. It will then be opened, and the waste packages will be removed and inspected prior to being transferred to the underground radiological experimental area.

From the underground shaft station, a vehicle similar to a flatbed truck will take the waste packages into an experimental room, where a forklift will place the packages in storage racks. This storage location will then be entered into a computerized data base, by bar code, so that every package will be traceable.

Disposal of Remote-Handled Transuranic Wastes

Only after the actual Disposal Phase begins will the WIPP receive remote-handled (RH) waste shipments.

RH TRU waste is transuranic (TRU) waste with higher levels of penetrating radiation. Because of this penetrating radiation the waste must be shielded or handled remotely. Approximately three percent of waste scheduled for transport to the WIPP will be remote handled. This waste will arrive in specially designed, Nuclear Regulatory Commission certified, shielded casks. The container holding the waste is the RH TRU waste canister which is a carbon steel cylinder approximately two feet in diameter and ten feet in length. The RH canister will be carried inside the cask. When a shielded cask arrives at the WIPP it will be carefully inspected, and all of its shipping documents will be checked. The cask will then be transported into the RH portion of the Waste Handling Building, an area that is separate from the contact-handled (CH) area. The cask is then isolated in a special room and opened to remove the RH canister, which will be lifted to the "hot cell." In the hot cell, the waste container will be identified and inspected. The canister will then be placed in a facility cask for transport to the underground disposal room. Once in the underground disposal room, the facility cask will be placed on a machine in which a hydraulic ram pushes the RH canister into a predrilled hole in the disposal room wall. After the waste is emplaced, the hole will be plugged and the facility cask reused.



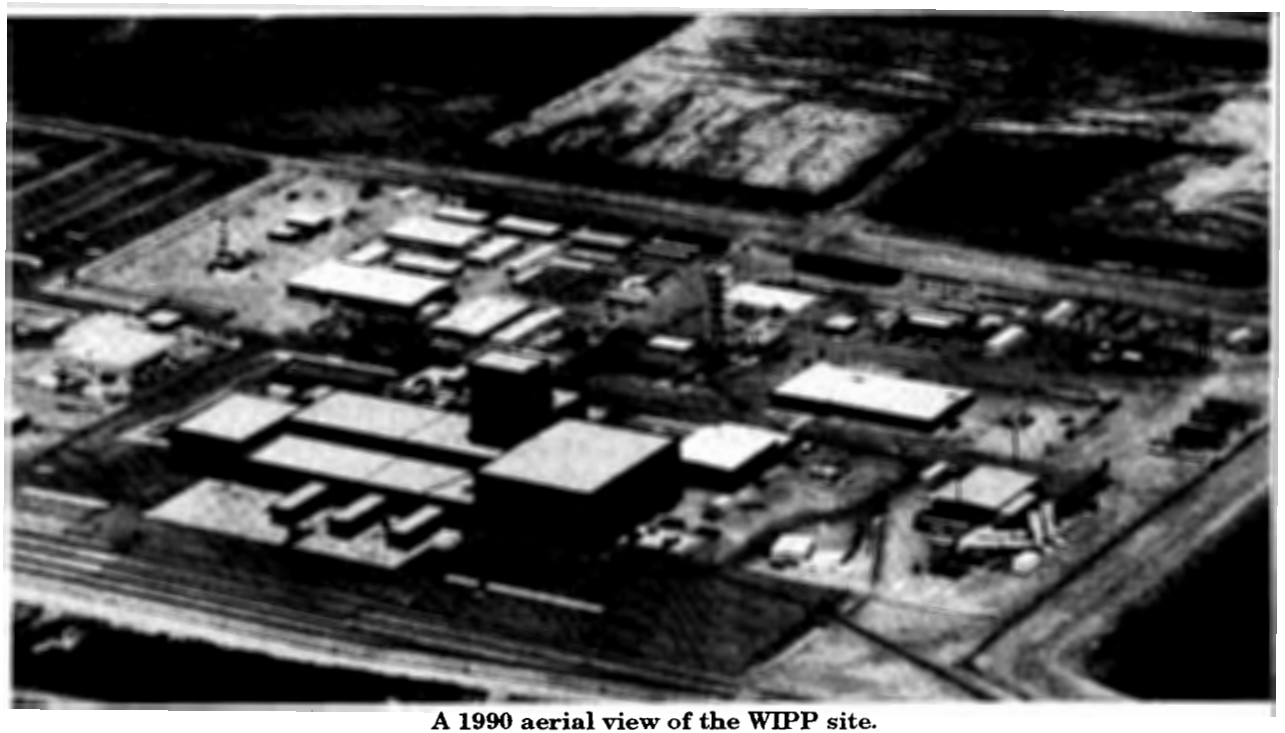
The RH TRU waste emplacement and retrieval machine.

