



# WESTERN GOVERNORS' ASSOCIATION

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## Western States Committed to Radioactive Waste Transport Safety

In March 1999, the federal government began shipping radioactive waste by truck to a deep geologic disposal site in southeastern New Mexico called the Waste Isolation Pilot Project (WIPP). The waste comes from environmental cleanups at former nuclear weapons production sites throughout the country. Transporting this waste to WIPP and disposing of it 2,150 feet under ground helps protect people and the environment.

The DOE and its contract carriers bear primary responsibility for the safety of shipments of radioactive waste, but Western States also play a critical role in protecting their residents and the environment from potential hazards associated with the transportation of the waste. In 1989, the Western Governors' Association established a Technical Advisory Group, consisting of representatives from Western States located along the transportation corridor, to address issues that would help

ensure the "safe and uneventful" movement of the waste. To achieve this objective, the Technical Advisory Group worked cooperatively with the DOE to develop a comprehensive transportation safety program, which contains stringent protocols, principles and procedures. This program has been fully implemented by both the DOE and each of the 12 states represented on the Technical Advisory Group (Arizona, California, Colorado, Idaho, Oregon, Nebraska, Nevada, New Mexico, Texas, Utah, Washington and Wyoming). Since the WIPP opened, each element of the transportation safety program is reviewed annually and updated and changed as necessary, to reflect best practices and ongoing needs.

In following the safety protocols, principles and procedures as developed, the DOE and Western States have ensured that extraordinary attention to detail is part of each shipment.

## The Waste

The waste disposed of at the WIPP is called transuranic (TRU) waste. Transuranic waste is characterized as:

- Radiating more than 100 nanocuries of alpha-emitting transuranic isotopes per gram of waste;
- Having a half-life of greater than 20 years;
- And will remain radioactive for thousands of years requiring isolation in a geologic repository.

Transuranic waste consists of protective clothing, tools, glove boxes, glassware, equipment, soils, sludge, leaded rubber gloves, air filters, ash salt metals, ceramic parts, plastics and solidified waste contaminated with man-made radioisotopes heavier than uranium. These elements include plutonium, neptunium, americium, curium and californium. Transuranic waste is produced during nuclear fuel assembly, nuclear weapons research, production and cleanup, and reprocessing spent nuclear fuel.

Prior to 1970, transuranic waste was buried at DOE sites in shallow landfills. Since then, newly generated transuranic waste has been stored in metal drums and other temporary storage containers in anticipation of its eventual shipment to the permanent disposal site.

Ninety-six percent of the TRU waste identified for disposal at the WIPP is classified as "contact-handled," which means the radiation it emits is not very penetrating and does not require heavy shielding. Inhalation and ingestion are the primary radiation hazards posed by this waste. Even in very small quantities, certain contact-handled transuranic materials – such as those containing plutonium – can deliver significant internal radiation doses if taken into the body.

The remaining four percent of the waste is called "remote-handled." The radiation that this waste emits is very penetrating and

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## Transportation Routes





## Transport vehicle with three TRUPACT-II shipping casks

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requires heavy shielding. The transportation safety plan described in this fact sheet was initially developed for contact-handled waste shipments and has since been updated to incorporate the necessary planning and training for remote-handled shipments to the WIPP.

### The Disposal Site

The disposal site at the WIPP is an underground repository located about 30 miles southeast of Carlsbad in southeastern New Mexico. Radioactive waste is permanently disposed 2,150 feet below the surface in an ancient salt formation, which provides a geologically stable, moisture-free environment. The WIPP was constructed as a research and development facility to demonstrate the safe disposal of transuranic waste.

The initial WIPP shipment originated at Los Alamos National Laboratory in New Mexico. Other DOE facilities in the West that have shipped transuranic waste to the WIPP are the Idaho National Laboratory, Rocky Flats Environmental Technology Site, Hanford Site, Lawrence Livermore National Laboratory, Lawrence Berkeley National Laboratory and the Nevada Test Site.

