

The WIPP Transportation System - "Safer Than Any Other"

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ABSTRACT

The Department of Energy (DOE) has developed an integrated transportation system to transport transuranic (TRU) waste from ten widely dispersed generator sites to the Waste Isolation Pilot Plant (WIPP). The system consists of a Type B container, a specially designed trailer, a lightweight tractor, the DOE TRANSCOM satellite-based vehicle tracking system, and uniquely qualified and highly trained drivers. The DOE has demonstrated that this system is ready to transport the TRU waste to the WIPP site efficiently and safely. Since the system was put in place in November 1988, it has been repeatedly upgraded and enhanced to incorporate additional safety measures. In June of 1989, the National Academy of Sciences (NAS) 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" (emphasis added). The NAS conclusion was made before the DOE implemented the Enhanced Driver Training Course for carrier drivers. The challenge facing the DOE was to examine the transportation system objectively and determine what additional improvements could be made to further enhance safety.

INTRODUCTION

The DOE has developed a first-of-a-kind transportation system. Included is a total transport package which includes a Nuclear Regulatory Commission approved Type B container, a lightweight tractor, a custom-designed trailer, specially trained drivers, and a satellite-based 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. Having established the system and demonstrated its readiness to transport TRU waste to the WIPP site the DOE stepped back and sought areas to further enhance safety.

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MASTER

THE APPROACH

With the transportation system components on hand, the next step was to look at each one and seek areas of improvement. This analysis resulted in improvements in the tracking system; communications; the driver qualification, selection; and training process; transfer of tracking system to a replacement vehicle; placard visibility; and TRUPACT-II recovery procedures.

TRACKING IMPROVEMENTS

The previous tracking system utilized a commercial service which employed the use of Loran-C towers to assist in locating a vehicle. The accuracy of this system was highly dependent upon the density of Loran-C towers along the carrier routes. On some routes the location accuracy was acceptable; in others (e.g., Wyoming) it was intolerable. On occasion the system would "lock up" due to insufficient signal input. Weather and terrain seemed to influence vehicle location also. Under certain conditions the system failed or provided errors of eighty (80) miles from known vehicle location.

With the announcement that dual satellite tracking testing was complete and commercially available, the WIPP vehicles were the first within DOE to upgrade to the new technology. Results were impressive. Accuracy has been demonstrated to be within 500 feet. Vehicles which were known to be following each other were displayed as overlapping icons on the operators PC monitor; this also was the case for vehicles parked side by side. Weather and terrain are no longer a factor. The tracking system could not be better.

DRIVERS

Driver qualifications already far exceeded DOT requirements, and penalties for violations were 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 and termination for the second. To ensure the high quality of drivers currently on hand, a driver peer-review system has been instituted as part of the hiring process and a ninety-day probationary period has been added. To enhance the vehicle maintenance posture, drivers are now required to complete a certified North American Standard Commercial Vehicle Safety Alliance vehicle inspection course. Drivers now have the same credentials as those inspecting them at weigh stations and ports of entry while enroute, and drivers are more attuned to inspection requirements and potential deficiencies in their own vehicle. Pride in their accomplishment is reflected in their display of the "CVSA Certified" pin on their "Dawn Enterprise" hats.

COMMUNICATIONS

The existing Motorola Mini Tac 6000x Universal improved mobile telephone service has been upgraded with a cellular addition including a "follow me roamer." In addition to expanding the cellular capability, clarity has been improved; and instead of guessing which signal the roamer function was locked onto, the driver enters a code as he approaches a new area, and calls made to one location are forwarded to the vehicle's new location.

TRUPACT-II RECOVERY

Previous plans provided for the recovery of a TRUPACT-II in the event it had been involved in an accident and had become dislodged from the trailer. A further refinement was to address the event in which the trailer was damaged but the TRUPACT-II packages were still attached to it. A method has been developed to use nylon slings and cables to transfer the package to a replacement trailer in the vertical position without the use of a forklift or the requirement to weld on stainless steel lifting lugs used when the package is separated from the trailer. This method saves the logistics aspects of finding a large capacity forklift and does not affect the certification of the package. The unique sling required for this operation is carried on the tractor at all times and drivers have been trained in this procedure.

TRACKING SYSTEM TRANSFER TO REPLACEMENT TRACTOR

Due to severe vibration problems and resultant component failure encountered by placing the tracking system on the gooseneck portion of the TRUPACT-II trailer, the system was moved to the roof of the tractor. This provided a lower profile and has resulted in no additional component failures. In the previous configuration, transfer of the tracking system to a replacement tractor, should it be required, was extremely time consuming. In the new configuration, four nuts are removed from the mounting bracket; and four replacement bolts are epoxied onto the roof of the replacement tractor. Set-up time for the epoxy is approximately 20 minutes, and subsequent removal is done by using a soldering iron which quickly releases the bolts. In this manner tracking and communications capabilities are not lost.

WEATHER

The DOE was already committed to monitoring "The Weather Channel" on a twenty-four hour per day basis and was making use of a PC-based weather system which provided TRU waste route specific weather information which was updated hourly. Operators also have a national directory of law enforcement agencies should they choose to check out local conditions. A further refinement of this was to incorporate state recommended weather protocol procedures which enabled the DOE to benefit from state knowledge of prevailing weather conditions or known highway impediments. Procedures now include provisions for receipt of information from states and relay of this information to the drivers so that appropriate precautions may be taken. In a similar manner, the route plans provided to the drivers will contain the known hazardous areas along the route so they will be aware of particularly dangerous areas.

PLACARD VISIBILITY

The Federal Code of Regulations pertaining to transportation allows for the use of reflective or retroreflective materials providing proper color codes are used. Following a recommendation made by the Oregon Hanford Advisory Committee reflective placards were custom made and installed on all WIPP trailers. Coincidentally, the reauthorization of the Hazardous Materials Uniform Transportation Safety Act on November 16, 1990 contained provisions addressing the use of reflective placards.

FUTURE

In the future, attention will be directed toward load management. The DOE is exploring the use of load sensors with a tractor cab read out capability. This will enable drivers to ascertain whether they are still within the legal 80,000 pound limit prior to departure. It will also facilitate load management with respect to maximizing payload by showing that perhaps more weight can be added thus reducing the number of trips required and enhancing transportation safety.

While in production, the DOE realized that incorporation of self-adjusting slack adjusters on the TRUPACT-II trailer brakes would enhance safety. Further investigation revealed that it would be less expensive to retrofit the trailers than make a change during the initial production run. This remedy is currently being implemented.

When replacement tractors and trailers are needed, the DOE will require antilocking brake systems on both. Additionally, transparent armor is being considered for the tractor windshield.

The DOE will continue to explore the transportation world and incorporate those features which contribute to safety.

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