

# DOT/HIGHWAY AND IATA/AIR General Awareness, Function Specific, and Security Awareness REFRESHER COURSE



Department of  
**Environment &  
Conservation**

2016

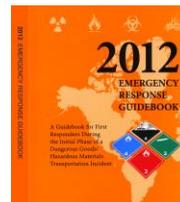
Linda H. Lawhorn, CHMM CDGP

# INTRODUCTION

- ▶ Why are we here?
  - 49 CFR 172.704(c)(2)
  - Two years or three?
- ▶ Sign-in Sheet
- ▶ Test
- ▶ Reminder: This is a REFRESHER.

# Books

- ▶ You need the current version of the regulations to be assured of making compliant shipments. In addition, visiting auditors will check to see that you're using current regulations.
  - 49 CFR is available for free on-line ([e-CFR](#)) or fairly inexpensively (<\$60).
  - IATA Dangerous Goods Regulations are not free, nor are they cheap (>\$200), but fines for noncompliant shipping are higher.
- ▶ Don't forget the ERG! Current version is 2012.



# THE PROCESS

- ▶ Identify
- ▶ Classify
- ▶ Package
- ▶ Mark / Label / **Placard**
- ▶ Document

Let's talk about highway shipping first.



# Identify

- ▶ Gather information about the chemical nature, the quantity, and the packaging of the material you're shipping.
  - ▶ Make use of Safety Data Sheets, chemical references, contact with manufacturers.
- 

# Classify

- ▶ Reference all hazard class definitions
  - 49 CFR 173.50 – 477
- ▶ Consider Packing Group
- ▶ Don't forget RQ
  - 49 CFR 172.101 App A Tbl 1
- ▶ Consult the “Big Table” for PSN choices
- ▶ EXTRA: Can Class 9 be a subsidiary hazard? 173.140

# Package

- ▶ What types of packaging are authorized? available?
- ▶ If UN-spec. is required, choose compatible packaging.
- ▶ **IMPORTANT:** Read Sections in 8A carefully – this is where you get relief from requirements.

49 CFR 172.101 Col. 8



# Marking

- ▶ Common markings include:
  - Proper shipping name, UN number
  - TO/FROM information
  - LQ marking, arrows, RQ

49 CFR 172.300

# Labeling

- ▶ Labels are identified in Column 6 of the Big Table
- ▶ Must be in close proximity to the PSN and UN number.

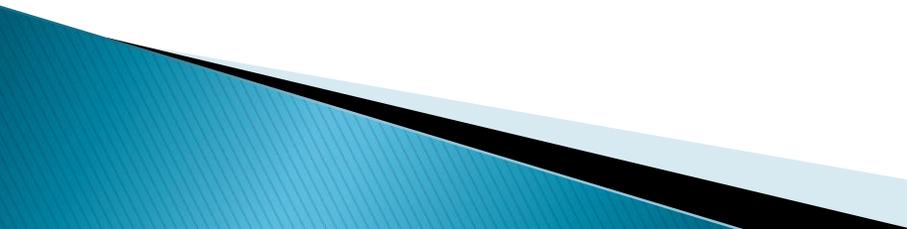
49 CFR 172.400



# Documentation

- ▶ DOT's required elements of a shipping paper
  - To/From
  - Basic Description
  - Emergency Response Information/ Telephone Number
  - Shipper's Certification
  - Keep shipping papers for two years

49 CFR 172.200



# Documentation

SEQUENCE is specified for the DOT Basic Description:

- UN, PSN, Class, PG, Quantity

Additional information appears after the basic description.



# Placarding

- ▶ Placarding – Tables 1 and 2
  - Table 1 – Placard any amount
  - Table 2 – Placard >1001 lbs.

