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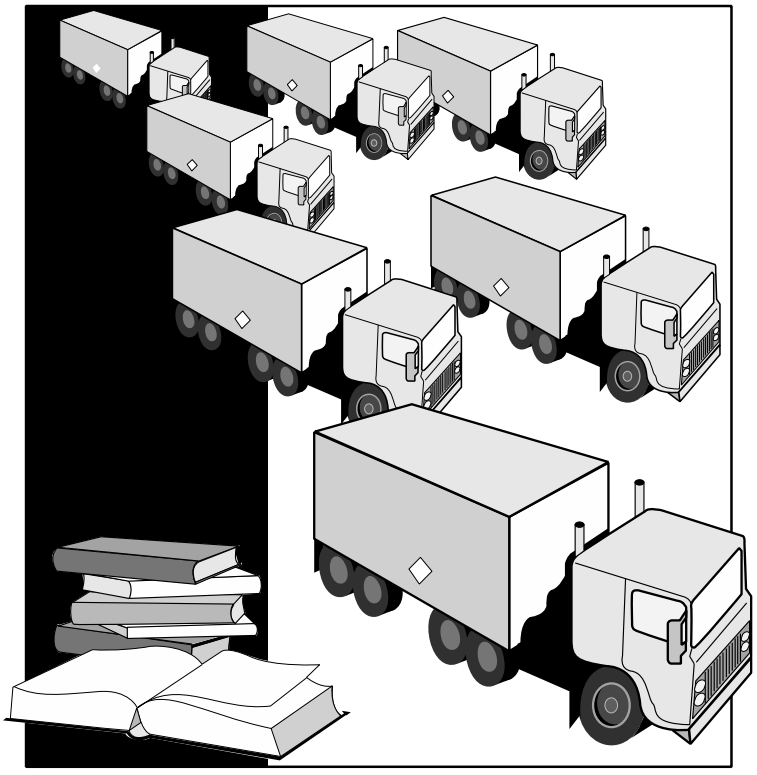
HMPT: Introduction

Live 27916
Test 27917



July 2016

Los Alamos
NATIONAL LABORATORY
EST. 1943
Operated by Los Alamos National Security, LLC for the NNSA

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Contents

Introduction

Course Overview

This course, *HMPT: Introduction Live 27916*, addresses the Department of Transportation's (DOT's) general awareness, transportation security awareness, and safety training requirements for Los Alamos National Laboratory (LANL) in the Hazardous Materials Packaging and Transportation (HMPT) training. Although the course itself is suggested to be taken one time only, the accompanying test (27917) is required initially and then every 36 months.

This course is intended to help you learn how to navigate the regulations found in 49 Code of Federal Regulations (CFR), Parts 107–178, *Transportation*. These regulations change frequently, and it is your responsibility to keep up to date with these changes. This course will give you tools to perform your hazardous materials (HAZMAT) tasks according to the most current regulations.

Course Objectives

After completing this course, you will be able to recognize

- the training requirements for employees who perform HAZMAT transportation and packaging functions,
- the purpose of the DOT HAZMAT regulations and how they are arranged,
- how LANL implements the DOT regulations,
- general information on the communication of hazards,
- the penalties for noncompliance with DOT regulations,
- the DOT security training requirements,
- security risks and threats associated with HAZMAT transportation activities, and
- required safety practices associated with HAZMAT.

Target Audience

HMPT training is required for each HAZMAT employee who

- prepares HAZMAT for shipment;
- loads, unloads, or handles HAZMAT;
- operates a vehicle used to transport HAZMAT; and
- is responsible for the safety of transporting HAZMAT.

The table below defines specific HMPT training sections (covered by four courses). The topics in the third column of the table are found in 49 CFR 107–178, Section 172.704, "Training Requirements."

If you are . . .	you must take . . .	which contains the . . .
any HAZMAT employee,	*HMPT: Introduction (Live Course 27916, Test 27917),*	General Awareness/Familiarization, Security Awareness, and Safety Training.
an employee who is responsible for packaging HAZMAT,	*HMPT: Introduction (Live Course 27916, Test 27917),*	General Awareness/Familiarization, Security Awareness, and Safety Training.
	HMPT: Identification of Hazardous Materials (Live Course 27918, Test 27919),	Identification of Hazardous Materials Function-Specific Training.
	HMPT: Preparing Shipments (Live Course 27920, Test 27921),	Packaging Operations, Marking of Packages, Labeling of Packages, and Shipping Papers Function-Specific Training.
an employee who is responsible for preparing the shipping papers and/or for transporting the materials,	*HMPT: Introduction (Live Course 27916, Test 27917),*	General Awareness/Familiarization, Security Awareness, and Safety Training.
	HMPT: Identification of Hazardous Materials (Live Course 27918, Test 27919),	Identification of Hazardous Materials Function-Specific Training.
	HMPT: Preparing Shipments (Live Course 27920, Test 27921),	Packaging Operations, Marking of Packages, Labeling of Packages, and Shipping Papers Function-Specific Training.
	HMPT: Movement by Highway (Live Course 27922, Test 27923),	Placarding, Segregation and Separation for Highway Transportation, and Special and Unique Moves Function-Specific Training.
driver	*HMPT: Introduction (Live Course 27916, Test 27917),*	General Awareness/Familiarization, Security Awareness, and Safety Training.
	HMPT: Movement by Highway (Live Course 27922, Test 27923),	Placarding, Segregation and Separation for Highway Transportation, and Special and Unique Moves Function-Specific Training.
	HMPT: Driver Training (Live Course 27930, Test 27931)	Function-Specific Training

Course Limitations

This training pertains to the packaging and transportation of *bulk* and *nonbulk packages* of HAZMAT by highway.

Training for the transportation of hazardous waste, radioactive material, and explosives is addressed in other courses and may be required for specific jobs.

Course Prerequisites

This course is the initial HMPT training and has no prerequisites.

About This Course

To earn credit in the UTrain Learning Management System for the live class (#27916), you must attend a class and sign a roster.

To earn credit in UTrain for the test (27917) given at a proxied terminal site, you must score 80% or better on the test.

For lessons learned that pertain to this course, please go to the All Tools link on the LANL internal homepage and access links to lessons learned.

Acronyms

CFR	Code of Federal Regulations
DHS	Department of Homeland Security
DOE	Department of Energy
DOT	Department of Transportation
EM&R	Emergency Management and Response Group
EPA	Environmental Protection Agency
ERG	*Emergency Response Guidebook*
HAZMAT	hazardous material(s)
HMPT	hazardous materials packaging and transportation
IAEA	International Atomic Energy Agency
IATA/ICAO	International Air Transport Association/International Civil Aviation Organization
LANL	Los Alamos National Laboratory
LANS	Los Alamos National Security, LLC
NMED	New Mexico Environment Department
n.o.s.	not otherwise specified (also seen as N.O.S.)
NRC	National Response Center
ORM-D	Other Regulated Materials - Domestic
OS-PT	Operations Support Division - Packaging and Transportation Group
PCBs	polychlorinated biphenyls
PHMSA	Pipeline and Hazardous Materials Safety Administration
PSN	proper shipping name
P&T	packaging and transportation
RQ	reportable quantity
SDS	safety data sheet
UN	United Nations definitions
US	United States
WQH	Water Quality and Hydrology Group

Definitions

Term	Definition (as found in 49 Code of Federal Regulations [CFR] 171.8)[a]
Bulk Packaging	A packaging, other than a vessel or a barge, including a transport vehicle or freight container, in which hazardous materials are loaded with no intermediate form of containment. A Large Packaging in which hazardous materials are loaded with an intermediate form of containment, such as one or more articles or inner packagings, is also a bulk packaging. Additionally, a bulk packaging has: (1) A maximum capacity greater than 450 L (119 gallons) as a receptacle for a liquid; (2) A maximum net mass greater than 400 kg (882 pounds) and a maximum capacity greater than 450 L (119 gallons) as a receptacle for a solid; or (3) A water capacity greater than 454 kg (1000 pounds) as a receptacle for a gas.
Carrier	A person who transports passengers or property in commerce by railcar, aircraft, motor vehicle, or vessel.
Function-Specific Training	Training conducted to prepare a HAZMAT employee to perform specific HAZMAT functions. Reference: 49 CFR 172.704(a)(2).
General-Awareness Training	Training conducted to give HAZMAT employees a general understanding of DOT regulations and requirements. Reference: 49 CFR 172.704(a)(1).
HAZMAT Employee ***Note:*** *At LANL, the term "HAZMAT employee" includes Department of Energy (DOE) employees and employees of contractors and subcontractors.*	A person who is employed by a HAZMAT employer and who in the course of employment directly affects hazardous materials transportation safety. This term includes an owner-operator of a motor vehicle that transports hazardous materials in commerce. This term includes an individual, including a self-employed individual, employed by a HAZMAT employer who, during the course of employment 1. loads, unloads, or handles hazardous materials; 2. designs, manufactures, fabricates, inspects, marks, maintains, reconditions, repairs, or tests a package, container, or packaging for use in transporting hazardous materials; 3. prepares hazardous materials for transportation; 4. is responsible for safety of transporting hazardous materials; or 5. operates a vehicle used to transport hazardous materials.
HAZMAT Employer	A person who uses one or more of its employees in connection with transporting hazardous materials in commerce; causing hazardous materials to be transported or shipped in commerce; or representing, marking, certifying, selling, offering, manufacturing, reconditioning, testing, repairing, or modifying containers, drums, or packagings as qualified for use in the transportation of hazardous materials. This term includes an owner-operator of a motor vehicle that transports hazardous materials in commerce. This term also includes any department, agency, or instrumentality of the United States, a state, a political subdivision of a state, or an Indian tribe engaged in an activity described in the first sentence of this definition.

Definitions—continued

Term	Definition (as found in 49 Code of Federal Regulations [CFR] 171.8)
Nonbulk Packaging	A packaging that has (1) a maximum capacity of ≤450 L (≤119 gal.) for a liquid or (2) a maximum net mass of ≤400 kg (≤882 lb) for a solid or (3) a water capacity of 454 kg (1000 lb) or less for a gas. Reference: 49 CFR 173.115.
Recurring Training	Refresher training that has to be conducted at specific time intervals (every three years). Reference: 49 CFR 172.704(c)(2). ***Note:*** *The International Air Transport Association/International Civil Air Organization (IATA/ICAO) requires retraining every 2 years.*
Safety Training	Training conducted to ensure HAZMAT employees recognize emergency response information in accordance with 49 CFR 172.602, recognize hazards associated with hazardous materials and measures to protect HAZMAT employees, and recognize methods and procedures for avoiding accidents. Reference: 49 CFR 172.704(a)(3).
Security Awareness Training	Training conducted to provide an awareness of security risks associated with hazardous materials transportation and methods designed to enhance transportation security, and training to recognize and respond to possible security threats is also covered. Reference: 49 CFR 172.704(a)(4).
Security In-Depth Training	Training given to persons required to have a security plan in accordance with 49 CFR 172.800 who handle, perform a regulated function, or are responsible for implementing the security plan. This training must include LANS security objectives and specific security procedures and responsibilities and actions to be taken by each employee in the event of a security breach. Reference: 49 CFR 172.704(a)(5).
Technical Name	A recognized chemical name currently used in scientific and technical handbooks, journals, and texts. Generic descriptions are authorized for use as technical names provided they readily identify the general chemical group.

[a]For more definitions, see 49 CFR 171.8.

Term	Definition (as found in 49 Code of Federal Regulations [CFR] 171.9)
Rules of Construction	Unless the context requires otherwise, (1) Words imparting the singular include the plural; (2) Words imparting the plural include the singular; and (3) Words imparting the masculine gender include the feminine. The word (1) “Shall” is used in an imperative sense; (2) “Must” is used in an imperative sense; (3) “Should” is used in a recommendatory sense; (4) “May” is used in a permissive sense to state authority or permission to do the act described, and the words “no person may ***” or “a person may not ***” means that no person is required, authorized, or permitted to do the act described; and (5) “Includes” is used as a word of inclusion, not limitation.

Note: *At the Laboratory, the term "HAZMAT employee" includes DOE employees, Los Alamos National Security, LLC (LANS) employees, and employees of contractors and subcontractors.*

Activity No. 1

(Answers are found on page 51.)

Pickup Truck Activates Radiation Detectors

Instructions: Read the following lessons learned, and identify the potential cause(s) of the event.

In 1994, a pickup truck that was loaded with salvaged equipment was detained at the entrance portal of the Los Alamos County Landfill when the facility's radiation detectors were activated. Although the pickup truck and contents were the property of a private organization, the majority of the contents were determined by markings to have been owned previously by LANL. Therefore, LANL assumed responsibility for the items. The truck was moved to a radiologically controlled area to be examined. The investigation revealed that a vacuum gauge that contained a radioactive material, which is regulated by the DOT, actuated the landfill's radiation detectors.

In tracking the origin of the materials, LANL personnel determined that the equipment had been stored by the private organization in an unoccupied basement for at least 5 years. Seven days before the incident, the equipment had been moved to the LANL materials warehouse because the private organization believed that the materials were only on loan from LANL.

LANL warehouse personnel accepted the equipment, even though a shipping paper was not present with the shipment. Property officials were able to determine that two items did originate at LANL. The rest of the items on the pallets (including the vacuum gauge) were identified as uncontrolled property and could not be tracked.

LANL warehouse personnel judged that the equipment now belonged to the private organization and requested that the pallets be returned to the private organization. The private organization's personnel picked up the three pallets and transported them to the Los Alamos County Landfill.

This occurrence was reported both as a potential concern and as a DOT noncompliance by a non-DOE shipper.

