

THE WIPP TRANSPORTATION SYSTEM: DEDICATED TO SAFETY*

T. Ward
Westinghouse Electric Corporation
WIPP Project
P.O. Box 2078
Carlsbad, NM 88221
V. Daub and M. McFadden
U.S. Department of Energy
WIPP Project
P.O. Box 3090
Carlsbad, NM 88221

ABSTRACT

When developing a transportation system to transport TRU waste from ten widely dispersed generator sites the Department of Energy (DOE) recognized and addressed many challenges and first-of-a-kind aspects. Shipments of waste to the Waste Isolation Pilot Plant (WIPP) were to cover a twenty-five year period and utilize routes covering over twelve thousand miles in twenty-three states. Enhancing public safety by maximizing the payload, thus reducing the number of shipments, was the primary objective. To preclude the requirement for overweight permits, the DOE started with a total shipment weight limit of 36,287 kilograms and developed an integrated transportation system consisting of a Type "B" package to transport the material, a lightweight tractor and trailer, stringent driver requirements, and a shipment tracking system referred to as "TRANSCOM."

INTRODUCTION

The DOE has developed a first-of-a-kind transportation system, which consists of a total transport package that includes a Nuclear Regulatory Commission approved Type "B" container, a lightweight tractor, a custom designed trailer, specially-trained drivers, and a shipment tracking system. In the development effort, the DOE has been exceptionally sensitive and responsive to public concerns and the need for safety in the transport of transuranic waste to the WIPP site. Included are measures taken in the development of the transport system that meet or exceed all existing requirements, and in the interest of public safety incorporates all precautionary measures possible.

THE APPROACH

To prevent the need for special permits, the DOE started with a from-the-ground-up approach and developed an integrated total "transportation system" (container, tractor, trailer, drivers, and tracking system) with a weight limit of 36,287 kilograms. The container was designed to maximize capacity and required a custom designed and field-tested trailer. Total weight constraints also required a lightweight custom-built tractor, as shown in Fig. 1.

In addition to the transport package, the DOE analyzed all existing requirements and public concerns in the development of its transportation system. As a development and operating philosophy, safety and security of the shipments took priority over cost and schedule. The product is not time sensitive in arriving at its destination. Driver com-

pensation is based upon miles completed and on hourly rates when not driving. By specific design, there is no driver incentive to drive in other than a safe manner.

TRACTOR

To maximize safety and driver comfort, tractor characteristics and capabilities were studied and a unique lightweight tractor was specially tailored as part of the transportation package. A weight limit of 8,165 kilograms was established for a conventional sleeper-type tractor. Actual weight, including fuel, spare tire, tire chains, and drivers is 8,146 kilograms. Tractors are dedicated to WIPP shipments only and are subject to strict inspection and maintenance requirements. By contract, the carrier can not exceed a two percent downtime rate and is required to have an eight-hour enroute tractor replacement capability. Enroute inspection of the tractor, trailer, and container tie-downs is required every two hours or 185 kilometers. For example, these inspections coupled with pre-trip, post-trip and potential port-of-entry and weigh scale inspections incurred enroute equate to 74 possible inspections on a round-trip from the WIPP to the Hanford, Washington site.

DRIVERS

Like the tractors, drivers are dedicated to WIPP shipments only. Shipments are driven by veteran drivers who have completed extensive screening and training prior to being deemed qualified for TRU waste shipments. In selecting a contract carrier, the DOE reviewed existing Department of Transportation (DOT) driver requirements for the

* Work supported by the U.S. Department of Energy Assistant Secretary for Defense Programs Office of Defense Waste and Transportation Management, under DOE Contract No. DE-AC04-86AL31950.



Fig. 1. Total "Transportation Package".

transport of radioactive material and chose to exceed them. In the final carrier selection process, the DOE selected a carrier whose driver requirements exceeded both DOT and DOE requirements.

Transuranic (TRU) waste drivers must be at least 25 years of age, have at least 185,300 kilometers experience with tractor trailers, have two years of uninterrupted experience within the last five years as a tractor trailer driver, have no moving violations or chargeable accidents in the past three years, be U.S. citizens, submit to substance abuse testing in accordance with DOT guidelines, pass a road test and undergo a driver profile examination. Drivers who meet these qualifications receive further training provided by the DOE's Transportation Safeguards Academy utilizing the specific transport vehicle, "loaded" to its maximum anticipated weight. Drivers were trained on mountainous, flat, rural, city and interstate routes, as well as training on sabotage, protestors, adverse weather conditions, emergency braking, rollover prevention and use of radiation detection instruments. After successful completion of this course, drivers also undergo an annual recertification and are subject to severe penalties for safety violations.

