WIPP TRU WASTE TRANSPORTATION
A CIRCLE OF SAFETY

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ABSTRACT

To support the mission of the Waste Isolation Pilot Plant (WIPP), the U.S. Department of Energy (DOE) and its management and operating contractor, the Waste Isolation Division (WID) of Westinghouse Electric Corporation, required a transportation system that would meet regulatory requirements and address the issues and concerns of the various stakeholders. The transport system is designed to transport 20,000 or more shipments of contact handled, radioactive, transuranic (TRU) waste over a thirty-five-year period in a safe manner. The system must also meet or exceed all safety requirements. To achieve this objective, the DOE and Westinghouse worked closely with the Western Governors' Association (WGA), the Southern States Energy Board (SSEB), the Indian tribes, and outside agencies to identify their concerns on the transport of radioactive material. Using the various inputs, the DOE and Westinghouse built a transportation system that has set standards for the transportation industry. The system incorporates an integrated equipment design, highly qualified drivers, training for emergency response personnel, and testing and evaluation of both equipment and personnel. Each portion of the system is like the arc of a circle. By connecting the arcs, a "circle of safety" is made around the transport of TRU wastes.

I. CIRCLE OF SAFETY

A. Equipment

The DOE and WID began building the TRU waste transportation system in 1988. The bases for the system are safety, regulatory compliance, maximization of the payload to minimize the number of shipments, and meeting the concerns of the states, Indian tribes and general public. A U. S. Nuclear Regulatory Commission approved Type B, double-containment packaging was required as the payload would include plutonium materials in excess of 20 curies. To maximize the payload a new generation of packaging was required as previous lead shielded casks simply would not allow volumetric transport at legal highway weights. From these requirements the Transuranic Packaging Transporter (TRUPACT-II) evolved. To further maximize the payload, a single purpose, minimum weight trailer (± 10,000 lbs.) was designed for transport. The last component of the maximum payload is a conventional, lightweight tractor (max. 18,000 lbs.). This first arc of the transportation program was thoroughly tested and is maintained under a rigorous maintenance and inspection program.

B. Emergency Response Knowledge

The second concern to be addressed was the knowledge/experience level of the emergency response teams along the routes to the WIPP site. The DOE, in working with the states and Indian tribes, agreed to provide training to the first responders along the routes. The States Training and Education Program (STEP), provides training in Emergency Response Actions, hazardous constituents, the incident command structure, incident mitigation and medical management. This program has given the first responders a greater appreciation, not only of TRU waste, but of all hazards involved in transportation accidents.

C. Driver Requirements

The individual behind the wheel was the third arc to be considered. In addition to the Federal Motor Carrier Safety Requirements, the driver must be at least 25 years of age, have at least 100,000 miles in a tractor-trailer unit, and have at least two years of uninterrupted semi-tractor and trailer commercial driving experience in the last five years. The contract carrier also requires that the drivers have no chargeable accidents or moving violations within three years prior to application and while performing their duties under the contract. To enhance the driver's knowledge,

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additional training was given in the use of radiation-detection instruments, specific hazards of the payload, media training, and recovery of the packaging. The drivers were also sent to a decision driving course. This training includes braking control, skid control techniques, cornering, serpentine maneuvers, evasive action, jackknife control and recovery. The drivers are evaluated on their ability to make the correct defensive driving decision in staged situations on the special test course.

D. System Performance

The fourth and final arc is the verification of the system performance. The DOE conducts exercises with the states and Indian tribes to test response to incident/accident scenarios. These scenarios have two levels of involvement. One level concentrates on the state and local emergency response and medical teams, the DOE Albuquerque Operations Office and the Carlsbad Area Office. The second level includes these units and adds the DOE Headquarters Emergency Operations Center and other federal emergency response agencies. Each exercise is staged to provide the maximum training to and evaluation of the participants.

II. RESULTS

A. National Academy of Sciences

The early result (1989) of this circle of safety was an acknowledgment by the National Academy of Sciences that: "The system proposed for the 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]

B. Carrier Accomplishment

Since that early acknowledgment, the TRU transportation carriers have made approximately 250 shipments covering more than 900,000 miles. Not one vehicle has been involved in an accident. Not one citation, commercial or personal, has been issued against the drivers. The carrier has been audited by the Department of Energy; WID; NM Motor Transportation Division; Colorado State Patrol, Hazardous Materials Division; and the U.S. Department of Transportation. Through each of these audits the carrier was commended for their performance and superior quality of personnel. As the miles and shipments increase, the benefit of the high standards and increased training levels is realized. That realization is that the WGA, SSEB and other stakeholders accept the TRU carrier and that DOE is not having to defend the safety of the transportation system. The system has proven itself.

C. States Training and Education Program

The STEP has enjoyed success in parallel with the transport system. The STEP has grown from emergency response training for local responders, to include training for county and state health agencies. A further outgrowth of the STEP program, is a greater involvement in increased levels of training at the state and Tribal levels, especially at state sponsored hazardous materials conferences. Many of the students extend invitations to WIPP to make awareness presentations to their respective private and public groups. As funding is available, WIPP supports these requests.

D. Emergency Response Exercises

In the past five years the TRU transportation system has conducted 10 integrated exercises with the states and Tribal nations. The first exercise, Transportation Accident Exercise (TRANSAX-90), involved participants from the local area (Colorado Springs), the host state (Colorado), DOE and contractor personnel from the WIPP Site, DOE-Albuquerque, DOE-Headquarters, and the Federal Emergency Management Agency. One of the lessons learned from this exercise was that more emphasis was needed on the response at the state and local level. This gave birth to WIPP Transportation Exercises (WIPPTREX). Both exercise programs utilize scenarios based on real transportation incidents. The demand for these exercises is growing due to the value received by the various agencies. Due to total cost, TRANSAXes are conducted approximately every other year. To accommodate states needs and requests, WIPPTREXes are currently conducted at the rate of two per year. Each exercise is fully critiqued and a written report is available for reference. One of the strong common threads of the exercises is the strengthening of contacts at the local, state, and federal levels.

III. SUMMARY

The transportation system developed by the DOE and the various stakeholders is now a standard of the transportation industry. This is evidenced by the WGA's imposition of the TRU transportation system principles on the recent Cesium shipping campaign. The WGA has also indicated that they will impose these same TRU principles on the upcoming spent fuel shipping campaigns.

ACKNOWLEDGMENTS

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REFERENCE

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