The Future of the WIPP

When the evaluation of the Test Phase data is completed, the WIPP's ability to comply with all applicable environmental regulations for permanent disposal can be measured. A decision can then be made as to whether or not the WIPP can be designated as a safe, permanent repository. If a decision for permanent disposal is made, the facility will operate as a repository for an additional 20 years beyond the experimental phase.

After the WIPP is filled it will be decommissioned. This process entails decontaminating and dismantling the surface facilities, then sealing the underground disposal area and shafts. Decommissioning of the WIPP will return the site to its original state. Permanent markers will then be placed on the site, designating the location of the repository. Finally, a monitoring study will be conducted. This study will provide a record of how well the sealed repository system is performing.

As part of the decommissioning activities, written records will be filed in all appropriate public land and planning offices to document use of the site and the nature of the buried wastes. Administrative controls will prohibit future exploration and development of any natural underground resources within the site boundary, thereby preserving the integrity of the repository.



A 1990 aerial view of the WIPP site.

After decommissioning, the site will look essentially as it did before construction.

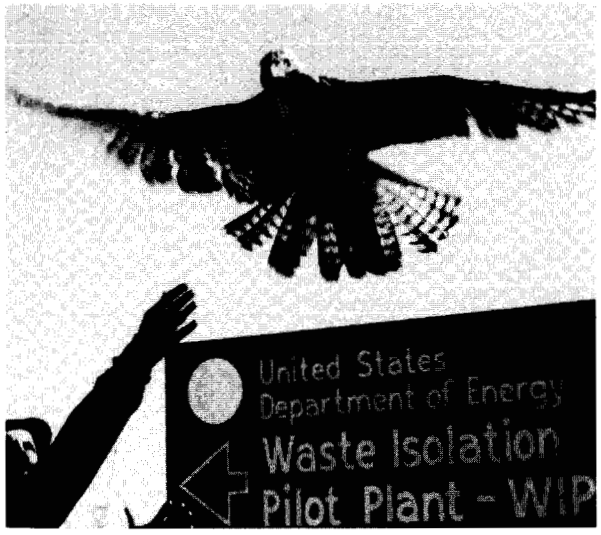
Environmental Studies at the WIPP

All the WIPP activities are focused on keeping the environment, employees, and the local population safe. Environmental activities ensure that construction and operation activities will not harm the environment or endanger public health and safety. Air and water quality, soil preservation, vegetation and wildlife over a large geographic area surrounding the WIPP are all periodically analyzed.

WIPP environmental monitoring activities have established a baseline of information on the amount of background radiation in the air, land, and water before any receipt of radioactive waste. Early data will be compared with data collected after waste receipt at the WIPP. Environmental impacts can be accurately assessed with these data.

Another WIPP program monitors the non-radiological effects of the WIPP on the environment. For example, because salt is known to be detrimental to plant growth, much care is being taken to keep mined salt confined to a very small region of the site. Little or no impact to plants has occurred outside the actual disturbed area of the site, indicating that WIPP conservation efforts have been successful.

These studies provide a maximum degree of protection to the public and the environment through the use of sophisticated monitoring equipment, extensive laboratory analyses, and continued reporting of monitoring programs' activities.



A juvenile Red-Tail Hawk being released after banding.

A WIPP employee takes a water sample from the Pecos River in nearby Carlsbad.

A WIPP employee logs data taken from an air sampler.

WIPP Benefits to the Local Community

The benefits of the WIPP are varied and far-reaching. On the local level, the WIPP has had, and will continue to have, an extremely positive economic impact on southeastern New Mexico. The WIPP currently provides approximately 700 jobs, 65% of which are filled with locally-hired personnel. As the project evolves, employment will be maintained at a constant level throughout the project's operational phase.

While obvious economic impacts include home purchases, groceries, and services, the WIPP also has more subtle economic benefits. As WIPP employees have settled into neighboring communities, they increase the tax base that supports schools, roads, and other public services. In addition, the dollars that the WIPP brings to southeastern New Mexico create jobs in such areas as office supplies, printing services, and construction.