Potential Cause(s):

1. _____

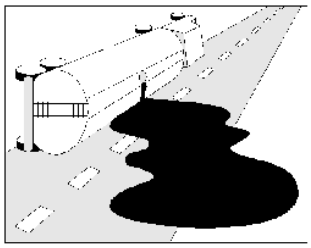
2. _____

3. _____

4. _____

ALO-LA-LANL-1994-0002

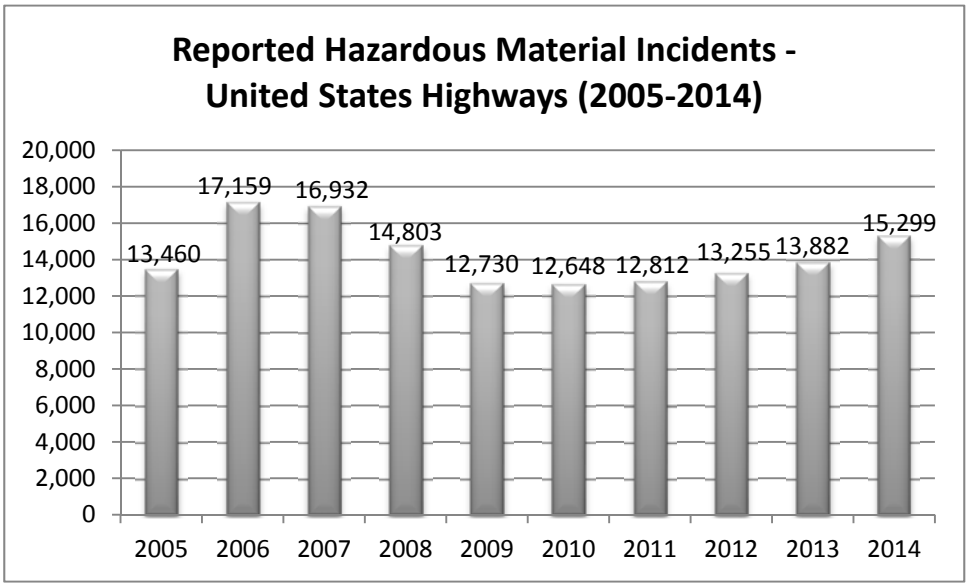
Hazardous Materials (HAZMAT) Incidents



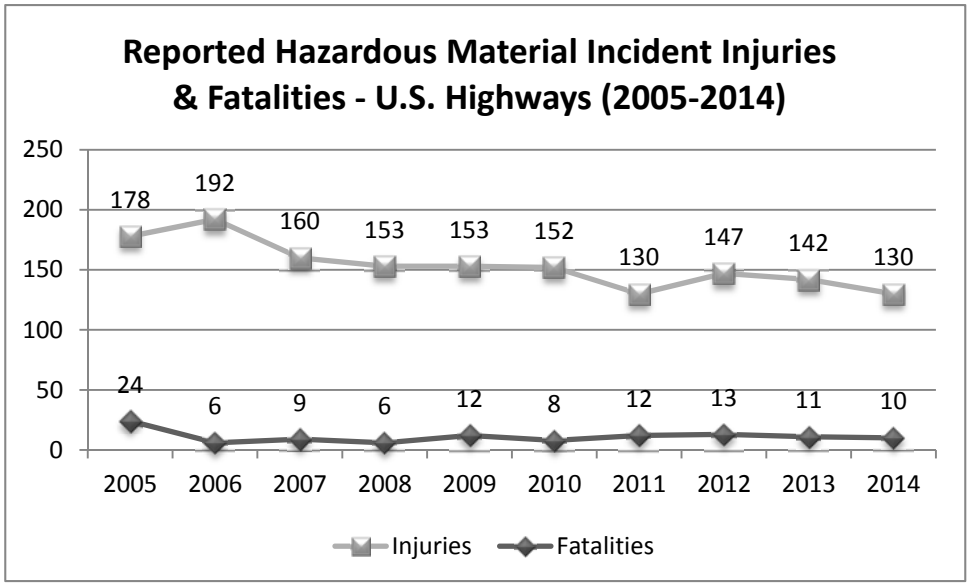
According to a commodity flow survey conducted in 2007 and released in January 2011 by the DOT,

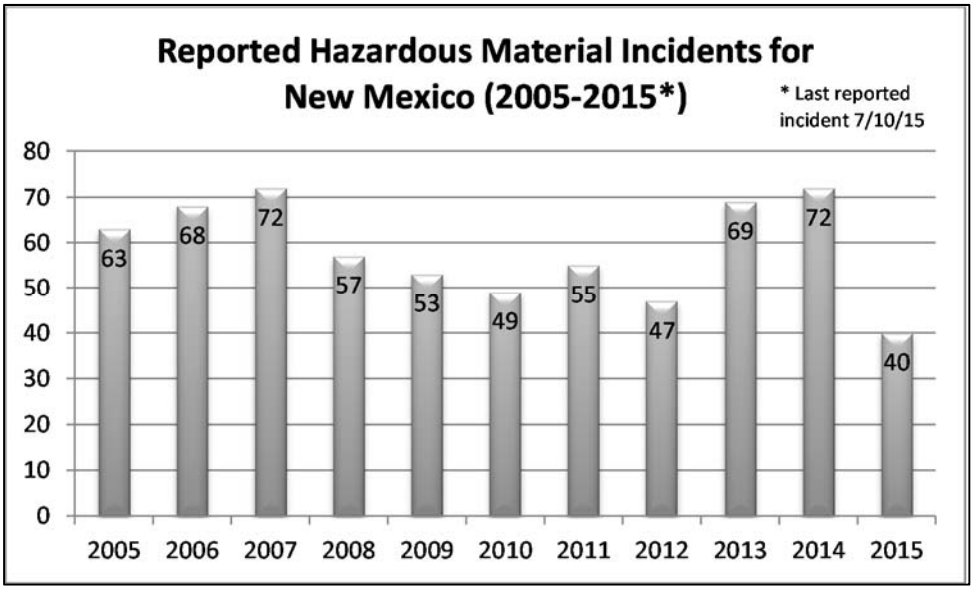
> Trucks transported the largest volume of hazardous materials through the nation's transportation system, moving 1.2 out of 2.2 billion tons of hazardous materials. These shipments accounted for 104 billion highway ton-miles, out of the total 323 billion ton-miles moved by all modes. Overall, the truck mode moved 53.9 percent of hazardous materials tonnage in 2007.

With this large volume of shipments taking place, many incidents occur. The following graph shows the annual number of HAZMAT incidents on highways in the United States (US) since 2005. The next graph shows the injuries and fatalities during that same period. The third graph shows the number of HAZMAT incidents for New Mexico since 2005.



Hazardous Materials Incidents—continued





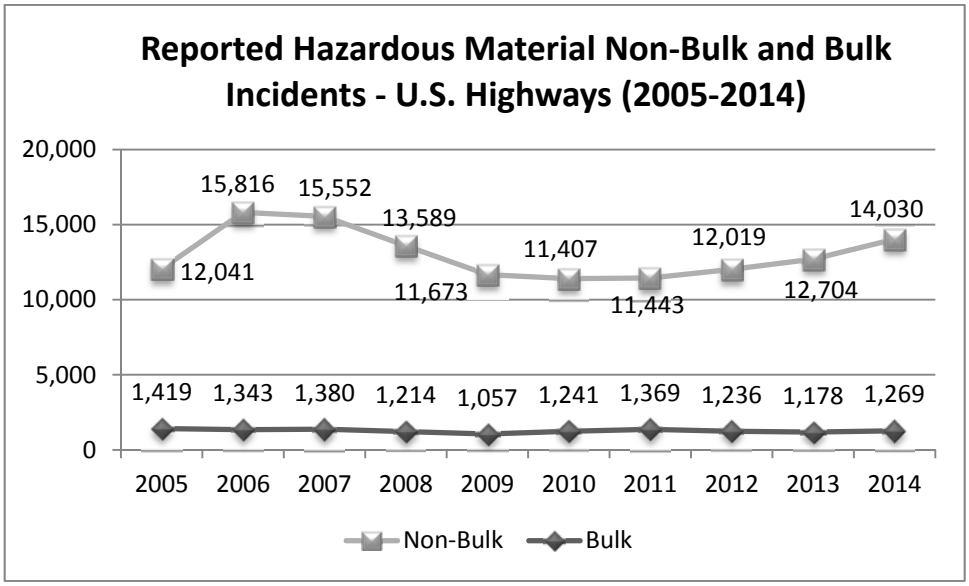
Hazardous Materials Incidents—continued

Transportation incidents typically involve

- vehicle accidents,
- loading mishaps,
- material spills,
- the inadequate packaging of materials, and
- the mixing of incompatible materials.

The root cause of most incidents is human error, and in fewer incidents, inadequate or inappropriate packaging of the material. The transportation phase that results in the most incidents is the unloading of material (3920 incidents in 2015).

As you can see from the graph below, fewer incidents occur when bulk materials (gas, petroleum, etc.) are being transported compared with nonbulk items.



Notes . . .

General Awareness/Familiarization

Overview

This section will provide you with an awareness of DOT training requirements, the regulations in Title 49 CFR Parts 107–178, LANL's implementation of these regulations, your personal responsibilities and liabilities under these regulations, and the penalties for not complying with DOT regulations.

Objectives

When you have completed this section, you will be able to recognize

- the training that is required for employees who perform HAZMAT packaging and transportation functions;
- the purpose for DOT HAZMAT regulations and how they are arranged;
- how the regulations are arranged in 49 CFR;
- what the LANL compliance requirements are with regard to DOT regulations;
- the hazards for HAZMAT in specific classes/divisions;
- general information on the communication of hazards;
- how, as HAZMAT employees, you are responsible for complying with the regulations; and
- which fines can be assessed for failure to comply with the regulations.

Diesel Fuel Released from Delivery Truck
ALO-LA-LANL-LANL-2005-0001

On February 2, 2005, the Emergency Management and Response Group (EM&R) received notification of a diesel odor at TA-16. Upon responding, personnel discovered a small diesel spill. An investigation determined that a Ford F-700 delivery truck was responsible for diesel spills at TA-15, TA-16, TA-40, and TA-3, as well as on roadways connecting those technical areas. Upon notification of the spill, the Water Quality and Hydrology Group (WQH) investigated and determined that the fuel had made its way to storm drains in various locations at LANL. As a result, LANL reported the spill to the National Response Center (NRC), the New Mexico Environment Department (NMED), and the Environmental Protection Agency (EPA).

Training Requirements

Title 49 of the CFR, Part 172.700 (Subpart H), *Training*, defines the training required by the DOT for all employees who handle, package, and/or transport HAZMAT.

DOT Training Areas

The DOT has divided its training requirements into the following areas:

- General Awareness/Familiarization—required for all HAZMAT employees. Reference: 49 CFR 172.704(a)(1).
- Function Specific—required for HAZMAT handlers, packagers, drivers, and shippers. Reference: 49 CFR 172.704(a)(2).
- Safety—required for all HAZMAT employees except packaging engineers. Reference: 49 CFR 172.704(a)(3).
- Security Awareness—required for all HAZMAT employees. Reference: 49 CFR 172.704(a)(4).
- In-Depth Security—required for HAZMAT employees required to have a security plan per 49 CFR 172.800.

DOT Training Areas and LANL Courses

LANL presents HMPT courses that cover the DOT training areas. These areas are covered in separate LANL training courses and are identified by courses provided in the table on page 2.

Frequency of Training

New HAZMAT employees must complete their training within 90 days of the date they were designated to perform an HMPT function. New HAZMAT employees cannot perform HMPT functions unsupervised without completing the required training. These employees are allowed to perform HMPT functions with the direct supervision of a properly trained and knowledgeable HAZMAT employee during the 90-day training period. Reference: 49 CFR 172.704(c)(1)(i and ii).

Training Requirements—continued

All HAZMAT employees must be certified that they have been trained and tested. An examination is administered after completion of each course to document the successful completion of the training. *You must refresh your HMPT—hazardous materials packaging and transportation—training, at a minimum, every 3 years.* Reference: 49 CFR 172.704(c).

Training Responsibilities

The HAZMAT employer is responsible for ensuring that each designated HAZMAT employee receives the required training to perform his or her function. HAZMAT employees are responsible for keeping their supervisors or managers informed of their current training status.

Radioactive Material Transportation Consideration
1998-LA-LANL-ESH7-0002

Summary of Incident:

A LANL researcher transported two depleted uranium samples to an offsite location in his private vehicle and on a commercial airline. Although site radiological control requirements did not dictate that the small quantity of depleted uranium be labeled or stored as radiological material, more rigorous Department of Transportation (DOT) requirements that establish a 2-nanocurie-per-gram threshold applied because the material was transported over public roads and on a commercial airline.

Lesson Learned:

LANL employees may not, under any circumstances, transport DOT-defined radioactive materials as personal baggage on any privately owned, rented, or commercial vehicle (automobile, truck, or aircraft). All such movement must be made as a consigned DOT-compliant shipment. Additionally, properly **trained** hazardous materials employees must prepare all DOT-defined radioactive material for shipment before it is transported over public roads, whether between technical areas or off site.

Recommended Actions:

LANL personnel are encouraged to use **trained** hazardous material packaging and transportation specialists to categorize radiological materials shipments and provide DOT-approved packaging, marking, labels, and shipping papers.

DOT Regulations

Purpose

You must **comply** with DOT regulations whenever you ship or offer HAZMAT for shipment. No one is exempt from compliance with DOT regulations.

The regulation of the transportation of HAZMAT has been evolving for many years. At first, the safe transportation of explosives and shock-sensitive materials was the main concern, but as time progressed, other materials were identified as being hazardous. DOT transportation requirements, 49 CFR—specifically parts 171–178—define the regulation of these materials.

In 1990 Congress passed the *Hazardous Materials Transportation Uniform Safety Act*, which included new training requirements. The *purpose* for this action was to bring about a safe and consistent program for moving HAZMAT. Title 49 CFR 171–180 codifies the new laws. These regulations give the DOT authority over the transportation of *all* HAZMAT; these materials include hazardous wastes.

New DOT Regulations

DOT regulations are continually being updated, and new requirements are being implemented. As a HAZMAT employee, you should be aware of the changes in order to maintain compliance with DOT requirements.

