

# **Introduction to Radioactive Material Inspections of Shipments by Highway & Rail**

# Introduction

**During the recent TSG meeting the word “Trust” was referenced on numerous occasions. Toward the end of the meeting, it occurred to me that with all of the new members of NTSF, now would be a good opportunity to provide a brief overview the mechanisms and protocols currently in place to ensure the safe transportation of radioactive Shipments, whether by Rail or Highway. Thus, fostering an environment of “Trust”**

# Objective

**Provide a basic overview & understanding of the processes involved in ensuring the safe transportation of Radioactive Materials and Waste by Highway & Rail**

# Reality

**On any given day, various types of Radioactive materials are being transported by Rail and Highway.**

# Types of Radioactive Materials

- **HRCQ**
- **Quantity of Concern (QC)**
- **LSA/SCO**
- **Radiopharmaceuticals**
- **Uranium Hexafluoride (UF<sub>6</sub>)**
- **LLRW**
- **HLW**
- **SNF (limited)**

# Types of Radioactive Materials

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➤ **HLW**

➤ **SNF**

# Topic Focus

**For today's presentation we are going to focus on High-Level Radioactive Material and Waste (HLW).**

# Communication is Key

**Before we dive into the inspection processes it is necessary to understand the role that effective and accurate communication between all stakeholders plays in ensuring the safe transportation of RAM/HLW across our great Nation.**



# Communication is Key

For obvious safety and security reasons the movement of High-Level radioactive material and waste (HLW) is closely monitored. The vast majority of these higher-level shipments require *advance notification* to the individual States that are impacted by the shipment's movement from its *Point of origin* all the way to its final destination.

# Advance Notification basics

**Who – Governor’s Designee**

**What – Category dependent (Cat.1,Cat.2,HRCQ)**

**When – With in 4 days of entering jurisdiction.**

**Why – to provide impacted states with important information needed to determine appropriate inspection and/or response measures in the event of an incident.**

**The Planning Guide is an Excellent resource to find out more information about this process.**

# Advance Notification specifics

Specific information for shipments that are subject to the advance notification requirements Can be found in:

*10CFR Part 37 subpart D.*

# Why are Inspections Important?

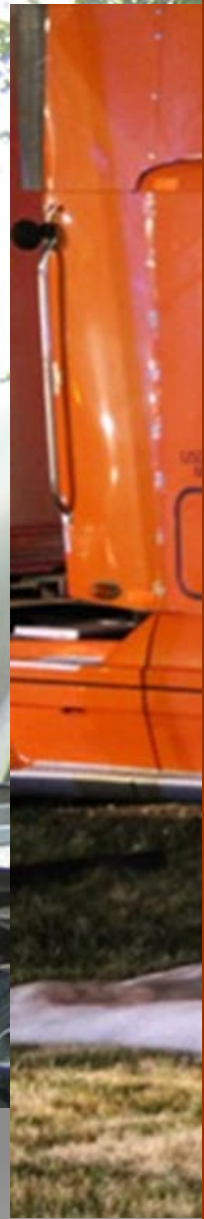
You tell me...





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# Federal Oversight and Authority

Although other entities may become involved for various reasons, there are 3 main Agencies regulating the movement of Hazardous Materials (including radioactive materials) throughout the United States by ground.

FMCSA – Transportation by Highway

FRA – Transportation by Rail

PHMSA – HM Regulations used by all modes of Transportation

**All 3 fall under the U.S. Department of Transportation and are governed by 49CFR.**



# Highway Inspections

(Quick breakdown)

Highway inspections are comprised of Levels & Specialized types based on the vehicle and/or cargo transported.

Most inspections will generally be conducted as ***Level I – III***.

The Specialized Inspection types include: Passenger, Hazardous Material, Cargo Tanks, Other Bulk Packages, and Level VI.

All inspections are conducted under CVSA's North American Standard Inspection program.

# Inspection Levels & Types

**Level 1** – Full inspection (may include HM)

**Level 2** – Full inspection w/o brake measurement

**Level 3** – Driver-only Inspection

**Passenger** – Motor coach, Limo, Party bus

**HM** – All Hazard Classes including Radioactive)

**Cargo Tank/OBP** – Spec. Cargo Tanks, IBCs, etc.

**Level VI** – HRCQ and Transuranics,

# Railroad Inspections

## (Quick breakdown)

By comparison, Railroad Inspections are not based on *Levels*, but rather built on a platform of Disciplines.