### Cask Safety

This fact sheet describes the transport safety program developed jointly by the Technical Advisory Group and DOE. This program builds on the safety that already exists due to the robustness of the shipping containers that are called casks.

All contact-handled waste is transported to the WIPP in one of two similar types of sturdy, reusable casks. The Transuranic Package Transporter (TRUPACT-II) is the primary shipping container. Inside the TRUPACT-II, transuranic waste is sealed in 55-gallon steel drums or steel boxes. Each TRUPACT-II holds up to 14 55-gallon drums or two boxes. Heavier waste materials are transported in a shorter version of the TRUPACT-II, called the HalfPACT, which can hold up to seven 55-gallon drums. Typically, a full shipment consists of three casks, although some shipments may only consist of one or two casks.

In order to transport radioactive materials, the casks must be certified and approved by the U.S. Nuclear Regulatory Commission (NRC) for the cask's ability to meet safety standards. These standards were set to minimize damage to casks in the case of a severe accident.

Unlike most radioactive-material shipping containers previously certified by the NRC, the TRUPACT-II and HalfPACT are flexible rather than rigid packages. The surfaces were designed to move and yet survive major impacts without losing their contents.

NRC regulations do not require actual testing of a full-scale cask to prove it can withstand extreme conditions. In most instances, the NRC accepts the results of computer simulations and physical tests on scale models. At the urging of the WGA Technical Advisory Group, DOE agreed that full-scale testing of TRUPACT-II prototypes was necessary because of the unique shape of the cask. The full-scale tests were designed to demonstrate the casks' ability to survive high-speed crashes and punctures followed by fires. Computer modeling was performed to satisfy NRC requirements for submersion in water. The State of New Mexico, the host state for the WIPP, helped in the design and review of the tests. The test program identified several shortcomings in the original design, which were corrected before the cask was used for transportation.

# Accident Prevention and Emergency Preparedness

Most truck accidents can be avoided by highly skilled and trained drivers using high-quality equipment and who avoid hazardous road and weather conditions. The accident prevention portion of the transportation safety program is based upon this philosophy. However, even with these precautions, an accident may occur. Therefore, an effective emergency preparedness program is necessary and was developed by the Technical Advisory Group as part of the overall program. The transportation safety program is described below.

## High-Quality Drivers and Carrier Compliance

The U.S. Department of Transportation sets standards for drivers of trucks that carry hazardous cargo. The DOE, recognizing the unique hazards posed by some radioactive materials and a heightened public interest in

radioactive material shipments, agreed to go beyond minimum federal requirements for WIPP drivers and carriers. The DOE adopted rigorous driver and carrier performance requirements to ensure that only high-quality drivers and vehicles are used for WIPP shipments.

All drivers must have extensive, accident-free experience and are tested for drug and alcohol abuse. Regular safety audits are conducted by DOE and/or the carrier's host state to ensure that drivers and carriers are in compliance with all regulations and contract requirements.

## Safety Inspections

All transuranic waste shipments are inspected by state personnel using standardized enhanced truck safety inspection requirements. These inspections take place before the trucks leave the DOE sites and periodically along the

route to ensure that the trucks are consistently in top working condition. The comprehensive inspection includes brakes, tires, lights, turn signals, cask tie-downs and many other mechanical items. Drivers' logs are checked to ensure they have not been behind the wheel for a longer period than allowed. Radiation surveys of the shipping containers are taken to ensure radiological standards are met. The state inspectors conducting these surveys are trained and certified by the Commercial Vehicle Safety Alliance, a North American organization of commercial vehicle inspection agencies. The inspection requirements for WIPP shipments are more stringent than for most other hazardous material shipments.