DOT Noncompliance Results from Incorrect Calculations
ALO-LA-LANL-MATWAREHS-2004-0005

On October 1, 2004, a Packaging and Transportation (SUP-5)-authorized shipper determined that an earlier onsite transport of a sealed source between TA-59 and TA-3, Building SM-30, resulted in a DOT noncompliance. Before the transfer, a Biological and Quantum Physics (P-21) employee had contacted SUP-5 seeking guidance on the transfer of a sealed source containing krypton between technical areas. A SUP-5-authorized shipper performed a calculation to determine if the source met the DOT definition of a radioactive material. The shipper determined that it did not meet the DOT thresholds, and the P-21 employee transferred the source. Subsequently, the P-21 custodian contacted SUP-5 asking for guidance on shipping the same source off site. **The shipper recalculated the material value because the DOT definition of radioactive material had changed on October 1, 2004.** The shipper determined that the source met the definition of radioactive material and was therefore regulated under the DOT. At that point, **the shipper realized that the original calculation for the onsite transfer was erroneous** and had met the previous DOT definition of radioactive material, as well.

DOT Regulations—continued

Accidents Causing Regulatory Changes

Bhopal, India

As a result of the accident in Bhopal, India (see excerpt below), the DOT identified and regulated materials that are poisonous when inhaled—*poison inhalation hazards*. Thousands died from breathing fumes, although no marking indicated any inhalation hazards.

Sacramento Rivers

In July 1991 an accident occurred where a tank car that contained 19,000 gallons of metam sodium, a pesticide, fell into the Sacramento River in California. At the time, the material was regulated when transported by oceangoing vessel but **not** when transported by rail or highway. The accident's resulting economic costs and damage to the environment were substantial enough to bring about new regulations by the DOT Hazardous Materials Regulations under *"Marine Pollutants."*

Bhopal

In the early hours of December 3, 1984, residents living near the Union Carbide pesticide plant in Bhopal, India, awoke coughing, choking, gasping, and in the case of thousands, slowly dying. Methyl isocyanate (MIC) gas leaked from the Union Carbide India Limited (UCIL) plant in Bhopal. Approximately 3800 people died, approximately 40 people experienced permanent disability, and approximately 2800 other individuals experienced partial disabilities.

An initial investigation by Union Carbide experts reported that a large volume of water had apparently been introduced into the MIC tank, causing a chemical reaction, forcing the chemical release valve to open, and allowing the gas to leak. A committee of experts working on behalf of the Indian government, which represented all claimants in the case, conducted its own investigation and reached the same conclusion. In May of 1989 UCIL made full payment of $470 million to the Indian government.

Since the disaster, in 2001 the Bhopal Memorial Hospital and Research Centre opened, funded largely by proceeds from the Union Carbide Corporation (UCC) sale of all its UCIL stock, and began treating patients. In July of 2004, 20 years after the disaster and 15 years after the initial settlement, the Supreme Court of India ordered the release of extra settlement funds to victims. News reports indicated that there was approximately $327 million in the fund as a result of earned interest from money remaining after all claims had been paid.

The Bhopal disaster is recorded as being the worst industrial disaster of the 20th century.

DOT Regulations—continued

Arrangement of the Regulations in 49 CFR

These regulations may appear to be a maze of references and requirements; however, with some patience and practice, you can learn to use these regulations to perform the task of shipping HAZMAT in full compliance. Title 49 is divided into several major parts with specific subject areas (see below).

Title 49 Parts…	Subject Area
171	General Information, Regulations, and Definitions
172	Hazardous Materials Table, Special Provisions, Hazardous Materials, Communications, Emergency Response Information, Training Requirements, and Security Plans
173	Shippers—General Requirements for Shipments and Packaging
177	Carriage by Public Highway
178	Specifications for Packagings

To locate a specific reference…		Example
1	Find the part number	**172**.203
2	Find the section number	172.**203**
3	Find the subsection	172.203**(k)**
4	Find the paragraph	172.203(k)**(2)**
5	Find the subparagraph	172.203(k)(2)**(ii)**

Activity No. 2

Activity No. 2: Find the titles of the following regulation references.

(Answers are on page 50.)

1) 49 CFR Part 171.8 _____

2) 49 CFR 172 Subpart G _____

3) 49 CFR part 173.2a _____

4) 49 CFR Part 172.101, Appendix A _____

5) 49 CFR 173.2a(a)(4) _____

DOT Regulations—continued

Additional Regulations

You must follow the regulations that affect the transportation of HAZMAT. In most cases, 49 CFR 171–178 will be the only regulations that apply; however, in some instances, additional regulations may also be applicable. The following table outlines other regulations that may be applicable to your operation(s).

Standards for…	are provided in…
Polychlorinated biphenyls (PCBs)	40 CFR 761
Hazardous substances	40 CFR 302
Hazardous wastes	40 CFR 260–263
Asbestos	40 CFR 61
Radioactive materials	10 CFR 60–73

Certain DOE orders, State of New Mexico regulations, and LANL requirements may also need to be followed during packaging and transportation operations.

LANL Compliance with 49 CFR Requirement

LANL implements 49 CFR packaging and transportation requirements through the *LANL Packaging and Transportation Program Procedure*, P151-1. This document contains the requirements for controlling HAZMAT packaging and transportation to meet safety and legal requirements. The requirements identified in P151-1 are applicable to the type of shipment or material movement being performed. The Operations Support Division-Packaging and Transportation Group (OS-PT) is responsible for the development, implementation, and maintenance of packaging and transportation (P&T)-required documents and has oversight responsibilities for all P&T activities.

All HAZMAT packaging and transportation activities at LANL must be conducted in accordance with 49 CFR 172, the LANL Packaging and Transportation Procedure P151-1, which requires the work to be done by trained and qualified workers and drivers who have been authorized by their responsible line manager.

Shipping papers that meet the requirements of 49 CFR, Part 172, Subpart C must be used for shipments of HAZMAT.

HAZMAT must not be transported in a private vehicle.

Compliance with DOT Regulations

Both *carriers* and *shippers* are responsible for fully complying with DOT regulations. *Carriers* must refuse to accept any HAZMAT that does not fully comply with DOT HAZMAT requirements. Only properly *classified, packaged, marked*, and *labeled* materials can be accepted for transportation.

The HAZMAT regulations are applicable to the transportation of HAZMAT in commerce. Because LANS is a “for-profit” business, it is in commerce. For more information, see P151-1.

Hazardous Materials

The DOT categorizes ***hazardous materials*** into nine *hazard classes.* These hazard classes are used to identify the hazards of materials based on the characteristics of the material. Some of the hazard classes are further categorized into *divisions* to separate their specific nature or characteristics. Reference: 49 CFR Part 173.2.

Recognition of Hazards

Hazards Associated with DOT Hazard Classes/Divisions

Although nine DOT hazard classes exist, some with divisions, the hazards can generally be grouped into the following four categories:

- flammables (classes/divisions 2.1, 3, 4.1, 4.2, 4.3, 5.1, and 5.2),
- poisons (classes/divisions 2.3 and 6.1),
- corrosives (classes/divisions 8 and 5.1), and
- reactives (classes/divisions 4.1, 4.2, 4.3, 5.1, and 5.2).

Exceptions

The hazards listed above do not adequately describe hazard classes/divisions 2.2 (nonflammable compressed gas), 7 (radioactive material), 9 (miscellaneous hazardous materials), and class 1 (explosive). These materials pose

- high-pressure hazards (division 2.2),
- radiation and contamination hazards (class 7),

- annoying effects to exposed personnel or represents a hazard during transport, such as elevated temperature materials (class 9), and
- explosives (divisions 1.1, 1.2, 1.3, 1.4, 1.5, 1.6).

Some of these materials may have more than one hazard, such as division 5.2, which is flammable and reactive. Any class-2 gases may also have a high-pressure hazard.

The table on the following page identifies the nine DOT hazard classes, the placard and DOT division numbers associated with each hazard class, and the characteristics of the material.

Recognition of Hazards—continued

Hazard Class	Hazard Division	Characteristics of Materials
1	1.1	Explosives (with a mass explosion hazard)
	1.2	Explosives (with a projection hazard)
	1.3	Explosives (with predominately a fire hazard)
	1.4	Explosives (with no significant blast hazard)
	1.5	Very insensitive explosives; blasting agents
	1.6	Extremely insensitive detonating substances
2	2.1	Flammable gas
	2.2	Nonflammable compressed gas
	2.3	Poisonous gas
3	3	Flammable and combustible liquid
4	4.1	Flammable solid
	4.2	Spontaneously combustible material
	4.3	Dangerous when wet material
5	5.1	Oxidizer
	5.2	Organic peroxide
6	6.1	Poisonous materials
	6.2	Infectious substance (etiologic agent)
7	7	Radioactive material
8	8	Corrosive material
9	9	Miscellaneous hazardous material
ORM-D (Other Regulated Materials-Domestic)	None	Includes consumer commodities that present a limited hazard during transportation because of their form, quantity, and/or packaging

Hazardous Substance, Reportable Quantity (RQ)

A hazardous substance is a material that is listed in Appendix A of 49 CFR 172.101 and in a quantity, in one package, that is equal to or exceeds the reportable quantity (RQ).

This definition is different from HAZMAT. HAZMATs are those materials that meet the defining criteria for hazard classes and divisions in 49 CFR or are listed in the Hazardous Materials Table of 49 CFR 172.101.

Appendix A of 49 CFR 172.101 has two tables. Table 1 is Hazardous Substances other than Radionuclides, and Table 2 is Radionuclides.

Communication of Hazards

If you are involved in the transportation of HAZMAT, you must be able to recognize and identify hazards associated with the materials being transported and properly respond in case of an accident or incident.

You are responsible for

- *recognizing* the hazards of materials being transported,
- *responding* accordingly if problems arise during the transportation of HAZMAT, and
- *complying* with DOT regulations.

During transportation, the hazards of materials are identified by communication that appears on the

- package,
  - markings listed in 49 CFR 172.300–172.338,
  - labels listed in 49 CFR 172.400-172.450,
- shipping papers listed in 49 CFR, Part 172, Subpart C,
  - the *Emergency Response Guidebook* (ERG) pages, and
- placards on the vehicles listed in 49 CFR 172.500-172.560.

Package

The following table identifies the standard DOT communication items that appear on most HAZMAT packages. This information will be seen in the form of markings and labels on packages when required.

DOT Communication Items	Function
United Nations (UN)/North America (NA) identification number	Provides information to emergency responders
Proper shipping name (PSN)	Identifies the material in the package
DOT hazard class/division label	Communicates the hazards (based on the material's characteristics) contained in the package
Shipper's and/or receiver's name and address	Identifies where the shipment originated and where it is going
UN specification marking	States specific information about the packaging used for the material

Shipping Papers

Shipping papers accompany shipments of HAZMAT when required. The communication on the shipping papers will correlate with the information that is marked and labeled on the packages.

Placards

Placards placed on the vehicle also communicate the specific hazards of materials that the vehicle carries. These placards communicate the class/division hazards based on the characteristics of the material.

Penalties for Noncompliance with the Regulations

The courts have already indicated that ignorance of the law is not an acceptable defense for not complying with DOT regulations. All people who work in the HAZMAT field must know and understand the regulations imposed upon them.

The DOT assesses fines when noncompliance with regulations is discovered. Two categories of violations exist in the DOT incentive program.

Communication of Hazards—continued

Category of violation	Definition	Penalties that may be assessed
Criminal	Knowingly, willfully, or recklessly violates a requirement of the federal hazardous material transportation law or regulation. Reference: 49 CFR 107.33 and 171.3(b).	• Fined under Title 18, US Code, or imprisoned for not more than 5 years or both, except the maximum amount of imprisonment shall be 10 years in any case in which the violation involves the release of a hazardous material that results in death or bodily injury to any person. • Federal law specifies penalties up to a $250,000 fine for an individual and $500,000 for a company and 5 years' imprisonment for the willful discharge of a hazardous waste at other than designated facilities.
Civil	Knowingly violates a requirement of the federal hazardous materials transportation law. Reference: 49 CFR 107.329.	• Is liable for a civil penalty of not more than $75,000 for each violation, except the maximum civil penalty is $175,000 if the violation results in death, serious illness, or severe injury to any person or substantial destruction of property, and there is no minimum except for a minimum civil penalty of $450 for violations relating to training.

Self-Assessment: General Awareness/Familiarization

(Find answers on page 28)

1. When do DOT regulations apply to shipping?

2. What is the purpose of DOT HAZMAT transportation regulations?

3. When do DOT regulations affect you?

4. List three individual responsibilities that concern the shipping of HAZMAT.
   a.
   b.
   c.

5. Must the carrier refuse a HAZMAT shipment if something is out of compliance?

6. Fill in the blanks.
   Both the _____ and the _____ are responsible for ensuring compliance with HAZMAT transportation regulations.

Self-Assessment: General Awareness/Familiarization—continued

7. Identify the level of fines that the DOT can impose for a single civil or criminal violation.
   a. Civil:

   b. Criminal:

8. What are the training areas required by the DOT that are associated with a HAZMAT employee?
   a.
   b.
   c.
   d.
   e.

9. Of the DOT training areas, what is the minimum that all HAZMAT employees must receive?
   a.
   b.
   c.
   d.

10. In what time period must a new HAZMAT employee complete DOT training?

11. Is it acceptable for an unsupervised, uncertified HAZMAT employee to prepare a HAZMAT shipment for transport?

Answers: General Awareness/Familiarization

1. When do DOT regulations apply to shipping?

   Whenever transporting or offering for transportation a DOT HAZMAT.

2. What is the purpose of DOT HAZMAT transportation regulations?

   To provide consistent requirements for the safe transportation of HAZMAT.

3. When do DOT regulations affect you?

   Whenever offering or transporting HAZMAT in public access areas or under the requirements of a DOE order.

4. List three individual responsibilities that concern shipping HAZMAT.

   a. Recognize HAZMAT being transported.
   b. Respond accordingly if problems arise during the transportation of HAZMAT.
   c. Comply with DOT regulations.

5. Must the carrier refuse a HAZMAT shipment if something is out of compliance?

   Yes.

