# **Nuclear Waste Shipment Logistics**



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#### **Overarching Mission**

The mission of nuclear waste shipment logistics is

to provide the DOE and the public with a safe,

secure and efficient system that addresses loading

at waste generation sites, enroute transportation

and unloading at the receipt facility.

# **The Logistics Challenge**

- Spatial diversity of shipping locations
- Differing waste forms, volumes & loading capabilities
- Varying levels of transportation access
- Challenging transportation operations
- Complex receipt facility interactions





#### **Spatial Diversity of Shipping Locations**



128 sites in 39 states

### **Cargo Waste Forms**



### **Transportation Access - Mode Choice**

- Rail
  - Regular train
  - Dedicated train
- Truck
- Barge
- Intermodal



### **Transportation Access - Route Designation**

#### Highway

- DOT routing regulations
  - Routes are selected to reduce time in transit
  - Vehicles operate over preferred routes
    - Interstate highway system, including bypasses or beltways
    - A state or tribe may designate alternative routes in addition to or in lieu of the interstate system

#### Rail

- There are currently no federal rail routing regulations
- Standard rail industry practices
  - Minimize time, distance, number of carriers, interchange points
  - Maximize use of best track

### **Transportation Operations**

- Permits and fees
- Advance notification
- Inspections
- Escorts
- Tracking & communications
- Safe parking
- Contingencies



### **Receipt Facility Interactions**



#### **Integrated Waste Management System Logistics**



## **Risk Management**

- Safety, Security & Environmental
  - Workers
  - Affected outside individuals
  - Communities
- Operational
  - Throughput
  - Schedule delays
  - Equipment utilization
  - Implications on safety & security
- Societal
  - Actual
  - Perceived





### **Shipment Experience to Date**

- Roughly 3,000 shipments in the U.S. during the past 30 years
- 738 Navy container shipments, over 1 million miles since 1957
- Average 650 shipments per year in France and Britain
- There has never been a release of radioactive material harmful to the public or the environment





Source: Hank Jenkins-Smith, TEC 2008 presentation

#### **Perceived Risks of Energy Sources**

Considering the risks of normal operations and potential accidents, how do you rate the risks to society and the environment from these sources of energy?



Source: Hank Jenkins-Smith, TEC 2008 presentation

#### Perceived Risks vs. Benefits of Nuclear Energy

How do you rate the overall balance of risks and benefits of nuclear energy in the US?



Source: Hank Jenkins-Smith, TEC 2008 presentation

# Key Takeaway Messages

- Shipment logistics must be viewed in a holistic, integrated manner, with associated interdependencies among key operational components.

There are many different types of risks to consider in order to achieve a safe, secure and efficient system.
Be mindful of the (sometimes unintended) consequences of different waste management strategies in terms of how it influences shipment logistics and vice versa.

- Accomplishing a successful shipment logistics outcome is doable, but requires careful and coordinated planning & implementation.

## **Questions & Comments?**