Introduction

Western Governors' Association WIPP Transportation Safety Program

The Waste Isolation Pilot Plant (WIPP) shipping campaign will include over 19,500 transuranic waste shipments to the WIPP repository in southeastern New Mexico during its 30-year operational life. These shipments, originating at five major DOE sites and various smaller sites throughout the United States, will traverse 30 states and the lands of at least 11 sovereign tribal governments. Because of the large number of shipments, the considerable mileage to be logged, and the hazardous nature of the cargo, every reasonable precaution must be taken to ensure adequate protection of public health and the environment. Moreover, public confidence in the safety of the WIPP shipping campaign requires the highest standards for incident prevention and emergency preparedness.

Recognizing that corridor states have the responsibility for ensuring the safety of their residents and for responding to any incident which might occur, Western Governors have unanimously adopted several related policy resolutions addressing the safety of the WIPP shipments. The objective of these resolutions is the safe and uneventful transportation of nuclear waste from current temporary storage facilities to more suitable interim or permanent repositories. Western Governors are committed to working with Congress and the DOE to achieve this objective.

In 1989, the WGA established its Technical Advisory Group to work toward achieving this objective. The Technical Advisory Group originally consisted of representatives from seven Western states along the initial transportation corridor to the WIPP: New Mexico, Colorado, Wyoming, Utah, Idaho, Oregon, and Washington. The Technical Advisory Group was later expanded to include Arizona, California, Nebraska, Nevada, Texas, and Wyoming, Western states through which inter-site shipments or shipments to the WIPP will also occur.

Initial funding was provided by a 1988 Cooperative Agreement with the U.S. Department of Transportation (DOT). In 1989, the Technical Advisory Group prepared a *Report to Congress* describing the needs of the Western states to prepare for the WIPP and intersite shipments in the following areas:

- Accident Prevention
    - High–Quality Drivers and Carrier Compliance
    - Independent Inspections
    - Bad Weather and Road Conditions
    - Safe Parking During Abnormal Conditions
    - Advance Notice of Shipments
    - Access to Information on Shipment Status

- Emergency Preparedness
    - Mutual Aid Agreements
    - Emergency Response Plans and Procedures
    - Training and Retraining
    - Emergency Response Equipment

- Public Involvement and Information

The Secretary of Energy agreed with the conclusions in the 1989 *Report to Congress* and directed the DOE to enter into a Cooperative Agreement with the WGA. Working with DOE, Western states developed a model program to help ensure that the transuranic waste shipments are "safe and uneventful." The elements of this program are described in this Guide, and generally follow the outline from the *Report to Congress*. The Technical Advisory Group updated the *Report to Congress* with a 1991 *Report to the Western Governors and Secretary of Energy*. The Technical Advisory Group identified Medical Preparedness and Highway Routing as additional areas to be addressed. These are included in this Guide.

In 1995 and again in 2003, Western corridor state Governors and the Secretary of Energy signed a Memorandum of Agreement to implement the principles and standards contained within this Guide. These principles and standards are designed to help achieve the Governors' objective of the "safe and uneventful transportation of nuclear waste" through the Western states. They were cooperatively developed by Western corridor states, the DOE-CBFO, and the DOE Headquarters.

In 2004, the Technical Advisory Group prepared a *Report to Western Governors on the Status of the WIPP Transportation Safety Program*. The Report attributed the success of the first five years of the transuranic waste shipping campaign to the comprehensive transportation safety program that Western corridor states and the DOE had jointly designed and implemented. In addition, the Report identified several lessons learned from the first five years of shipments that the Technical Advisory Group believe are indispensable to a successful radioactive waste shipping campaign. These include: engaging in collaborative problem solving among Western corridor states and with the DOE and maintaining high standards throughout the shipping campaign.

Each section of the Guide contains a summary statement describing the issue, the objective, the approach, and the evaluation process used by the DOE and Western corridor states for each program element. A summary table which provides information about the key documents and associated reference materials is included at the end of each section. A copy of all documents and reference materials referred to in the summary tables is maintained at the WGA offices in Denver, Colorado.