6. Fill in the blanks.
   Both the _____ and the _____ are responsible for ensuring compliance with the HAZMAT transportation regulations.

   the shipper and the carrier

Answers: General Awareness/Familiarization—continued

7. Identify the level of fines that the DOT can impose for a single civil or criminal violation.
   a. Civil: Maximum = $75,000 for each violation
   $175,000 = in the event of a death, serious illness, severe injury, or substantial destruction to property due to a violation
   b. Criminal: Maximum of up to 5 years in jail for the responsible person(s) and/or
   Maximum (corporation) = $500,000
   Maximum (individual) = $250,000

8. What are the training areas required by the DOT that are associated with a HAZMAT employee?

   a. General Awareness/Familiarization
   b. Function-Specific
   c. Safety
   d. Security Awareness
   e. In-Depth Security

9. Of the DOT training areas, what is the minimum that all HAZMAT employees must receive?

   a. General Awareness/Familiarization
   b. Function-Specific
   c. Safety
   d. Security Awareness

Answers: General Awareness/Familiarization—continued

10. In what time period must a new HAZMAT employee complete DOT training?

    No more than 90 days from the time assignment takes place.

11. Is it acceptable for an unsupervised, uncertified HAZMAT employee to prepare a HAZMAT shipment for transport?

    No.

HAZMAT Transportation Security Awareness

Overview

In the wrong hands, HAZMAT can pose a significant security threat. At LANL, potentially significant security threats exist with operations involving certain materials. LANL's objective is to handle and process all shipments with the least possible exposure to theft, misuse, and destruction, or harm to workers, the public, and the environment.

This section addresses HAZMAT transportation security awareness training.

Objectives

When you have completed this section, you will be able to recognize

- when the DOT HAZMAT security plan is required,
- that transportation of certain HAZMAT can pose security risks,
- the DOT HAZMAT security training requirements, and
- and respond to possible security threats.

HAZMAT Transportation Security Awareness Training

Training requirements for HAZMAT transportation security are specified in 49 CFR 172.704(a)(4), *Security Awareness Training*, and 49 CFR 172.704(a)(5), *In-depth Security Training*. This section addresses security awareness training.

In accordance with 49 CFR 172.704(a)(4),

- each HAZMAT employee must receive training that provides an awareness of security risks associated with HAZMAT transportation and the methods designed to enhance transportation security;
- the training must also include a component about how to recognize and respond to possible security threats; and
- new HAZMAT employees must receive security awareness training within 90 days of employment.

Recognizing HAZMAT Transportation Security Threats

The US Department of Homeland Security (DHS) lists the following as possible indicators of terrorist surveillance:

- unusual or prolonged interest in security measures or personnel, entry points and access controls, or perimeter barriers, such as fences or walls;
- unusual behavior, such as staring at or quickly looking away from personnel or vehicles entering or leaving designated facilities or parking areas;
- observation of security reaction drills or procedures;
- increase in anonymous telephone or e-mail threats to facilities in conjunction with suspected surveillance incidents;
- foot surveillance involving two or three individuals working together;
- mobile surveillance using bicycles, scooters, aircraft, and other vehicles, now including drones;
- prolonged static surveillance using operatives disguised as panhandlers, food vendors, news agents, or street sweepers not previously seen in the area;
- discreet use of still cameras, video recorders, or note-taking at non-tourist-type locations; and/or
- use of multiple sets of clothing and/or identification or use of sketching materials (paper, pencils, etc.).

Responding to HAZMAT Transportation Security Threats

Security is the responsibility of every member of the LANL workforce. Each employee has a responsibility to remain knowledgeable in and to comply with LANL transportation security policies and procedures, as applicable to that particular employee's position. All employees are responsible for reporting

- observations of breaches in security to their supervisors;
- observations of breaches in security to DOE officials, as their job duties require; and
- observations of breaches in security to other external authorities, as their job duties require, such as law enforcement agencies, as needed.

Responding to HAZMAT Transportation Security Threats—continued

All employees are encouraged to contribute suggestions to their supervisors or managers and to the LANL Lessons Learned Program to improve the performance of the *Transportation Security Plan*.

HAZMAT Security Plan

In accordance with 49 CFR 172.704(a)(5):

- Each HAZMAT employee must receive training concerning the security plan, perform a regulated function related to the HAZMAT covered by the security plan, or be responsible for implementing the security plan.
- The training must include company security duties and responsibilities for each employee and specific actions to be taken by each employee in the event of a security breach.
- New HAZMAT employees must receive in-depth security training within 90 days of employment.

In 2003, the DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) added Subpart I, *Safety and Security Plans,* to 49 CFR. Subpart I contains the requirements for the development and implementation of plans to address safety and security risks relative to the transportation of HAZMAT in commerce, above the quantities listed in 49 CFR 172.800. LANL has developed *LANL Transportation Security Plan,* P&T-PLAN-031, to address LANL personnel security, facility security, unauthorized access, and en-route security. Training to UTrain Item 55422, *LANL Transportation Security Plan*, must be completed if any HAZMAT employee ships or transports any HAZMAT in the quantities listed in 49 CFR 172.800. Contact Operations Support-Package and Transportation at 665-8628 to arrange training.

As stated in 49 CFR 172.800 (b), a HAZMAT transportation security plan is required for each person who offers for transportation in commerce or transports in commerce one or more of the following HAZMATs that can pose security risks:

- a highway route-controlled quantity of class 7 (radioactive) material;
- any quantity of a division 1.1, 1.2, or 1.3 material;
- a quantity of a division 1.4, 1.5, or 1.6 material requiring placarding in accordance with subpart F of this part;

HAZMAT Security Plan—continued

- a large bulk quantity of division 2.1 material;
- a large bulk quantity of division 2.2 material with a subsidiary hazard of 5.1;
- any quantity of a material poisonous by inhalation, as defined in §171.8 of this subchapter;
- a large bulk quantity of a class-3 material meeting the criteria for Packing Group I or II;
- a quantity of desensitized explosives meeting the definition of division 4.1 or class-3 material requiring placarding in accordance with subpart F of this part;
- a large bulk quantity of a division 4.2 material meeting the criteria for Packing Group I or II;
- a quantity of a division 4.3 material requiring placarding in accordance with subpart F of this part;
- a large bulk quantity of a division 5.1 material in Packing Groups I and II; perchlorates; or ammonium nitrate, ammonium nitrate fertilizers, or ammonium nitrate emulsions, suspensions, or gels;
- any quantity of organic peroxide, Type B, liquid or solid, temperature controlled;
- (a large bulk quantity of division 6.1 material [for a material poisonous by inhalation see paragraph (5) above];
- a select agent or toxin regulated by the Centers for Disease Control and Prevention under 42 CFR part 73 or the US Department of Agriculture under 9 CFR part 121;
- a quantity of uranium hexafluoride requiring placarding under §172.505(b);
- International Atomic Energy Agency (IAEA) Code of Conduct Category 1 and 2 materials, including Highway-Route-Controlled quantities as defined in 49 CFR 173.403 or known radionuclides in forms listed as RAM-QC by the Nuclear Regulatory Commission; and
- a large bulk quantity of class-8 material meeting the criteria for Packing Group I.

Safety Practices

Overview

Human error is the cause of almost 70% of all HAZMAT transportation accidents. Proper handling of packages, proper response to incidents, and knowledge of how to identify a questionable situation can eliminate most of these accidents.

The training in this section is designed to explain DOT requirements for emergency-response notification, how to report incidents and accidents that involve HAZMAT and how to provide instruction in the use of the *Emergency Response Guidebook* (ERG).

Objectives

When you have completed this section, you will be able to

- reference the DOT ERG for specific information,
- select the appropriate actions to take for a given HAZMAT leak or spill,
- identify the actions that you must take to ensure that HAZMAT incidents are properly reported, and
- recognize your personal responsibilities with regard to incidents that involve the transportation of HAZMAT.

LANL emergency responders are trained to mitigate HAZMAT incidents.

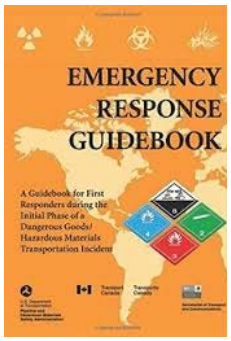
Emergency Response Information

Emergency-response information must be available at all transportation locations, including vehicles that transport HAZMAT. Title 49 CFR 172.602 requires that the following information be listed:

- the basic description and technical name of the material,
- immediate hazards to health,
- risks of fire or explosion,
- precautions to be taken in the event of an accident or incident,
- methods for handling fires,
- methods for handling spills in the absence of fire, and
- first-aid measures.

The ERG, safety data sheets (SDSs), or other available material that provides all the information listed above may be useful to fulfill the emergency-response information requirement under 49 CFR 172.602.

The Emergency Response Guidebook



The ERG provides the emergency-response information required by the DOT. The ERG was developed to prescribe the initial-response actions that you must take during a HAZMAT-transportation incident to increase the measure of protection to both yourself and the general public. You should use the information as guidance during the initial emergency-response phase of the incident.

The ERG is organized into five specific areas of information. The following table describes its organization.

On these pages…	you will find…	The material in this section is identified by …
white	the three-digit guide number that identifies which emergency-response guide you should follow.	DOT **placards** or orange panel on intermodal containers**.**
yellow		The DOT identification number and is listed in numerical order.
blue		The DOT PSN—proper shipping name—and is listed in alphabetical order.
orange	the guides that identify the potential hazards and what emergency action you should take.	**The emergency-response guide number** and is listed in numerical order.
green	isolation distances of the compounds having PSNs that were highlighted in the yellow- and blue-page sections.	**The DOT identification number** and is listed in numerical order.

In the ERG orange section, POTENTIAL HAZARDS, PUBLIC SAFETY, AND EMERGENCY RESPONSE are listed in order of severity.

If an entry is highlighted in either the yellow-bordered pages or blue-bordered pages AND THERE IS NO FIRE, go directly to the Table of Initial Isolation and Protective Action Distances (green-bordered pages) and look up the ID number and name of the material to obtain initial isolation and protective action distances. IF THERE IS A FIRE or IF A FIRE IS INVOLVED, go directly to the appropriate guide (orange-bordered pages) and use the evacuation information shown under PUBLIC SAFETY.

The white pages in the back of the *Emergency Response Guidebook* provide guidebook contents, glossary, and emergency response phone numbers.

Activity No. 3-A: ERG Work Exercise – *Non-Poison-Inhalation Hazards—No Fire Present*

(Find answers on page 52.)

DOT ID No.	Name of Material (PSN)	ERG Guide No.	Entry High-lighted Yes/No	Fire Present Yes/No	PUBLIC SAFETY As an immediate precautionary measure, isolate spill or leak area (in all directions). For at least how many meters?		
					For Liquids	For Solids	For Gases
1114			No	No			
1452			No	No			
1891			No	No			
1872			No	No			

Activity No. 3-B: ERG Work Exercise – *Poison-Inhalation Hazards—No Fire Present*

(Find answers on page 53.)

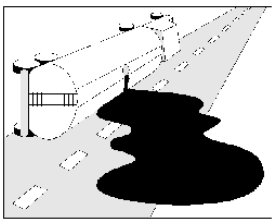
DOT ID No.	Name of Material (PSN)	ERG Guide No.	Entry High-lighted Yes/No	Fire Present Yes/No	Initial Isolation and Protective Action Distances			
					Small Spills		Large Spills	
					1st isolate in all directions Meters	Then protect downwind DAY Kilometers	1st isolate in all directions Meters	Then protect downwind NIGHT Kilometers
	Lithium nitride		Yes	No				
	Methyl mercaptan		Yes	No				
	Potassium phosphide		Yes	No				
	Ethyl chloro-formate		Yes	No				

Activity No. 3-C: ERG Work Exercise – *Hazardous Materials—Fire Present*

(Find answers on page 54.)

DOT ID No.	Name of Material (PSN)	ERG Guide No.	Entry High-lighted Yes/No	Fire Present Yes/No	PUBLIC SAFETY As an immediate precautionary measure, isolate spill or leak area (in all directions). For at least how many meters?		
					For Liquids	For Solids	For Gases
1077				Yes			
1689				Yes			
	Nicotine			Yes			
	Trimetho-xysilane			Yes			

Appropriate Actions for Leaks or Spills



In the event of a HAZMAT accident, always practice the following list of ***"nevers."***

- Never assume that an accident situation is harmless.
- Never touch the material.
- Never track the material away from the accident.
- Never approach too close to the material.
- Never evacuate to the downwind side of the incident.
- Never allow other persons into the affected area.
- Never respond to an accident without proper training and equipment.
- Never respond to an accident alone.

Appropriate Action for Leaks or Spills—continued

If you are involved in a HAZMAT accident or incident, follow the ***GIN principle*** in your response action.

Step	Action
G	Get away from the accident area to a safe place upwind.
I	Isolate the area so others will not enter or become affected.
N	Notify the appropriate authorities and response personnel.

Only those personnel who can provide proper response action should attempt to respond to an accident or incident. Proper response means that you

- are appropriately trained in emergency-response techniques,
- have protective equipment and clothing available,
- are properly trained to use your protective equipment, and
- are accompanied by another individual—not going at it alone.

Incident Reporting

Reportable Incidents

Reportable incidents occur when

- a person is killed;
- a person receives an injury requiring admittance to a hospital;
- the general public is evacuated for 1 hour or more;
- a major transportation artery or facility is closed or shut down for 1 hour or more;
- the operational flight pattern or routine of an aircraft is altered;
- a fire, break, spillage, or suspected radioactive contamination occurs involving radioactive material;
- a fire, break, spillage, or suspected contamination occurs involving an infectious substance other than a diagnostic specimen or regulated medical waste;
- a release of a marine pollutant occurs in a quantity exceeding 450 L (119 gal.) for a liquid or 400 kg (882 lb) for a solid; or

Incident Reporting—continued

- a situation exists of such a nature that, in the judgment of the person in possession of the HAZMAT, it should be reported to the National Response Center (NRC) (e.g., a continuing danger to life exists at the scene of the incident).

