The Advantages of Dedicated Train Service for Rail Shipments to the U.S. Department of Energy Waste Isolation Pilot Plant (WIPP)

Introduction

The objective of the Western Governors' Association (WGA) Radioactive Waste Transportation Safety Program is the safe and uneventful transport of radioactive waste from temporary storage facilities to more suitable treatment and storage facilities. Western Governors recognize development of a successful transportation program requires cooperation among the Western states, the U.S. Department of Energy (DOE), its carriers, and the U.S. Department of Transportation.

The WIPP highway shipping campaign has proceeded in a safe and uneventful manner since WIPP began accepting transuranic waste in March 1999. The success of the WIPP campaign is directly attributable to the cooperative effort between DOE and the Western states to plan, develop and implement the WIPP Transportation Safety Program. This program addresses both accident prevention and emergency response. The Western Governors expect that DOE will fulfill the commitment to follow these procedures for the transport of all transuranic waste through Western states.

The highway transportation safety and information program developed between the Western states and the DOE for the shipment of transuranic waste to WIPP is a model and shall serve as a guide for developing a program suitable for planned rail shipments to WIPP. To achieve the same high standards in its rail shipping campaign that have been achieved for truck shipments, DOE must use dedicated trains.

Background

DOE has initiated planning to ship transuranic waste to the WIPP site in New Mexico by rail. Waste would be shipped in TRUPACT-II containers on flat-bed rail cars (cask cars). Each cask car could hold up to seven TRUPACT-II containers. A typical shipment would consist of up to three cask cars and two buffer cars. DOE proposes to make at least 1,700 shipments of more than 4,400 rail cars over a 33-year time frame.

General commerce and dedicated trains are two types of rail service available. General commerce trains, also referred to as regular trains, comprise the majority of rail traffic today and travel set routes on one carrier's tracks at a regular schedule (WIEB 1995). General commerce trains, also referred to as regular trains, represent the majority of rail traffic. Regular trains carry all kinds of goods, including hazardous materials. They stop at rail yards and sidings along the way to add or remove cars. The schedule for a shipment made by regular train is dependent on the carrier's timetable, which may result in shipments being delayed en route waiting for the next train traveling in its direction.

A dedicated train is a train that carries only one commodity from origin to destination, stopping to refuel, to change crews, and, if more than one carrier is required, to change locomotives. Dedicated trains are usually considered to be a subset of regular trains service that is characterized by homogeneity of the cargo (WIEB 1995, DOT 1998). Because all the cars in a dedicated train are traveling to the same destination, dedicated trains usually bypass classification yards. Layover times en route are usually minimal which may result in much shorter travel times for the goods being shipped by dedicated train.

DOE has announced its intention to use "general commerce" service for these shipments. By opting to use "general commerce" trains, DOE ignores the safety and security enhancements of the WIPP Transportation Safety Program that should be implicated through the use of dedicated trains.

Rail Transportation Safety Program

DOE's proposal to ship by general commerce service, or regular trains, would severely limit the ability of DOE and the Western states to reasonably adapt the highway safety program to rail. As demonstrated by the highway transportation safety program, a successful transportation safety program must focus on the states' prominent role in the areas of planning, evaluating routes, ensuring shipment equipment and crew safety, preventing accidents, preparing emergency and medical response teams, and informing the public.

Program elements of particular concern with regular train service for the shipments include carrier compliance, inspections of track and equipment, avoiding bad weather and track conditions, shipment tracking, shipment routing, and security. The advantages of using dedicated trains to implement these elements of the transportation safety program are shown in the attached table.

Accident Avoidance

The use of dedicated trains is an option that greatly enhances safety, similar to the enhanced safety achieved for highway shipments though the use of a dedicated contract carrier. The majority of railroad accidents (52%) occur in classification yards (DOT 2002). Dedicated trains bypass classification yards, hence avoiding the most likely location for accidents to occur.

Human factors are the primary cause of railroad accidents (36%). Most of the accidents caused by human factors (82%) are related to activities in classification yards (DOT 2002). Use of dedicated trains, which bypass classification yards, would significantly reduce the risk of accidents from human factors.

Equipment defects on rolling stock are the primary cause of 14% of railroad accidents (DOT 2002). The use of dedicated trains would allow all of the rolling stock in a shipment to be

inspected prior to the shipment, reducing the probability of equipment failure causing an accident.

The use of dedicated trains would also create the opportunity to use improved technology developed by the rail industry, such as electronically controlled pneumatic brakes. These brakes allow all of the brakes in the train to be applied instantaneously. The electronic control signal for these brakes would also allow the use of defect detection technology to be used on the train, significantly reducing the potential that equipment defects would cause an accident.

Most train accidents involve only one train, but frequently involve many of the railcars in the train. An accident involving general commerce trains, which carry many types of goods including other hazardous materials, can pose serious problems for emergency responders and recovery crews. A single train accident involving a dedicated train, however, would involve fewer cars and no other hazardous materials other than the transuranic waste.

Security

Dedicated trains would greatly enhance security of the shipment. Dedicated trains would only stop for fueling and crew changes. For shipments in general commerce, however, the cask cars would be held in classification yards or sidings for indefinite periods waiting to be added to another train.

Conclusion

The option of using dedicated trains allows for significant safety and security enhancements to rail shipments of transuranic waste to WIPP when compared to regular trains (general commerce service). Many of these transportation safety enhancements that meet or exceed the safety and security requirements, which are used in the highway shipping campaign, cannot be put in place for rail shipments if they are made by regular trains. This is particularly true for the inspection of equipment and the application of the "defect free" criteria used for truck shipments. The use of dedicated trains for WIPP shipments should be required to achieve the goals of the transportation safety program.

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