Transuranic Waste

Transuranic wastes are discarded materials that have been generated from activities associated with nuclear weapons production research and development, and decontamination and decommissioning of production facilities, since the 1940s. This waste is contaminated with man–made radioactive materials with atomic numbers greater than uranium, such as plutonium, americium, and curium.

Transuranic waste is officially defined as waste contaminated with alpha–emitting radionuclides, having atomic numbers greater than 92 and with half–lives greater than 20 years and in concentrations greater than 100 nanocuries per gram of waste. The waste consists of things such as laboratory clothing, tools, glove boxes, leaded rubber gloves, glassware, air filters, ash salt metals, ceramic parts, plastics, and solidified waste contaminated with man-made radioactive materials including plutonium and americium. Some of these wastes contain hazardous chemical constituents (*e.g.*, carbon tetrachloride, lead, toluene, xylene) and are classified by the U.S. Environmental Protection Agency (EPA) as “mixed” transuranic waste.

Transuranic waste shipments pose a range of potential hazards with inhalation being the primary hazard. Inhalation of certain transuranic materials, such as plutonium, even in microgram quantities, could deliver significant internal radiation doses to the body. The principal focus of the Technical Advisory Group is to reduce the chance and severity of an incident through stringent transportation safety procedures. There are two classifications of transuranic waste: contact handled (CH) and remote handled (RH).

The greatest percentage of waste planned for disposal at the WIPP site, by volume (96 percent), is CH waste, which primarily emits alpha radiation. This type of radiation cannot penetrate human skin. Therefore, external exposure to alpha radiation from contamination is usually not serious because of the protection provided by the skin. CH waste also emits gamma radiation which results in dose rates at the surface of the waste container of 200 mrem per hour or less and can be safely handled without special protection when in the proper container.

A small percentage (4 percent by volume) of the waste planned for disposal at the WIPP site is RH waste, which primarily emits gamma radiation. This results in containers with a surface radiation dose rate in excess of 200 mrem per hour. These containers are handled by remote means and when in transport are placed in a specially designed transporter which has additional shielding to protect workers, drivers, and the public.

Waste Isolation Pilot Plant

The DOE constructed the WIPP, in southeastern New Mexico, 26 miles east of Carlsbad. The WIPP underground facility, which is 2,150 feet underground in a 2,000-

foot thick salt formation, was constructed as a research and development facility to demonstrate the safe disposal of transuranic waste from the DOE defense facilities and private contractor sites. The waste disposed at the WIPP was generated after 1970 from defense-related plutonium reprocessing and fabrication, and defense-related research activities at the DOE facilities.

Transportation System

Figure 1 - Transport Vehicle with Two TRUPACT-II Containers and One HalfPACT Container.

All waste will be transported either intersite or to the WIPP in U.S. Nuclear Regulatory Commission (NRC) certified Type-B containers under 10 CFR 71. Currently, for CH waste, the WIPP is certified to use two reusable shipping packages. They are the Transuranic Packaging Transporter (TRUPACT–II) and a shorter version called the HalfPACT. A typical shipment consists of one to three TRUPACT–II containers or some combination of up to three TRUPACT-II containers and HalfPACT containers. One configuration of the transport vehicle is shown in Figure 1.

The TRUPACT–II is a cylindrical metal container with a flat bottom and a domed top and is transported in an upright position. A multi–layered wall design increases the package strength and provides the ability to withstand potential transportation incidents. Inside the TRUPACT–II, the CH waste is sealed in 55–gallon steel drums or “standard waste boxes”. Each TRUPACT–II holds up to fourteen 55–gallon drums or two “standard waste boxes”. The loaded TRUPACT–II containers are mounted on specially designed trailers and pulled by conventional diesel–powered tractors. The HalfPACT container is a shorter version of the TRUPACT-II container and is designed to carry heavy material (seven 55-gallon steel drums or 1 “standard waste box”) without exceeding legal truck weight limits as defined by the DOT.