Immediate Notification

Immediately after a reportable incident or as soon as practical but no later than 12 hours after the occurrence of any incident described above, each person in physical possession of the HAZMAT must provide notice by telephone to the NRC at 800-424-8802 or 202-267-2675 or online at http://www.nrc.uscg.mil. Each notice must include the following information:

- Name of reporter
- Name and address of person represented by reporter
- Phone number where reporter can be contacted
- Date, time, and location of incident
- Extent of injury, if any
- Class or division, proper shipping name, and quantity of HAZMAT involved, if such information is available
- Type of incident and nature of HAZMAT involvement and whether a continuing danger to life exists at the scene

Documentation

Each person in physical possession of HAZMAT at the time that any of the following incidents occurs must also submit a written report, separate from the telephone notification, on form DOT F 5800.1 Rev. 01/2004, to the DOT per 49 CFR 171.16(a). The report must be written and at DOT headquarters within 30 days of the date the incident occurred. This written report is required when

- a telephone report is required by 49 CFR 171.15(b), 49 CFR 171.16(a)(1), and 49 CFR 171.15(c);
- any hazardous substance is released during transportation as stated in 49 CFR 171.15 Note;
- there is an unintentional release of HAZMAT or the discharge of any quantity of hazardous waste as stated in 49 CFR 171.16(a)(2);

Incident Reporting—continued

- a specification cargo tank with a capacity of 1000 gal. or greater containing any HAZMAT suffers structural damage to the lading retention system or damage that requires repair to a system intended to protect the lading system, even if no release of HAZMAT exists; or
- undeclared HAZMAT is discovered.

Hazardous Substances

Under 40 CFR 302.6, the EPA requires a person in charge of facilities (including transport vehicles, vessels, and aircraft) to report any release of a hazardous substance in a quantity equal to or greater than its reportable quantity, as soon as that person has knowledge of the release, to the DOT's National Response Center at (toll free) 800-424-8802 or (toll) 202-267-2675.

The telephone call must indicate if the release of an RQ of the hazardous substance has occurred and is required beyond the call in the reporting requirement in 49 CFR 171.15.

Personal Responsibility

You are responsible for

- the safety of HAZMAT during transportation;
- knowing how to properly handle a HAZMAT transportation incident (the initial response is very critical);
- interpreting information from available materials and responding only if properly trained, properly equipped, and when accompanied by someone else; and
- reporting emergency conditions and taking what necessary actions you can to lessen the severity of the dangers that may result from an incident or accident that involves HAZMAT.

Personal Responsibility—continued

In case of an onsite accident, incident, spill, or leak that involves HAZMAT, follow the GIN principle and contact the Central Alarm Station at 911. Trained personnel will respond to the incident and take appropriate action to neutralize the spill or leak.

Self-Assessment: Safety Practices

(Find answers on page 47)

1. List the three steps that you must use to reference or obtain information from the ERG—*Emergency Response Guidebook*.

   a.

   b.

   c.

2. Identify the emergency-response guide numbers for the following materials:

   a. Chlorine:

   b. Cyclohexane:

   c. Methylhydrazine:

   d. Uranium hexafluoride:

   e. Flammable liquid, not otherwise specified (n.o.s.)

   f. Flammable liquid, toxic, n.o.s.

3. Identify those materials addressed in question 2 that require isolation-distance consideration per the ERG green section if NO FIRE is present.

4. A small spill of nitrogen trioxide with NO FIRE present should be isolated by how many feet in all directions?

5. What hazard classes/divisions exhibit ignition and fire hazards?

6. What hazard class/division should never be exposed to water?

7. What is the primary risk associated with class 8?

Self-Assessment: Safety Practices—continued

8. List the hazard class(es)/division(s) that present(s) an inhalation-hazard concern.

9. List the conditions under which an incident notification must be made to the DOT at the earliest practicable moment.

10. When must a detailed HAZMAT incident report (form F 5800.1 Rev. 01/2004) be written and sent to the DOT?

11. When must a person in physical possession of HAZMAT notify the National Response Center (NRC) of a spill or leak?

12. Identify the GIN principle—what to do when confronted with a HAZMAT transportation incident or accident.

G =

I =

N =

13. Where, and with whom, do the HAZMAT transportation emergency-response actions begin?

Answers: Safety Practices

1. List the three steps that you must use to reference or obtain information from the ERG—*Emergency Response Guidebook*.
   a. Identify the material's emergency-response guide number by referencing the yellow pages (listed by DOT number) or the blue pages (listed by the PSN).
   b. Identify the appropriate emergency-response actions (orange pages) for the given material.
   c. Identify the "isolation" requirements (green pages) for materials in the yellow or blue pages that are highlighted.

2. Identify the emergency-response guide numbers for the following materials:
   a. Chlorine: #124
   b. Cyclohexane: #128
   c. Methylhydrazine: #131
   d. Uranium hexafluoride: #166
   e. Flammable liquid, n.o.s. #128
   f. Flammable liquid, toxic, n.o.s. #131

3. Identify those materials addressed in question 2 that require isolation-distance consideration per the ERG green section if NO FIRE is present.

   chlorine, methylhydrazine, and uranium hexafluoride

4. A small spill of nitrogen trioxide with NO FIRE present should be isolated by how many feet in all directions?

   200 feet

5. What hazard classes/divisions exhibit ignition and fire hazards?

   division 2.1; class 3; division 4.1; division 4.2; division 4.3; division 5.1; and division 5.2.

6. What hazard class/division should never be exposed to water?

   division 4.3.

Answers: Safety Practices—continued

7. What is the primary risk associated with class 8?

   A high corrosion risk to human skin, steel, and aluminum.

8. List the hazard class(es)/division(s) that present an inhalation-hazard concern.

   division 2.3 and all materials identified as inhalation hazards.

9. List the conditions under which an incident notification must be made to the DOT at the earliest practicable moment.

   Whenever, as a result of the HAZMAT,

   - a person is killed;
   - a person receives an injury requiring admittance to a hospital;
   - the general public is evacuated for 1 hour or more;
   - a major transportation artery or facility is closed or shut down for 1 hour or more;
   - the operational flight pattern or routine of an aircraft is altered;
   - a fire, break, spillage, or suspected radioactive contamination occurs involving radioactive material;
   - a fire, break, spillage, or suspected contamination occurs involving an infectious substance other than a diagnostic specimen or regulated medical waste;
   - a release of a marine pollutant occurs in a quantity exceeding 450 L (119 gal.) for a liquid or 400 kg (882 lb) for a solid; or
   - a situation exists of such a nature that, in the judgment of the person in possession of the HAZMAT, it should be reported to the NRC, e.g., a continuing danger to life exists at the scene of the incident.

Answers: Safety Practices—continued

10. When must a detailed HAZMAT incident report (Form F 5800.1 Rev. 01/2004) be written and sent to the DOT?

    Anytime the following event occurs in transportation:

    - An unintentional release of a HAZMAT, substance, or waste
    - A reportable incident addressed in 49 CFR 171.15(a)

11. When must a person in physical possession of HAZMAT notify the NRC of a spill or leak?

    Whenever the spill or leak results in the release of a reportable quantity of a hazardous substance.

12. Identify the GIN principle—what to do when confronted with a HAZMAT transportation incident or accident.

    G = Get away from the accident area to a safe place upwind.
    I = Isolate the area so others will not enter or become affected.
    N = Notify the appropriate authorities and response personnel.

13. Where, and with whom, do the HAZMAT-transportation emergency-response actions begin?

    The response actions begin immediately at the accident or incident scene.

    The initial responder is the person who identifies if a problem exists.

Notes . . .

Appendix

Answers to Activity Questions

Activity No. 1 – Page 8

Pickup Truck Activates Radiation Detectors

In 1994, a pickup truck that was loaded with salvaged equipment was detained at the entrance portal of the Los Alamos County Landfill when the facility's radiation detectors were activated. Although the pickup truck and contents were the property of a private organization, the majority of the contents were determined by markings to have been owned previously by LANL. Therefore, LANL assumed responsibility for the items. The truck was moved to a radiologically controlled area to be examined. The investigation revealed that a vacuum gauge that contained a radioactive material, which is regulated by DOT, actuated the landfill's radiation detectors.

In tracking the origin of the materials, LANL personnel determined that the equipment had been stored by the private organization in an unoccupied basement for at least 5 years. Seven days before the incident the equipment had been moved to the LANL materials warehouse because the private organization believed that the materials were only on loan from LANL.

LANL warehouse personnel accepted the equipment, even though a shipping paper was not present with the shipment. Property officials were able to determine that two items did originate at LANL. The rest of the items on the pallets (including the vacuum gauge) were identified as uncontrolled property and could not be tracked.

LANL warehouse personnel judged that the equipment now belonged to the private organization and requested that the pallets be returned to the private organization. The private organization's personnel picked up the three pallets and transported them to the Los Alamos County Landfill.

This occurrence was reported both as a potential concern, and as a DOT noncompliance by a non-DOE shipper.

Cause(s): In not adequately defining, communicating, or enforcing transportation policies, requirements, and regulations, the root cause for this occurrence involves a management problem. DOT shipping papers are required when shipping any regulated materials in order to communicate these hazards to the general public, emergency response personnel, and shipping and receiving personnel.

The private organization violated DOT shipping regulations when it transported the regulated material to the LANL warehouse by way of public roads without the necessary DOT shipping papers.

LANL became a part of the violation when its personnel received the regulated material without requiring the necessary shipping papers. LANL policy requires the necessary shipping and receiving papers for all DOT-regulated materials.

Corrective Actions: The shipper (private organization) was notified of the DOT shipping-paper deficiencies.

Training was developed and provided for LANL shipping and receiving personnel on the procedures to follow when DOT shipments are received that are not covered by DOT shipping papers.

The shipping and receiving procedures were expanded to include procedures to be followed when shipments are received that may need to be covered by DOT shipping papers but do not have them.

Answers to Activity Questions—continued

Activity No. 2 – Page 18

1) 49 CFR Part 171.8	**Definitions and Abbreviations**
2) 49 CFR 172 Subpart G	**Emergency Response Information**
3) 49 CFR Part 173.2a	**Classification of a Material Having More Than One Hazard**
4) 49 CFR Part 172.101, Appendix A	**List of Hazardous Substances and Reportable Quantities**
5) 49 CFR 173.2a(a)(4)	**Division 2.2 (nonflammable gases)**

Activity No. 3-A – *Non-Poison-Inhalation Hazards—No Fire Present* – Page 38

DOT ID No	Name of Material (PSN)	ERG Guide No.	Entry High-lighted	Fire Present	PUBLIC SAFETY Orange As an immediate precautionary measure, isolate spill or leak area (in all directions). For at least how many meters?		
yellow	blue	orange	Yes/No	Yes/No	For Liquids	For Solids	For Gases
1114	**Benzene**	**130**	**No**	**No**	**50**	**-**	**-**
1452	**Calcium chlorate**	**140**	**No**	**No**	**50**	**25**	**-**
1891	Ethyl bromide	**131**	**No**	**No**	**50**	**-**	**-**
1872	Lead dioxide	**141**	**No**	**No**	**50**	**25**	**-**

Answers to Activity Questions—continued

Activity No. 3-B – *Poison-Inhalation Hazards—No Fire Present* – Page 39

DOT ID No. yellow	Name of Material (PSN) blue	ERG Guide No. orange	Entry High-lighted Yes/No	Fire Present Yes/No	Initial Isolation and Protective Action Distances			
					Small Spills		Large Spills	
					1st Isolate in all directions meters	Then protect downwind DAY kilometers	1st Isolate in all directions meters	Then protect downwind NIGHT kilometers
2806	Lithium nitride	138	Yes	No	30	0.1	60	2.1
1064	Methyl mercaptan	117	Yes	No	30	0.1	150	3.2
2012	Potassium phosphide	139	Yes	No	30	0.1	300	4.0
1182	Ethyl chloroformate	155	Yes	No	30	0.1	60	0.6

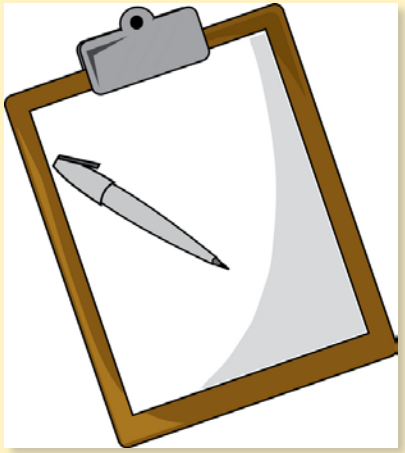
Answers to Activity Questions—continued

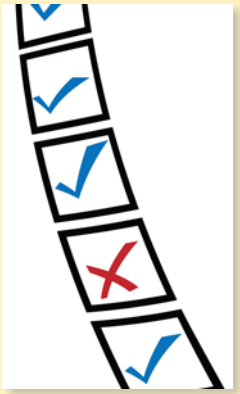
Activity No. 3-C – *Hazardous Materials—Fire Present* – Page 40

DOT ID No yellow	Name of Material (PSN) blue	ERG Guide No. orange	Entry High-lighted Yes/No	Fire Present Yes/No	PUBLIC SAFETY Orange As an immediate precautionary measure, isolate spill or leak area (in all directions). For at least how many meters?		
					For Liquids	For Solids	For Gases
1075 1077	**Propylene**	**115**	**No**	**Yes**	**-**	**-**	**100**
1689	Sodium cyanide	**157**	**Yes**	**Yes**	**50**	**25**	**-**
1654	**Nicotine**	**151**	**No**	**Yes**	**50**	**25**	**-**
9269	Trimetho-xysilane	**132**	**Yes**	**Yes**	**50**	**-**	**-**

When in the Classroom . . .

- Be sure to sign the roster.
  - print your name legibly
  - sign your name
  - print your Z number
- Make sure to fill out a class evaluation. We value your feedback!
- No cell phone use.
- No texting, please.