During the recent SCCOP presentation we learned that the FRA has 6 Main Disciplines.

# Inspection Disciplines

**Grade Crossing & Trespassing**

**Operating Practices**

**Track**

**Motive Power & Equipment(MP&E)**

**Signal**

**Hazardous Materials**

# Inspector Training (Highway)

**All Inspectors must, at a minimum:**

Be certified to conduct a Level 1 inspection (Certification requires completing a 2-week course, passing a requisite exam, and conducting a min. of 32 Level 1 inspections with a coach)

**Hazardous Materials Inspector:**

Same as above plus;

Complete additional 1 week HM course, pass requisite exam, conduct min. of 16 additional HM inspections with a coach)

**Inspectors must maintain certification(s) Annually.**

# Inspector Training

## (Highway)

### Level VI (Min. requirements)

Be Level 1 and HM certified

Successfully complete 1 week Level VI course  
(must achieve 90% or better on exam to pass)

To maintain Level VI recertification, inspectors must maintain Level 1 and HM certification as well as attend bi-annual Level VI training (minimum of 8 hours by certified instructor)

# Inspector Training (Rail)

## Rail Inspector (Min. requirements)

FRA *Discipline Specific* training may take up to a year to complete. During that time, the inspector/inspector candidate is on probation for 1 year whether they qualify in less than a year.

Hazardous Materials Discipline Inspector candidates must complete the HM 101, 102 & 103 courses prior to becoming certified.

# Inspector Training

## (Rail)

### Rail Inspector (Min. requirements)

Inspector candidates must demonstrate knowledge and applicability of the Rail Regulations, as well as competence in the following areas: Organization, working independently, timely completion of inspections and reports, and the ability to communicate with external persons/customers.

**Journeyman qualification is mandatory when beginning FRA training.**



# Similarities

As indicated earlier, PHMSA is responsible for promulgating the regulations governing Hazardous Materials for the Department of Transportation. Thus, *apart from modal differences*, all transportation of HM (including Radioactive Materials) is subject to the same requirements.

# Similarities

Since both modes of transportation are regulated by the requirements of 49CFR, the inspection process for Trucks & Trains will have a many similarities as well as a uniform approach with an overall goal of safety in mind.

# Inspection Basics

Although fundamentally difference modes of transportation, the inspection process for both Train and Truck can be broken down into 2 Basic Elements:

## Highway

Driver & Documents

Vehicle & Package

## Rail

Conductor & Documents

Rail Car(conveyance) &Package

*\*These are modal terms that mean the same thing\**

# Similarities

## (Driver/Conductor)

### HIGHWAY

### RAIL

**License and  
qualifications**

**CDL/Operators License &  
be Medically qualified**

**Conductor License & be  
Medically qualified**

**Certification &  
Requirements**

**Must have proper  
endorsements(HM, CT,  
etc.) and is subject to  
D&A test requirements  
(49CFR)**

**Must also maintain valid Driver's  
License to have engineer  
certification and is subject to  
D&A test requirements (49CFR)**

**Training**

**Subject to "Hazmat  
employee training" per  
49CFR Part 172 Subpart H**

**Subject to "Hazmat employee  
training" per 49CFR Part 172  
Subpart H**

# Similarities

## (Documents)

### HIGHWAY

### RAIL

#### Documents

- Shipping Papers
  - Route Plan (HRCQ only)
  - “Certificate of training” (HRCQ only)
  - HOS (11/14-Hour Rule)
- Consist/Manifest
  - HOS ( 12 hours on duty time per train crew)

# Similarities

## (Vehicle/Rail car)

### HIGHWAY

(CMV- Truck/Trailer)

#### Vehicle

- Brakes,
- Tires/Wheels,
- Coupling Devices,
- Frames/Suspension
- Lighting

### RAIL

(Rail- Locomotive/Railcar)

- Brakes Systems
- Wheels/Trucks
- Coupling Devices
- Frames/Suspension
- Lighting( applies to locomotive and End of Train Device (EOT))

# Similarities (Package)

## HIGHWAY

## RAIL

### Package

(Survey/Specification)