A benefit that cannot be adequately measured in dollars is the positive environmental impact of the WIPP. Through the studies that have been performed to ensure that natural resources of southeastern New Mexico will be preserved, technical knowledge about the local environment has increased. For example, information on southeastern New Mexico raptors would not be available without the research performed for the WIPP.

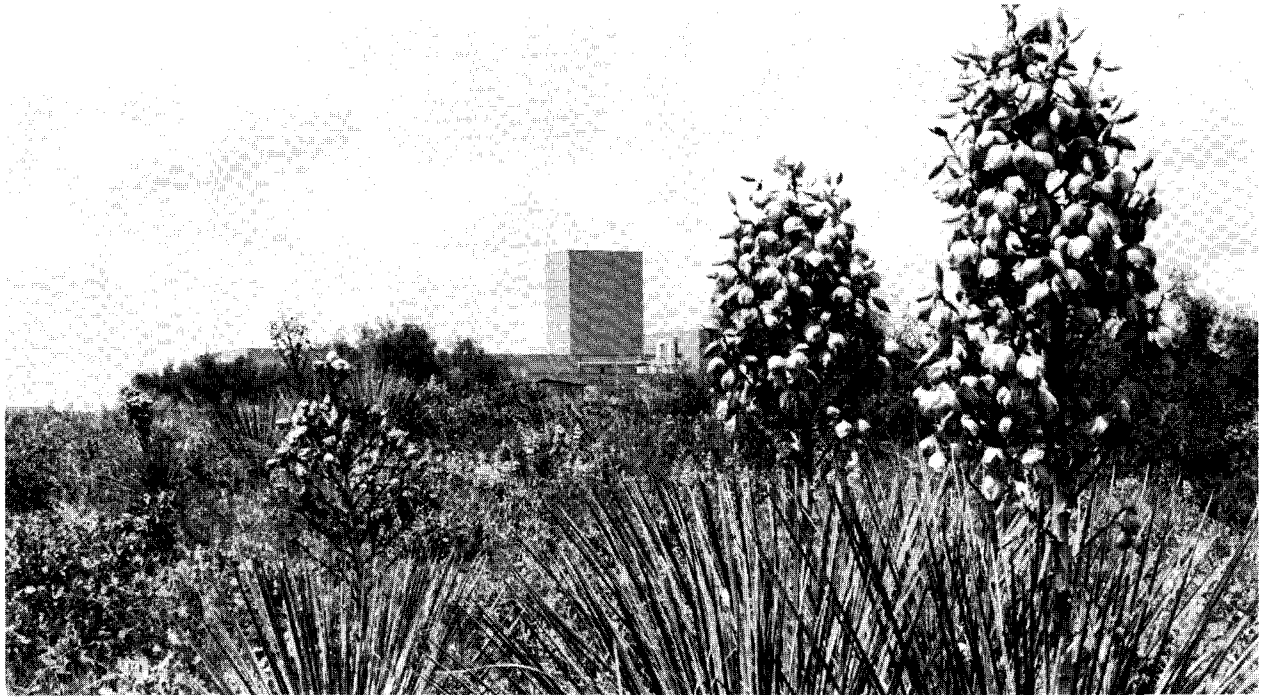
A Health Physics class is taught by WIPP personnel at New Mexico State University at Carlsbad.

Another benefit WIPP provides locally is the development of skills necessary for jobs at the site. For example, the WIPP needs trained health physics technicians. By working with New Mexico State University at Carlsbad (NMSU-C), WIPP officials have helped to develop a program that provides qualified health physics technicians. This is one of the few such programs in the United States. People who train in this program may be able to use their skills at the WIPP and at other facilities in the country.

Conclusion

The work the WIPP must do to fulfill its mission will result in a number of important and beneficial impacts. The scientific studies the WIPP fosters will add greatly to United States technologies for handling contaminated wastes. The WIPP will also contribute data necessary for the development of other waste repositories. In addition, if the Test Phase is successful, the WIPP will contribute to environmental protection in a very real way by actually accepting radioactive wastes that have been accumulating across the United States for decades.

The successful operation of the WIPP will promote a safer environment. Safe and efficient operations at the WIPP will also ensure the continued and constructive progress of America's nuclear programs.



The WIPP Waste Handling Building is shown with flowers, yucca, mesquite, sage, and scrub oak.

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