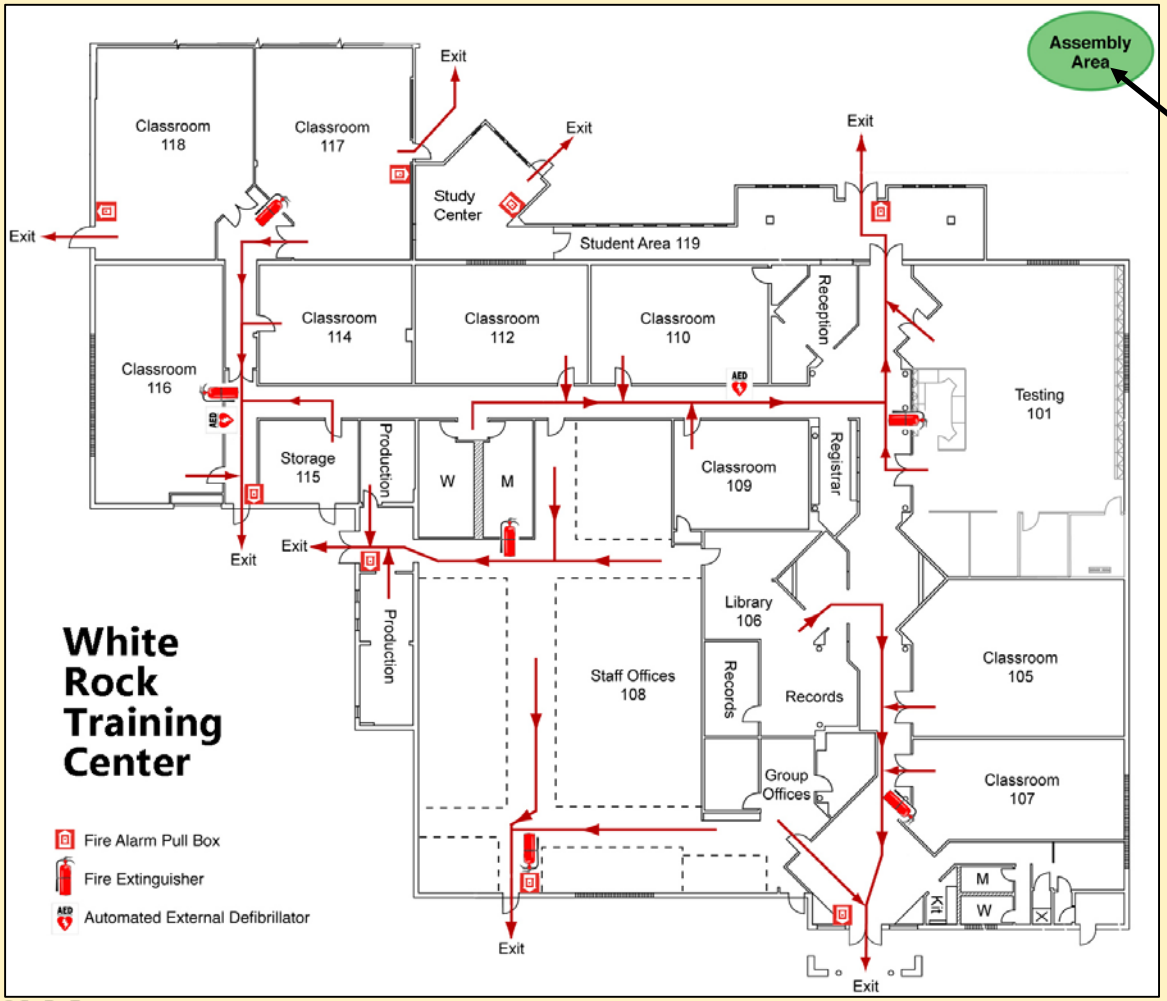


Emergency Evacuation

- If an alarm sounds, evacuate the building and report immediately to the assembly area.

- Eating, drinking, and smoking are prohibited during evacuations and at the assembly area.

Emergency Exit Routes



Go to the assembly area when you exit for an emergency.

- DO NOT LEAVE AREA
- NO FOOD OR DRINK
- NO SMOKING
- MINIMIZE TALKING

WRTC Evacuation Assembly Area

After exiting the building during an emergency, assemble at the grassy knoll beside the front parking lot.

HMPT: Introduction

LANL #27916 - HMPT Introduction
July 2016

You are required to pass an electronic exam with this class.

If you have a CRYPTOCard with administrative (A-level) authorities, you must have it with you to be proctored for the exam.

HMPT Introduction (#27916)

This initial course in HMPT training addresses

- General Awareness/Familiarization
- HAZMAT Transportation Security Awareness
- Safety and an Introduction to the Emergency Response Guidebook

An open-book, multiple-choice test will be given at 1:00 pm.

Course Objectives

Recognize

- The training requirements for employees who perform HAZMAT packaging & transportation functions
- The purpose of DOT regulations and how they are arranged
- How LANL implements DOT regulations
- General information on the communication of hazards
- The penalties for noncompliance with DOT regulations
- DOT security training requirements
- Security risks and threats associated with HAZMAT transportation activities
- Required safety practices associated with HAZMAT

Target Audience

HMPT training is required for each HAZMAT employee who

- Prepares HAZMAT for shipment
- Loads, unloads, or handles HAZMAT
- Operates a vehicle used to transport HAZMAT
- Is responsible for the safety of transporting HAZMAT

Course Limitations

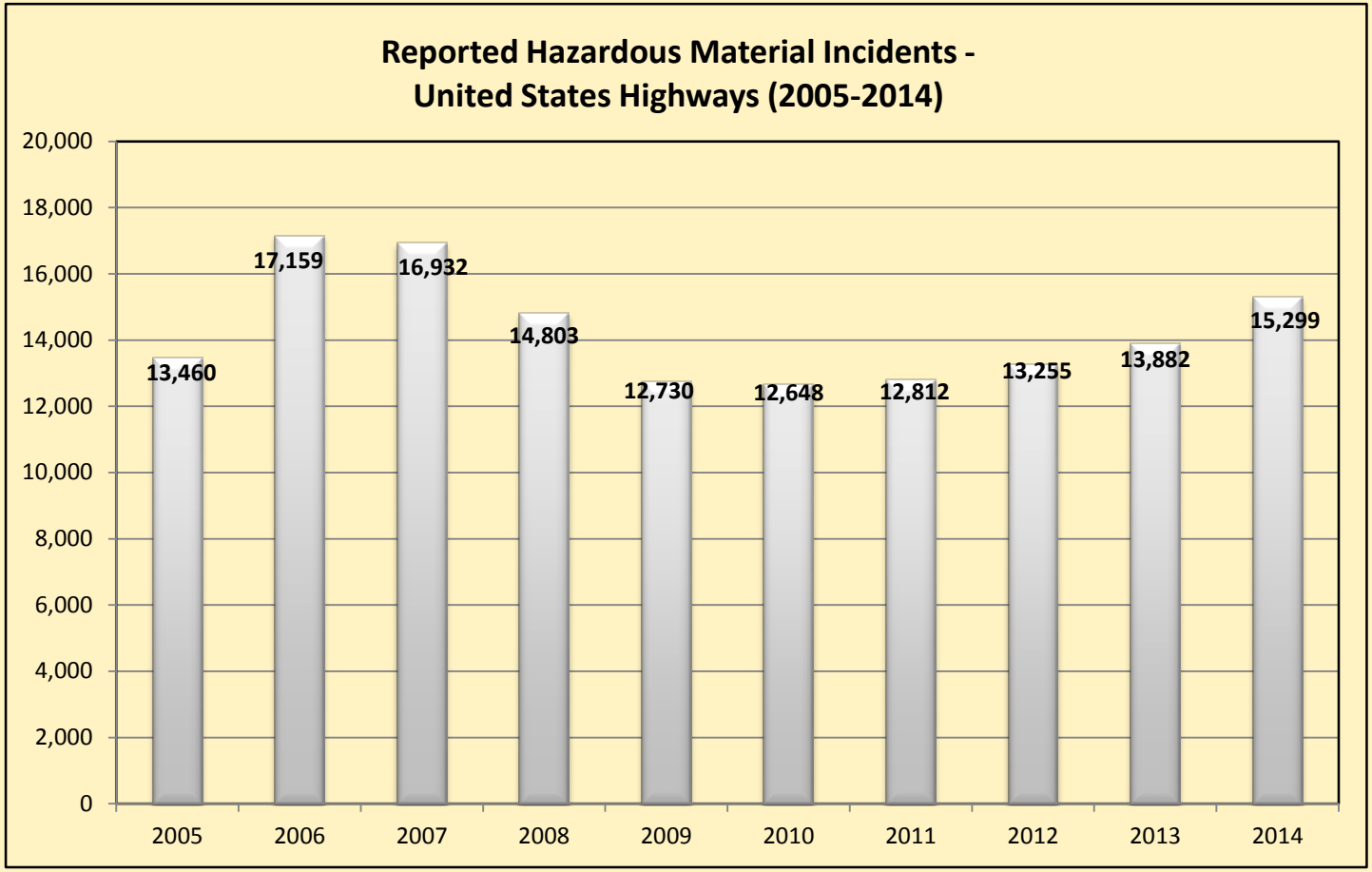
- Transportation of hazardous wastes, radioactive materials, and explosives covered in other courses

Course Information

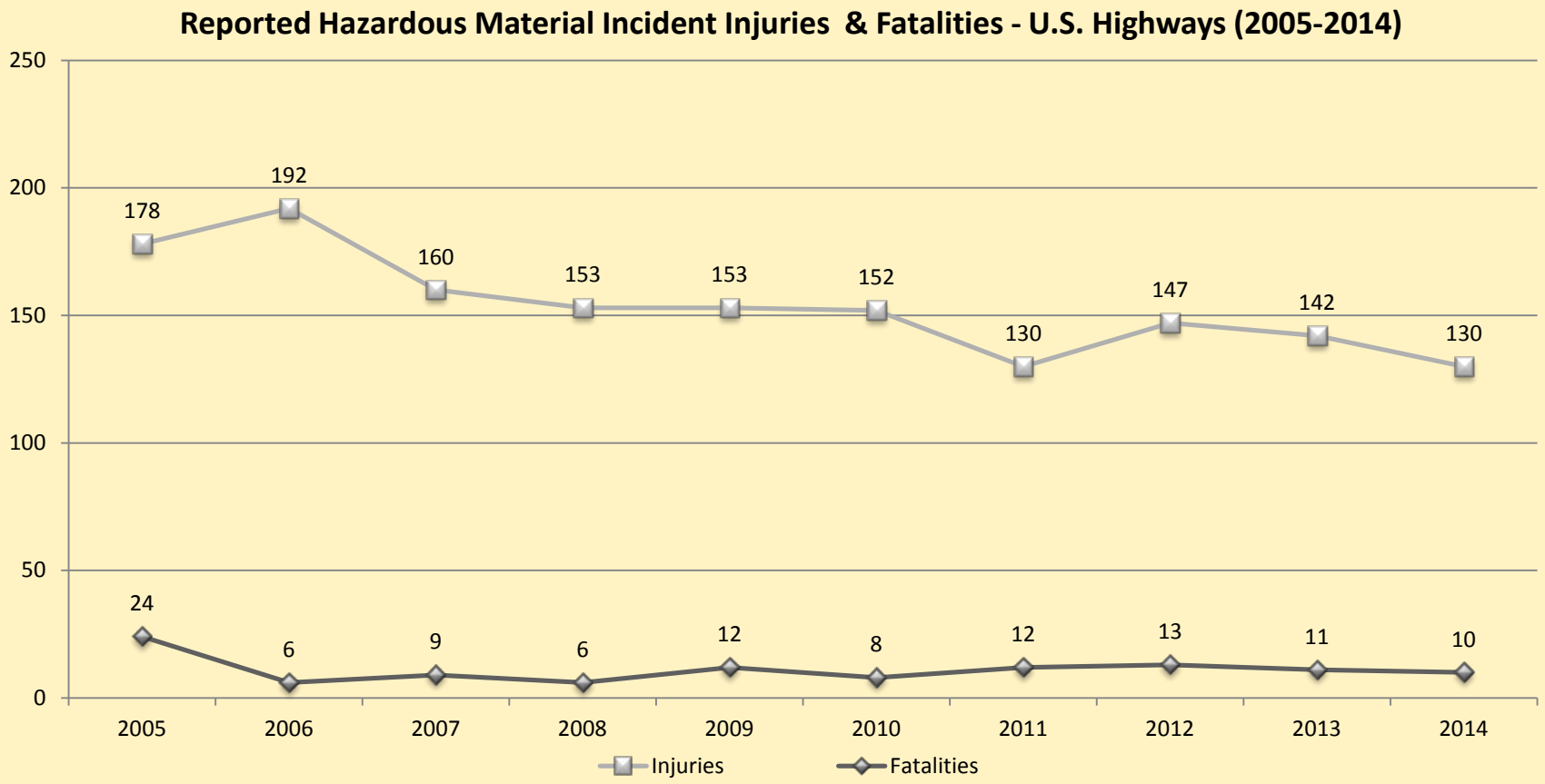
- Course prerequisites – None
- About this course
  - Attend class and sign roster for credit for #27916
  - Score 80% or better on test to receive credit for #27917