Driver penalties include:

- Deviation from route

- First time - Written warning and two weeks leave without pay
- Second time - Termination
- Failure to maintain adequate records
 - Same as above
- Failure to maintain constant surveillance
 - Termination
- Chargeable accident
 - Termination
- Moving violation
 - Termination

TRAILER

In the search for the safest trailer, air-ride and spring-ride trailers in tandem and split axle configurations were reviewed, built, and tested to determine the optimum design. Safety, weight, durability and stability were prime considerations in selection of the fleet model: an air-ride, split-axle lightweight trailer.

SHIPMENT MONITORING

A unique shipment monitoring capability is accomplished by a satellite-based tracking system referred to

as TRANSCOM. Via a personal computer and modem, the system provides the WIPP site, the Oak Ridge National Laboratories TRANSCOM Control Center (TCC), shippers, states and Indian tribes with the ability to monitor the location and status of all WIPP shipments twenty-four hours per day. The WIPP site, TCC and shippers also have a two-way satellite communication capability, as well as mobile phone communication with the shipments. In addition, all users of the TRANSCOM system have access to emergency information, advance shipment schedules, and a bill of lading for each shipment.

WEATHER

To further ensure safety, shipment monitors at the WIPP site also keep abreast of enroute weather conditions via "The Weather Channel" and a commercial PC-based weather system, KAVOURAS, which provides hourly updates of weather along TRU waste routes. Information available includes: trucking hazards at present, for the next 24 hours and the next three - five days; route conditions citing visibility, weather (rain, sleet, snow, etc.); snow depth; wind direction; and velocity. Additionally, the monitor has access to the drivers, state and local law enforcement agencies, and the shipping site traffic managers in order to make

a rational decision regarding shipments that may be affected by inclement weather, which is illustrated in Fig. 2.

SAFE PARKING

Should the need arise for a safe temporary parking area, the DOE has entered into an agreement with the Department of Defense (DOD) to allow temporary parking of its TRU waste shipments at military installations along the TRU waste routes if the situation merits.

SUMMARY

Components of the system that contribute to safety and efficiency are:

- Maximizing payload and reducing shipments
- Exceptionally strict maintenance requirements for tractors and trailers
- Frequent vehicle inspections
- Use of highly skilled and trained drivers
- Constant shipment surveillance
- Twenty-four hour per day satellite-based shipment tracking and communication capability
- Mobile telephone unit
- Continuous monitoring of the weather along the routes

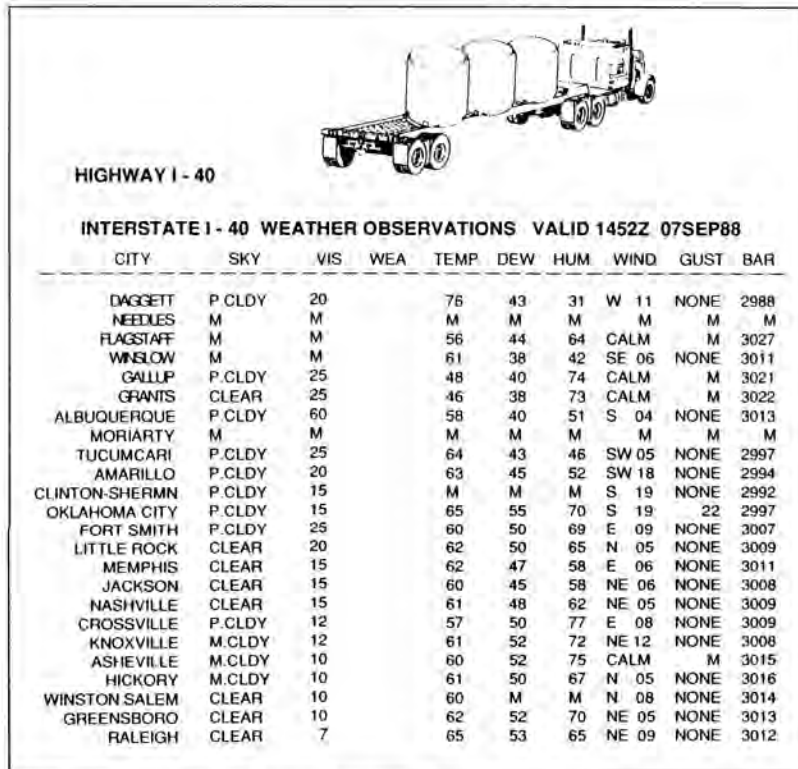


Fig. 2. TRU Waste Route Weather.

- Use of DOD safe parking areas
- Strict adherence to prescribed routes and speed limits

RESULTS

The DOE has developed a radioactive material transport package and system for the WIPP shipments that maximizes safety and efficiency while addressing public concerns. In June of 1989 the National Academy of Sciences 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." (1)

REFERENCES

1. National Academy of Sciences, "Draft Plan for the Waste Isolation Pilot Plant Test Phase: Performance Assessment and Operations Demonstration," Review Comments on DOE Document DOE/WIPP 89-011 (June 19, 1989).