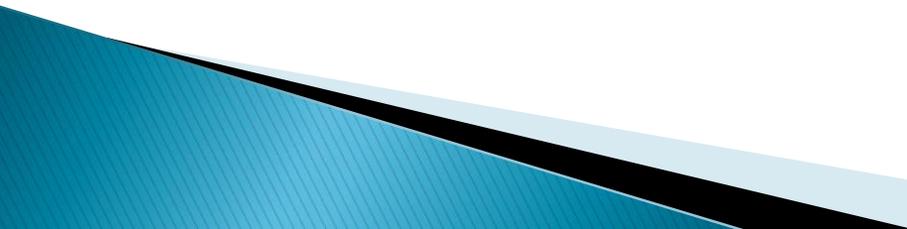
NOTE: 172.506(a) offering,  
172.516(c)(4) location

**49 CFR 172.500**

# Loading and Unloading

- ▶ Hazardous materials secured against movement
- ▶ No smoking
- ▶ Keep fire away
- ▶ Set handbrake
- ▶ Use appropriate tools

49 CFR 177.834



# Separation and Segregation

SEGREGATION TABLE FOR HAZARDOUS MATERIALS

Class or division	Notes	1.1 1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3 gas zone A	2.3 gas Zone B	3	4.1	4.2	4.3	5.1	5.2	6.1 liq- uids PG I zone A	7	8 liquids only	
Explosives .....	1.1 and 1.2	A	*	*	*	*	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Explosives .....	1.3		*	*	*	*	X		X	X	X		X	X	X	X	X			X
Explosives .....	1.4		*	*	*	*	○		○	○	○		○	○			○			○
Very insensitive explo- sives.	1.5	A	*	*	*	*	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Extremely insensitive explosives.	1.6		*	*	*	*														
Flammable gases .....	2.1		X	X	○	X			X	○							○	○		
Non-toxic, non-flam- mable gases.	2.2		X			X														
Poisonous gas Zone A	2.3		X	X	○	X	X				X	X	X	X	X	X				X
Poisonous gas Zone B	2.3		X	X	○	X	○				○	○	○	○	○	○				○
Flammable liquids .....	3		X	X	○	X			X	○					○		X			○
Flammable solids .....	4.1		X			X			X	○							X			○
Spontaneously combus- tible materials.	4.2		X	X	○	X			X	○							X			X
Dangerous when wet materials.	4.3		X	X		X			X	○							X			○
Oxidizers .....	5.1	A	X	X		X			X	○	○						X			○
Organic peroxides .....	5.2		X	X		X			X	○							X			○
Poisonous liquids PG I Zone A.	6.1		X	X	○	X	○				X	X	X	X	X	X				X
Radioactive materials ...	7		X			X	○													
Corrosive liquids .....	8		X	X	○	X			X	○		○	X	○	○	○	X			

49 CFR 177.848

Exercise 1: Cards

# Exercise 2: Paint related material

- ▶ 1 gallon can
- ▶ 3 55-gal drums

IP9151 Thinner



# Paint related material

IP9151 Thinner is described on the MSDS as “UN1263, Paint related material, 3, III”.

Big table says Class 3 label, 173.150 and .173 for packaging.

# Paint related material

1 one-gallon can:

173.150(b), Limited Quantities

Excepted from labeling,  
specification packaging if  
combination is used, shipping  
papers, and placarding.