A special container, called a “pipe overpack”, is used to transport wastes contaminated with higher concentrations of plutonium and americium. The “pipe overpack” container has been approved by the NRC and is designed to be placed into another container such as a 55-gallon drum. These are only used within the TRUPACT–II or HalfPACT and cannot be used alone as a transport container.

All RH waste will be transported in a package designed for RH waste. Both the RH-72B and 10-160B have been certified by the U.S. Nuclear Regulatory Commission as a Type B Package for transportation of RH waste. A typical shipment consists of one RH-72B container or one 10-160B container per truck trailer (as shown on the next page in Figures 2 and 3). Cut-away views of all approved TRU waste containers can be found in the included fact sheet on TRU waste containers.

Figure 2 – RH-72B Container Loaded on a Trailer

Figure 3 – 10-160B Container Loaded on a Trailer

In 1988, the DOE awarded a five–year contract to a commercial carrier for truck transportation of transuranic waste to the WIPP. In 1995, a new carrier was awarded the contract, then in 2000, the DOE awarded two separate transportation contracts: one small-business set-aside and one unrestricted contract. All trucking services are provided under a contract, which calls for the carriers to dedicate the trucks and drivers to only their contracts. In March 2007, DOE awarded a new unrestricted contract for WIPP transportation services to CAST Transportation of Henderson, CO. In September, 2007 the small business set-aside contract was awarded to Visionary Solutions of Oak Ridge, TN.

An important feature of the WIPP transportation system is the Transportation Tracking and Communications System (TRANSCOM). TRANSCOM is a combination of navigation, satellite communication and computer network technologies to monitor the movement of transuranic waste shipments either intersite or to the WIPP.

Figure 4 depicts the current and proposed routes to be used for the truck transportation of transuranic waste either intersite or to the WIPP. Alternative routes in the Western states may be designated using the safety considerations and negotiation process contained in Section XII, “Highway Routing of WIPP Shipments.” In selecting these routes, the DOE voluntarily agreed to use applicable DOT regulations (49 CFR 397) normally used for high-level radioactive wastes and spent nuclear fuel shipments. The routes are predominantly Interstate system highways. Where available, shipments will use beltway’s around urban areas. These routes are subject to change since some Western states may designate alternate preferred routes prior to the WIPP shipments crossing into their state.

Figure 4 – U.S. DOE Routes to WIPP (as of July 2008)

The WIPP transportation safety planning to date has been based on the assumption that all waste shipments will be by truck. However, the WIPP is accessible by rail, and the 1992 WIPP Land Withdrawal Act (WIPP LWA) required the DOE to evaluate the feasibility and impacts of shipping transuranic wastes to the WIPP by rail. In 2004, the DOE made a preliminary decision not to go forward with a comprehensive program to transport certain transuranic waste by rail. The DOE concluded that it would be more cost effective to transport the waste by truck. Use of rail would continue to be an option, but only on a case-by-case basis.

Documents	Responsible for Updates	Status
Documents included in Guide		
Land Withdrawal Act (Public Law 102-579 as amended by Public Law 104-201)	U.S. Congress	Final
Western Governors' Association Resolution 06-4, entitled "*U.S. Department of Energy Waste Isolation Pilot Plant (WIPP) and Transportation of TRU Waste*", 2006.	WGA	Final
Memorandum of Agreement Between the Western Governors and U.S. Department of Energy, February 2003.	WGA	Final
Report to Western Governors on the Status of the WIPP Transportation Safety Program, June 2004.	WGA	Final
DOE Fact Sheet: Transuranic Waste Transportation Containers	DOE	Final
Reference material		
WGA/DOE Cooperative Agreement, No. DE–FC04–90AL65416, as amended.	WGA/ DOE	Final
Report to Congress–Transport of Transuranic Wastes to the Waste Isolation Pilot Plant: State Concerns and Proposed Solutions, WGA Working Group on Nuclear Wastes, June 1989.	WGA	Final
Report to the Western Governors and Secretary of Energy, WGA Technical Advisory Group, June 1991.	WGA	Final