## Bad Weather and Road Conditions

The states and DOE have agreed on procedures to monitor weather and road conditions so transuranic shipments can avoid particularly hazardous driving conditions. Shipments do not depart DOE facilities if they are likely to encounter severe weather. If any of more than a dozen National Weather Service "watches" or "warnings" are in effect, such as a Winter Storm Warning or a Dense Fog Advisory, the shipments do not depart – even though the freeway may be open and other truck traffic is moving. Shipment schedules also avoid places and times where there is heavy traffic, such as a rush hour, major metropolitan areas and holiday weekends

## Safe Parking

If shipments encounter unexpected bad weather or road conditions, the drivers either proceed to a pre-selected safe parking area or select a safe parking area based upon criteria developed by the states. Some states have identified specific safe parking areas, such as ports-of-entry and state highway department facilities. The U.S. Department of Defense also has a memorandum of understanding with DOE, which allows federal military facilities along the routes to be used as safe parking areas.



**Emergency responders participate in a training exercise involving a simulated WIPP shipment.**

## Advance Notice of Shipments/ Access to Shipment Status

All transuranic waste shipments are monitored and tracked through a satellite system called the Transportation Tracking and Communications System (TRANSCOM). States have constant and direct access to this system. TRANSCOM displays schedules of upcoming shipments and provides near real-time tracking and status updates of shipments on the road and contains immediate emergency response guidance information. TRANSCOM also supports two-way satellite communication between the drivers, the carrier and DOE.

## Highway Routing

The routes used are predominantly Interstate highways. Shipments use beltways around urban areas, when available. The DOE selected routes early in the process and committed to directing the WIPP carrier to use these routes. This early route selection allowed states to focus their training efforts along those routes. To comply with U.S. Department of Transportation regulations, the states have also designated alternate routes, which they believe will enhance the safety and security of shipments.

## Security Plan

Since the events of September 11, 2001, the Technical Advisory Group has worked with the DOE to develop and implement enhanced security protocols that help ensure shipments are better protected from terrorist attack.

## Emergency Response Plans and Procedures

A well organized, coordinated effort is needed to make response to an accident swift and effective. Plans and procedures have been developed that are, specifically designed to deal with transportation incidents involving the WIPP shipments.

## Training

The DOE and states provide training to state and local emergency response and medical personnel along the WIPP shipping routes. Those trained include: firefighters, police, emergency medical staff, highway crews and other potential first responders. Training is supplemented with drills and exercises; each year, at least one of the Western States participates in a WIPP training exercise (WIPPTREX) where a WIPP related incident is simulated. These events enable both the DOE and the states to continually assess and improve emergency preparedness.

## Emergency Response Equipment

Radiation detection and personnel protective equipment have been provided to emergency responders and hospitals along the shipping routes to allow for an adequate response and assessment in the case of an incident. Training is also provided by DOE and the states on the operation and use of such equipment.

## Medical Preparedness

Emergency medical personnel along the routes have received training. This includes emergency medical technicians and paramedics who may respond to an accident scene and hospital emergency room personnel who may be required to treat accident victims. Accordingly, hospital radiological plans and procedures have also been developed and refined. Emergency medical personnel also participate in the drills and exercises previously described.

## Program Evaluation

The states conduct a comprehensive review of the effectiveness of the entire transportation safety program every two years. The most recent review, which was completed in 2007, concluded that the system "continues to be a successful system for safely transporting transuranic waste to WIPP."

## Proven Safety Program

More than 6,400 shipments of transuranic waste have been transported safely to New Mexico from eight DOE sites. There have been a few minor accidents involving these shipments, but no accident that resulted in a release of radioactive materials. That's not to say more serious accidents can't or won't happen, but the safety record of the shipments to date for this campaign demonstrates that the stringent protocols, principles, and procedures developed and implemented under the program have been followed. Both the states and DOE are committed to ensuring these protocols, principles, and procedures will continue to be adhered to throughout the entire campaign.

## To Learn More

For more information, contact the following:

### Western Governors' Association

303-623-9378

<http://www.westgov.org/wga/initiatives/wipp/radwaste>

### WIPP Site

WIPP Information Center  
U.S. Department of Energy  
1-800-336-9477

<http://www.wipp.energy.gov/>

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