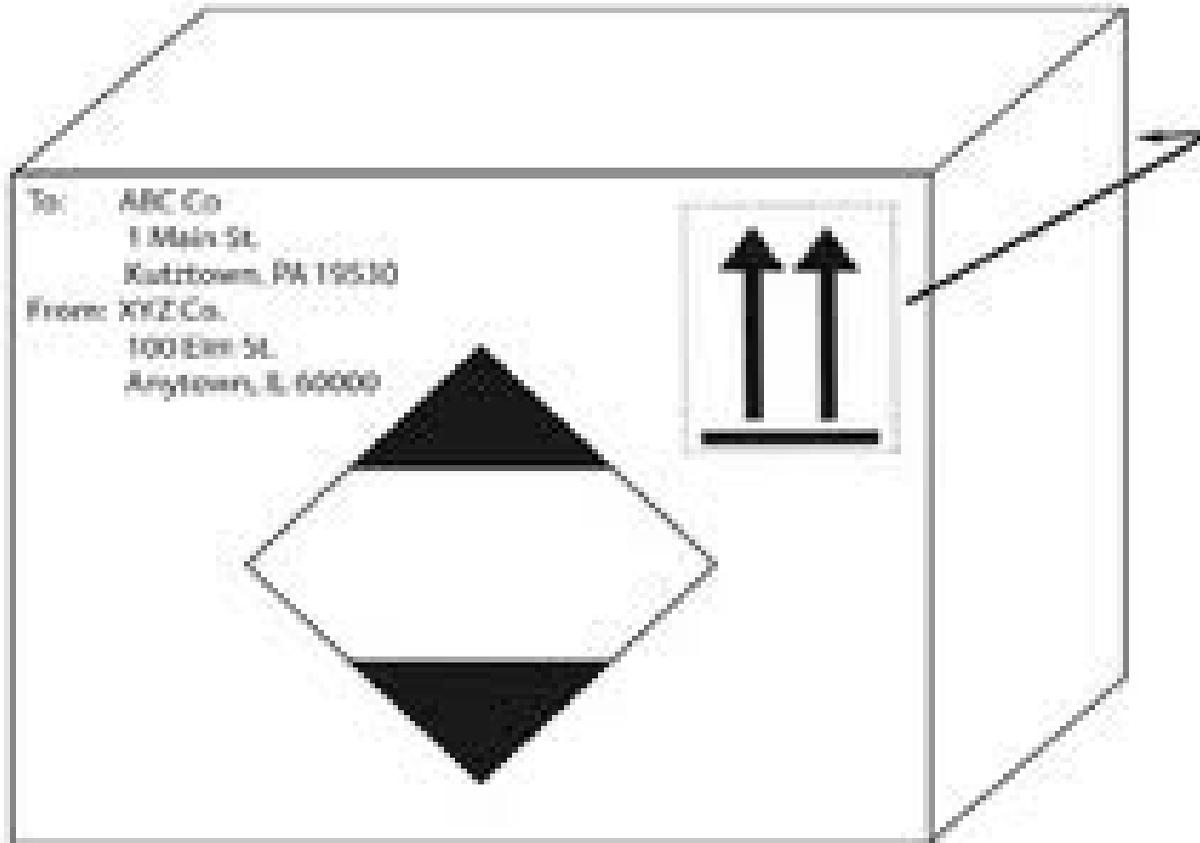
Gross weight up to 66 lbs., inner  
packagings up to 1.3 gallons  
each.

# Paint related material

Package in strong packaging,  
inside and out, to prevent  
damage and leakage

Mark per 172.312 arrows, .315  
Limited Quantity marking

# Paint related material



# Paint related material

3 55-gal drums, 400 lbs each:

Packaging, 173.173(a) and (b)(1) which says to use 173.203. (c) says closed-head drums are authorized. NOTE: follow closure instructions closely. **WHY?**

Marking, 172.301, “Paint-related material, UN1263”, TO/FROM information

# Paint related material

Labeling, see Column 6

Documentation, 172.201

**YELLOW** STRAIGHT BILL OF LADING - NOT NEGOTIABLE  
**YELLOW FREIGHT SYSTEM, INC. YFSY**  
 Questions? Contact Yellow Freight's 24 Hour Customer Service Center at:  
**800-610-6500**  
 You may request pickups, trace shipments or learn more about our other services at: [www.yellowfreight.com](http://www.yellowfreight.com)

DATE:

DRIVER AFFIX  
 PRO NUMBER  
 LABEL HERE.