Activity No. 1

HAZMAT Incidents Nationwide 2005–2014



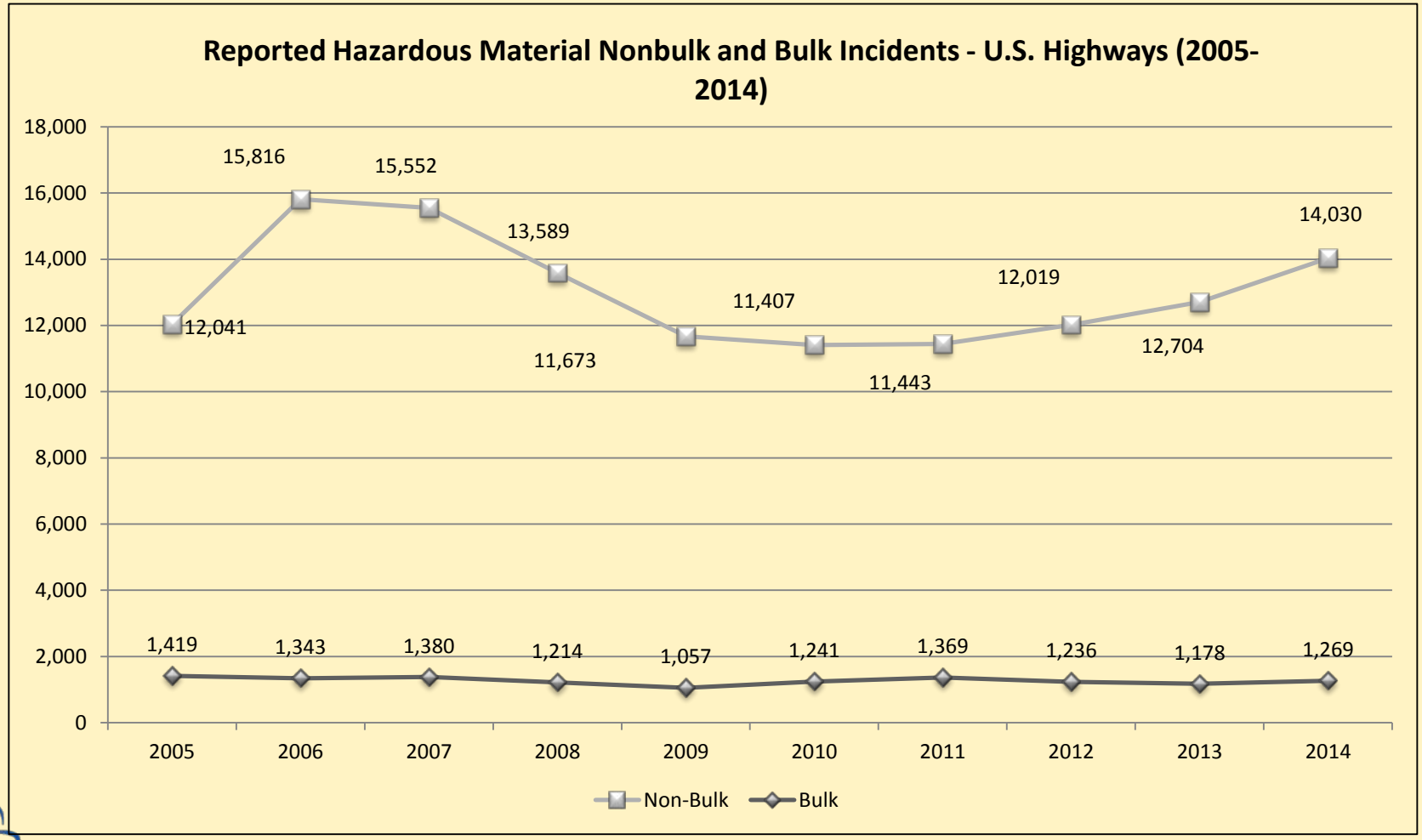
Injuries and Fatalities



New Mexico HAZMAT Incidents 2005–2015*

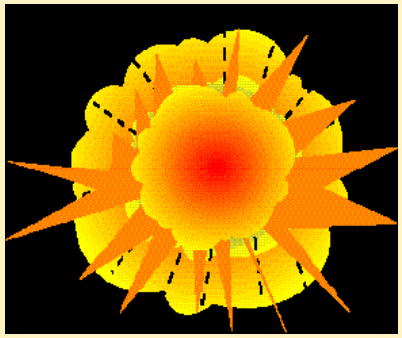
*Last reported incident 7/10/2015

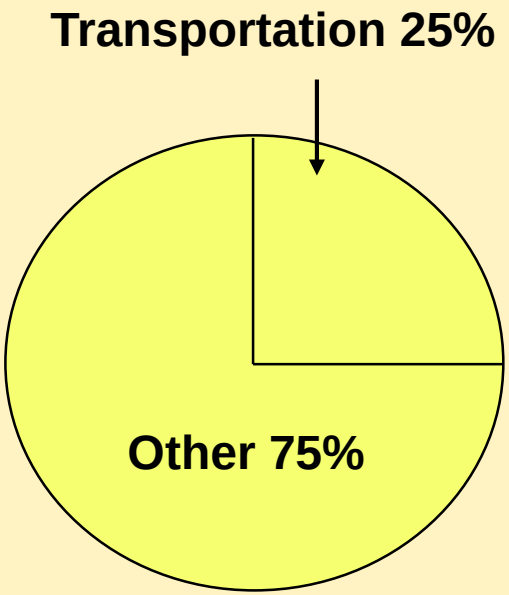
Hazardous Material Bulk/Nonbulk Incidents

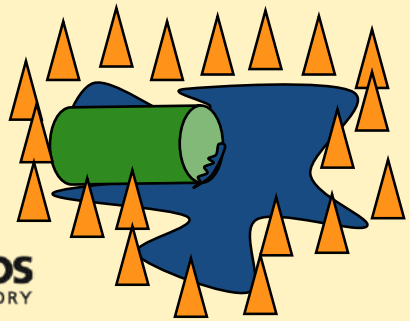


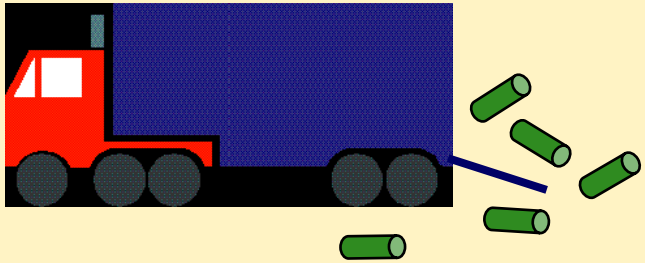
Multiple Chemical Accidents Occur Each Day

- Vehicle accidents
- Loading mishaps
- Material spills
- Inadequate packaging of materials
- Mixing of incompatible materials









Objectives

Recognize

- Required training for employees who perform HAZMAT packaging & transportation functions
- The purpose of DOT regulations and how they are arranged
- The arrangement of regulations in 49 CFR
- DOE compliance requirements with regard to DOT regulations
- The hazards for HAZMAT in specific classes/divisions

Objectives—cont

- General information on the communication of the hazards of the materials that will be transported
- Which fines can be assessed for failure to comply with regulations

DOT Training Requirements

49 CFR 172.704—areas of Training

- General Awareness/Familiarization
- Function Specific
- Safety
- Security Awareness
- In-Depth Security

Training Frequency

- Must be completed within 90 days of employment
- May work under direct supervision
- Refresher required every 3 years

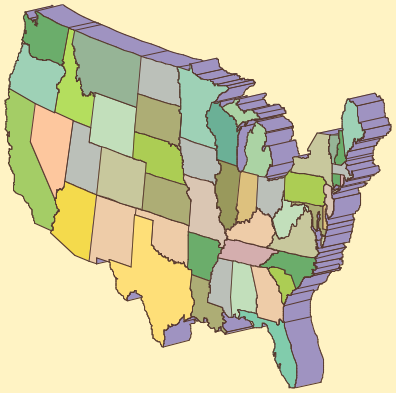
Evolution of the DOT Regulations

- Initial concern was the safe transport of
  - Explosives
  - Shock-sensitive materials
  - Unexposed film
- HAZMATs
  - Others identified
- DOT Transportation Requirements
  - 49 CFR

Hazardous Materials Transportation Uniform Safety Act - 1990

Federal Government

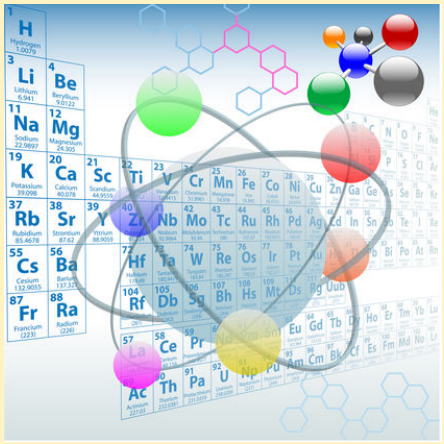
49 CFR



Material Movement

Other regulations

Universe of Chemicals According to the DOT



Hazmat Waste

Hazardous Materials

Hazardous Substance

Marine Pollutants

Arrangement of the Regulations in 49 CFR

- *Part 171* – General Information, Regulations, and Definitions
- *Part 172* – Hazardous Materials Table, Special Provisions, Hazardous Materials, Communications, Emergency Response Information, Training Requirements, and Security Plans
- *Part 173* – Shippers—General Requirements for Shipments and Packaging
- *Part 177* – Carriage by Public Highway
- *Part 178* – Specifications for Packagings

Parts, Subparts, and Sections

49 CFR 172, **Subpart C**, "Shipping Papers"

- **172.200** - Applicability
- **172.201** - General Entries
- **172.202** - Description of Hazardous…
- **173.203** - Additional Descriptions
- **172.204** - Shipper's Certification
- **172.205** - Hazardous Waste Manifest

Sections are further organized into subsections, paragraphs, subparagraphs, etc.

Activity No. 2

Parts, Subparts, and Sections—cont

Standards for . . .	are provided in . . .
Polychlorinated biphenyls (PCBs)	40 CFR 761
Hazardous substances	40 CFR 302
Hazardous wastes	40 CFR 260–263
Asbestos	40 CFR 61
Radioactive materials	10 CFR 60–73

LANL Compliance with 49 CFR Requirements

Procedure P151-1, *LANL Packaging and Transportation Program Procedure*

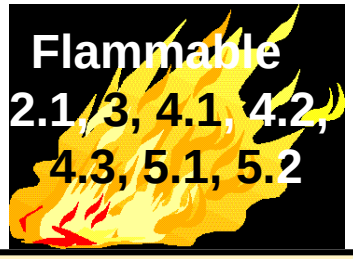
- **49 CFR 107 – 178**
- **DOE Order 460.1 (current revision)**
- **Carriers and shippers are responsible for fully complying with DOT regulations**

DOT Hazard Classes Based on Characteristics

9 DOT Hazard Classes

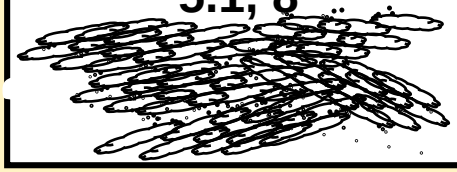
1. Explosives
2. Gases
3. Flammable and combustible liquid
4. Flammable solids
5. Oxidizers and organic peroxides
6. Poisons
7. Radioactive materials
8. Corrosives
9. Miscellaneous hazardous materials

Know the Hazards of the Material(s)



Poisons
2.3, 6.1

Corrosives
5.1, 8



Reactives
4.1, 4.2, 4.3,
5.1, 5.2 (1.1-1.6)

Others
2.2, 7, 9

Hazardous Materials/Substance

- Listed in 49 CFR 172.101 Appendix A
- In a quantity, in one package, that equals or exceeds the reportable quantity (RQ) listed in Appendix A
- When in a mixture or solution,
  - For radionuclides, conforms to paragraph 7 of Appendix A
  - For other than radionuclides, conforms to 171.8 definition of “hazardous substance” 171.8(3)(ii)

Communication of Hazards

You are responsible for

- **Recognizing** the hazards of the materials being transported
- **Responding** accordingly if problems arise during transportation
- **Complying** with DOT regulations

Recognizing HAZMAT in Transportation

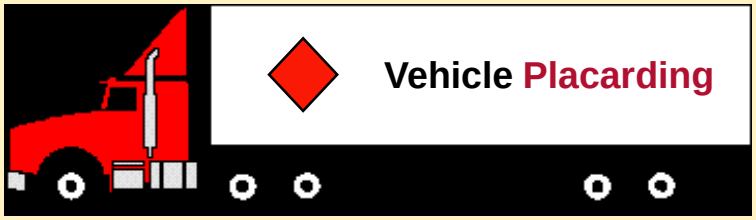
DOT communication items used to identify HAZMAT include packaging, marking, labeling, shipping papers, and placarding

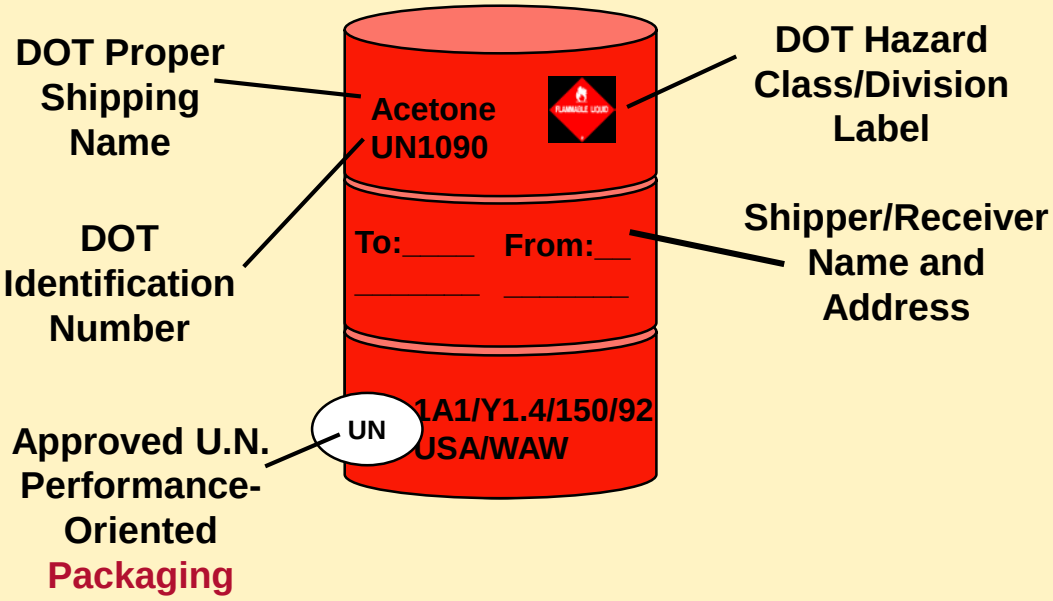
Hazardous Material
Shipping Paper

To: **From:**

1 Drum; Acetone; 3; UN 1090: PG II

55 gallons





DOT Compliance Is the Law . . .

Failure to comply can result in

- Criminal penalties … up to 5 years
  … up to 10 years for the release of hazardous materials that results in death or bodily injury to any person
  and/or … up to $500,000 - corporation
  … up to $250,000 – individual
- Civil penalties … up to $75,000 for each violation
  … up to $175,000 for each violation resulting in death, serious illness or injury, or substantial destruction of property

General Awareness/Familiarization

Self-Assessment

HAZMAT Transportation Security

In the wrong hands, HAZMAT can pose a significant security threat. At LANL, potentially significant security threats exist with operations involving certain materials.

LANL's objective is to handle and process all shipments with the least possible exposure to theft, misuse, and destruction or harm to workers, the public, and the environment.