- Industrial
  - Type A  $\leq A_1$  or  $A_2$
  - Type B  $> A_1$  or  $A_2$
- \*\*\*Package Survey\*\*\***  
(required for Level VI Inspection)

- Industrial
  - Type A  $\leq A_1$  or  $A_2$
  - Type B  $> A_1$  or  $A_2$
- \*\*\*Package Survey\*\*\***  
(Conducted by shipper pre-departure)

En-route Survey **MAY** be arranged thru  
Utility, State & RR at stopping points)

# Location/Scope

Highway Inspections may be conducted for:

## **A variety of reasons:**

Ex. Obvious violations, Imminent danger, Targeted Inspections (announced/unannounced), Cargo Specific Policy (Ex. HRCQ/Passengers)

## **At a variety of locations:**

Ex. Highway, Weight stations, Carrier/Shipper Facility



# Location/Scope

By comparison, Rail Inspections generally occur during preparation for departure.

Enroute inspections may occur during crew changes and/or at switching stations.

These enroute inspections may be limited in scope due to the complexity & size (length) of a train.

# Highway Inspections of Radioactive Materials

As we learned earlier Radioactive Materials are transported by highway almost every single day and many may be subject to a subject to a L1 or L2 Hazmat inspection.

However, Higher Level Radioactive Material/Waste (HRCQ – Transuranics) is subject to a very specific type of Inspection referred to as a **Level VI Inspection.**

# The Level VI Inspection

The Level VI inspection is an enhanced Level 1 with a focus on the additional regulatory requirements for Radioactive Materials, as well as Package survey.

These inspections are conducted by specially trained and certified Inspectors.

# The Level VI Inspection

What does “enhanced” mean?

A CMV transporting a shipment subject to a Level VI inspection (HRCQ or Transuranics) must pass a **Point of Origin** Inspection prior to departing the Shipper’s facility. Once the carrier passes this inspection, they will be issued a CVSA Level VI decal.

In order to receive a CVSA Level VI decal, the inspection must be “**Defect-Free**”.

# The Level VI Inspection

Based on jurisdictional Mandates or Policy, Category 1 or HRCQ shipments may be subject to **Enroute** inspections (which can include Level VI) as they will generally cross through a number of States along the intended route.

# Railroad Inspections

A Rail Hazardous Material Inspection includes a HM documentation inspection in conjunction with a ground level inspection of any HM package on rail for proper markings, labels and any potential leaks.

Inspections of Radioactive Shipment conducted by the FRA will include a more detailed review of package specific requirements for RAM (Part 173 subpart I) well as ensuring compliance with the additional regulatory requirements for Radioactive Materials.

# Rail Inspections

For a variety of reasons, the FRA does not currently have an enhanced Inspection process commensurate to the Level VI inspection for HLW Shipments.

**However**, the SNF Rail/Routing AHWG continues to explore ways to develop such a process that can be folded into the SCCOP.

At present, the framework from which the group is working is based on the “Reciprocal Rail Safety Inspection Protocol”.

# Rail Inspections

## For shipments requiring Advance Notification

Prior to the train crew arriving – FRA and State HM, Operating Practices, and Motive Power & Equipment personnel, Specialized HM Manager for railroad/s involved in route will conduct a **“Point of Origin” Inspection**

The FRA refers to these inspections as “Rail/Train/Package Preparedness Inspections”



# Rail/Train/Package Preparedness Inspection

## This inspection will include:

**HM – Package/Cask-** HM documentation review, a review of the completed surveys (*for train crew safety*), and a Package/Cask walk around to ensure proper marking & placards, etc..

**Assembled Train** – Once Train is assembled including locomotive consist, buffers cars, cask cars and escort vehicles) Ensure the following are completed prior to departure:

- The brake test - will include 100% operational brakes for each car in the train, and the train itself.
- All the cars, including the locomotive will be inspected with standards for brake supports, brake pistons and brake shoes quality.

**Qualified Personnel Checks** will be done prior but will include re-check of Engineer and Conductor Certifications, and job briefing.

**Track and Route Inspections** ( including alternative routes) will be reviewed/ completed and approved.

# WIPP Shipments

WIPP is the world's first underground repository licensed to safely and permanently dispose of transuranic radioactive waste.

WIPP transuranic waste consists of such things as laboratory clothing, tools, glove boxes, leaded rubber gloves, glassware, and air filters, ash, ceramic parts, plastics and solidified waste

# WIPP Shipments

The majority of the waste destined for disposal at the Waste Isolation Pilot Plant will be “Contact Handled TRU Mixed Waste”.

Waste not meeting the radiation dose rate criteria for CH waste will be categorized as “Remote Handled TRU Waste” (RH-TRU waste). RHTRU waste will be transported in heavily shielded casks similar to the types used for spent nuclear fuel transport.

# WIPP Shipments

Each shipment must pass a Point of Origin Level VI inspection prior to departing a TRU waste generator site.

# Package Types

## Type A



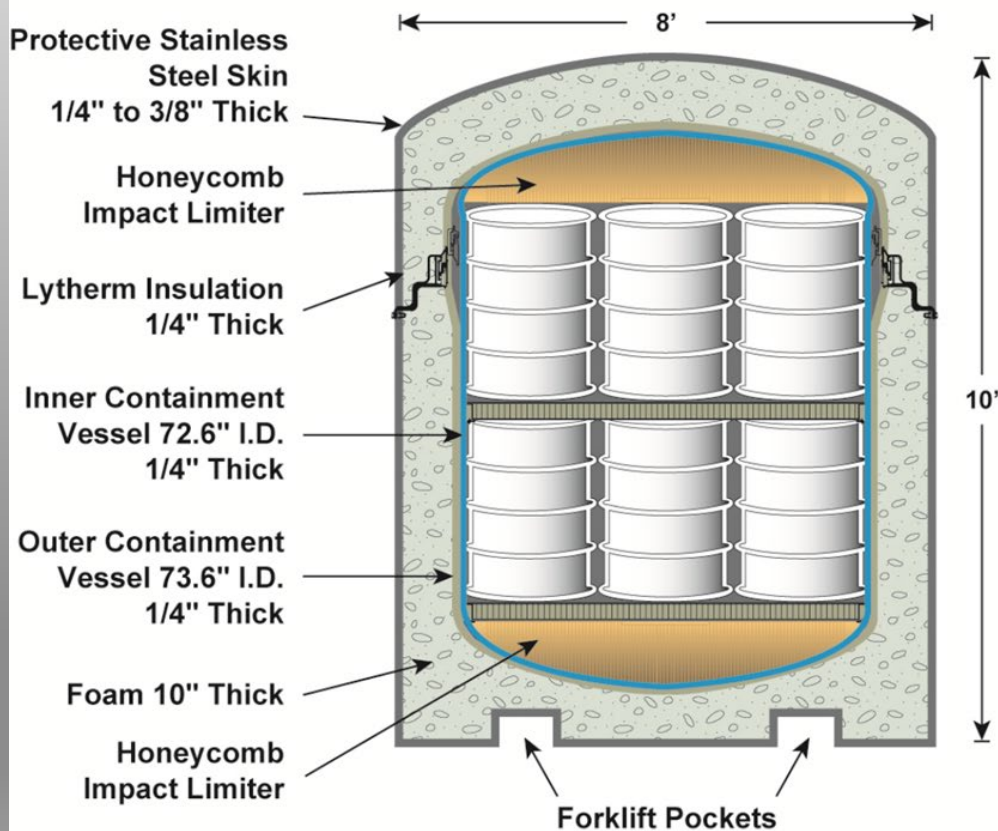
# Package Types

## Type B (TRUPACT II)



# Package Types

## TRUPACT-II



### Weight

12,705 lbs. empty

19,250 lbs. loaded

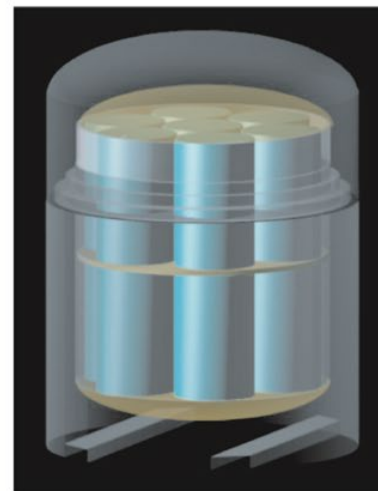
### Material

Stainless Steel

Polyurethane Foam

Ceramic Fiber

Insulation



# Questions