Objectives

- Recognize -
  - DOT's HAZMAT security plan requirement
  - That the transportation of certain HAZMAT can pose security risks
  - DOT's HAZMAT security training requirements
  - And respond to possible security threats

HAZMAT Security Plan

- DOT PHMSA added Subpart I, *Security Plans*, to 49 CFR 172.800
- Operations Support – Packaging and Transportation
- *LANL Transportation Security Plan*
- HAZMAT per 49 CFR 172.800(b) can pose security risks

Security Awareness Training

- Specified in 49 CFR 172.704
  - Security awareness training
- Required for each HAZMAT employee
- Must include how to
  - Recognize a possible security threat
  - Respond to a possible security threat
- New HAZMAT employees must be trained within 90 days

Transportation Security Threats

DHS possible indicators of terrorist surveillance:

- Unusual or prolonged interest in security measures
- Unusual behavior
- Observation of security reaction drills or procedures
- Increase in anonymous telephone or e-mail threats in conjunction with suspected surveillance incidents
- Foot surveillance involving two or three individuals
- Mobile surveillance
- Prolonged static surveillance using operatives
- Discreet use of still cameras, video recorders, or note taking at non-tourist-type locations
- Use of multiple sets of clothing and/or identification, or use of sketching materials

Responding to Security Threats

Security is the responsibility of every LANL worker!

All employees are responsible for the following:

- Reporting observations of breaches in security to your supervisor
- As your job duties require, reporting observations of breaches in security to DOE officials
- As your job duties require, reporting observations of breaches in security to other external authorities as needed

HAZMAT Security Plan

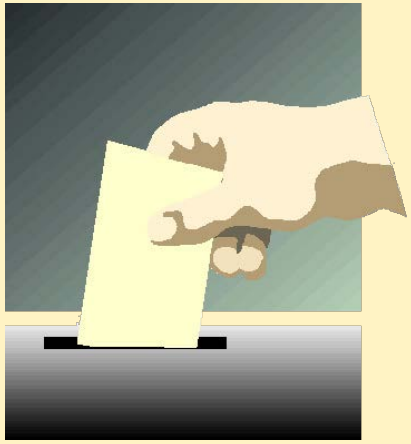
The LANL Transportation Security Plan -

- Must be completed by a HAZMAT employee:
  - if transporting anything in the quantities listed in 49 CFR 172.800 (b), and
  - within 90 days of employment.

Improving Performance

All employees are encouraged to contribute suggestions to

- Supervisors or managers
- LANL Lessons Learned Program

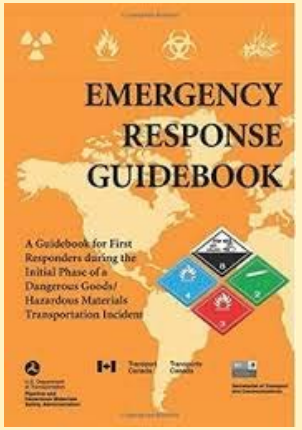


Safety


CAUTION


FLAMMABLE
3


1.1
1


EMERGENCY
RESPONSE
GUIDEBOOK
A Guidebook for First Responders during the Initial Phase of a Dangerous Goods/ Hazardous Materials Transportation Incident


POISON
6


WARNING


DANGER


CORROSIVE
8

Objectives

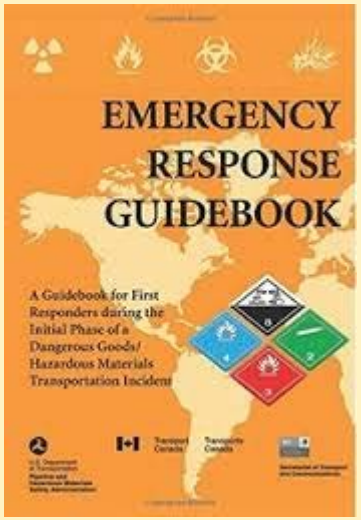
On completion of this section, you will be able to

- Reference the different sections of the ERG for specific information
- Select from appropriate actions (contained in the ERG) to take for a given HAZMAT leak or spill
- Identify actions that you must take to ensure that HAZMAT incidents are properly reported
- Recognize your personal responsibilities with regard to incidents that involve the transportation of HAZMATs

Recognition of Hazards

The hazards associated with HAZMAT are communicated through

- Package marking listed in 49 CFR 172.300–172.338
- Labels listed in 49 CFR 172.400–172.450
- Placards listed in 49 CFR 172.500–172.560
- The Emergency Response Guidebook (ERG) pages
- Shipping Papers listed in 49 CFR 172.200–205

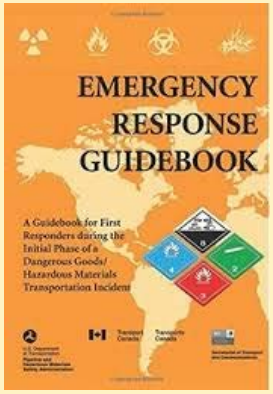


Emergency Response Information

Emergency response information must be available at all transportation locations

- Accompanying each HAZMAT shipment
- Present at each transportation facility

49 CFR 172.602 requires that specific information be listed



The DOT Emergency Response Guidebook Contains Vital Safety Information

- White Pages
  - Reference the DOT placards
- Yellow and Blue Pages
  - Reference the DOT ID # or DOT PSN
- Orange Pages
  - Identify specific response actions
- Green Pages
  - Identify “isolation” distances if no FIRE present

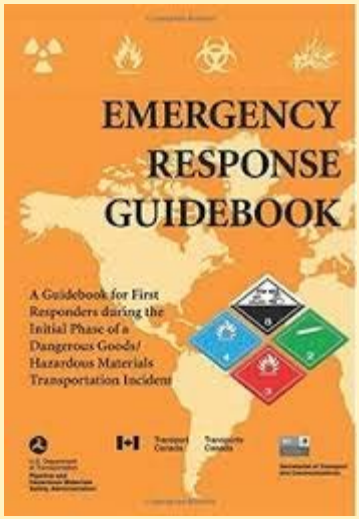
HAZMAT Transportation Safety Practices

Emergency

Response

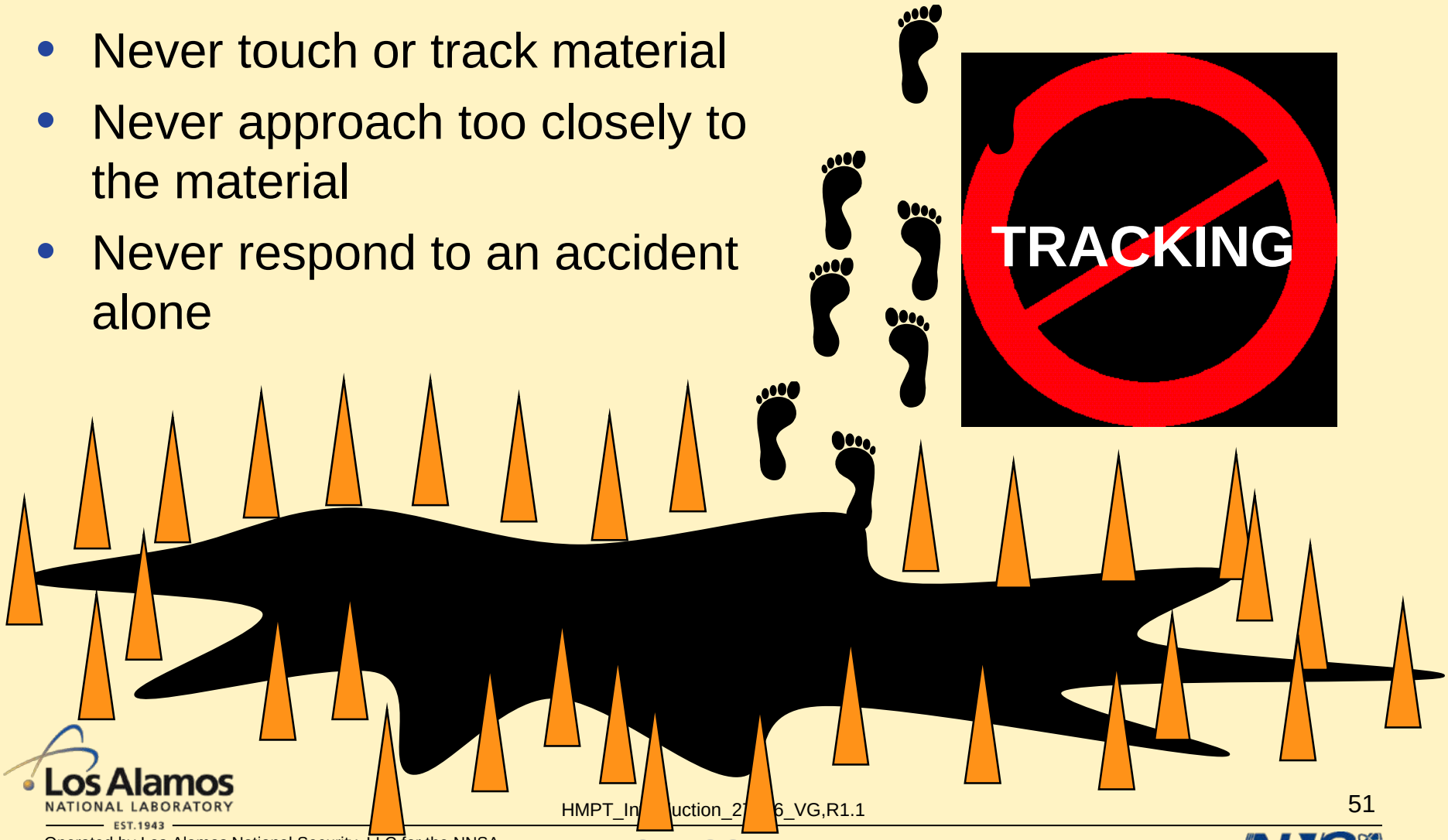
Guidebook

Work Exercise



Appropriate Actions for Leaks or Spills

- Never touch or track material
- Never approach too closely to the material
- Never respond to an accident alone



The GIN Principle for Response

Step	Action
G	**Get** away from the material
I	**Isolate** the area and deny entry
N	**Notify** appropriate personnel and first aid

Always use extreme care when dealing with an accident!

Proper Response Requires Proper Training

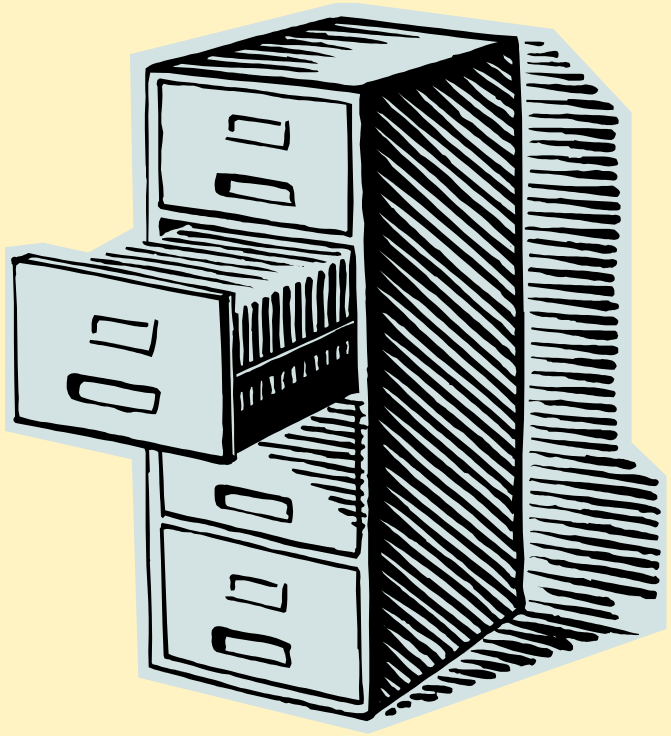
- Appropriately trained in emergency response techniques
- Have protective equipment and clothing available
- Properly trained in use of your protective equipment
- Accompanied by another individual—not going it alone

Situations Requiring Immediate DOT Notification

- Death
- Hospitalization
- General public evacuation ≥1 hour
- Road closures ≥1 hour
- Radioactive material incidents
- Infectious substance incidents

Written Incident Reports Must Be Filed with the DOT

- For any HAZMAT or hazardous waste release in transportation
- Specific DOT form must be used
- Filed with the DOT within 30 days



Hazardous Substance Releases

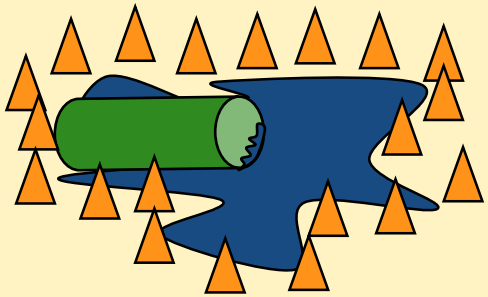
Hazardous Substances Require Special Notification when Released

- National Response Center
- Applicable to Reportable Quantities (RQs)

Personal Responsibility

You are responsible for

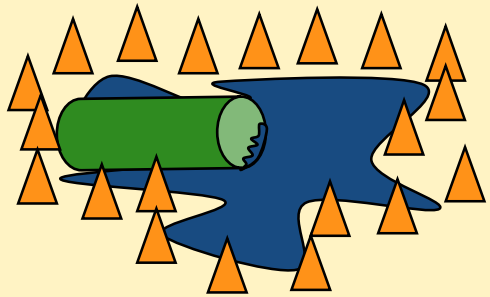
- Reporting emergency conditions and taking necessary actions
- The safety of your neighbors, friends, and fellow workers
- The safety of HAZMAT during transportation



Personal Responsibility—cont

You MUST

- Know how to properly handle a HAZMAT transportation incident
- Interpret information from available materials
- Respond only if properly trained, equipped, and accompanied by someone else



Personal Responsibility—cont

In case of an onsite accident, incident, spill or leak that involves HAZMAT,

- Call Emergency Response or 667-6211
- Follow the GIN principle
- Call 911

Trained personnel will respond.

HAZMAT Transportation Safety

Self-Assessment

HMPT: Introduction
Course 27916

Please complete the class evaluation before leaving to take the TEST.