SHIPPER (ORIGIN)			
FROM: SHIPPER		SHIPPER'S NUMBER	
STREET		CUSTOMER P.O. NO.	
CITY, STATE, ZIP		BILL TO (MAILING ADDRESS)	
CONSIGNEE (DESTINATION)		BILL TO (MAILING ADDRESS)	
TO: CONSIGNEE		BILL TO: NAME	
STREET		ADDRESS	
CITY, STATE, ZIP		CITY, STATE, ZIP	
PIECES	HAZ MAT	KIND OF PACKAGING, DESCRIPTION OF ARTICLES, SPECIAL MARKS AND EXCEPTIONS (Subject to Correction) LIST HAZARDOUS MATERIALS FIRST	WEIGHT LBS. (Subject to Correction)
3	X	UN1263, Paint-related material, 3, III	1200 lbs
Drums		ERG 128	

# Paint related material

Placarding, 172.504, Class 3 appears on Table 2, so you placard the truck if you have more than 1001 lbs. At 1200 lbs., you must placard the truck. Offer placards to the driver.

# Paint related material



Did you think about RQ? Thinner contains cyclohexanone and isophorone

# Exercise 3: Jet engine with 0.5 L fuel

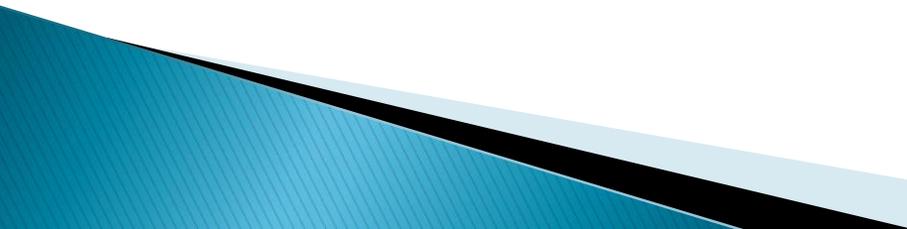
UN3166, Engine, internal combustion, 9

Special provision 135,  
packaging per 173.220

# Jet engine with 0.5 L fuel

173.220(b)(1): Make sure fuel does not exceed 0.5 L and will not leak.

(h)(1): not subject to ANY OTHER requirements by highway. Hooray!



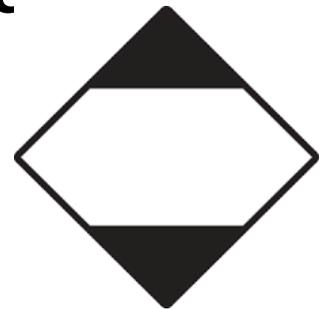
## Exercise 4: Limited Quantity

Assume you need to ship a box you received containing 12 aerosol cans of Class 2.1, 3 oz. each.

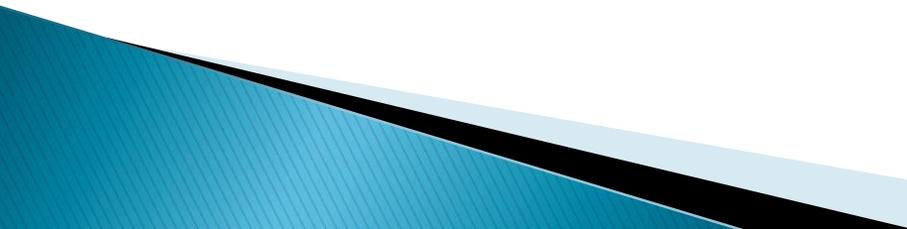
172.101, Aerosols, leads to 173.306 for packaging.

# Limited Quantity

173.306(a) and (i): limited quantities of compressed gases shipping by highway are excepted from labeling, specification packaging, placarding, and shipping papers. Must be in combination packaging and marked. Gross weight may not exceed 66 lbs.



# Materials of Trade

- ▶ Everything but explosives, radioactives, and infectious substances not otherwise classified.
  - ▶ Relief from most requirements.
  - ▶ No common carriers allowed.
  - ▶ See **49 CFR 173.6** for details.
- 

# READY FOR A BREAK? Here's something to think about...

Benefits of earning credentials (CHMM, CDGP, CIH, CSP, CHP, CET, ...)

- Median annual base salary is \$100K, 20% higher than non-credentialed at \$83K.
- Considering years of experience, salaries are about 10% higher for credentialed people with 5-14 years of experience than people of the same experience with no credential.

I have a credential – now what?

- National conference
- EHMM Course
- Desk Reference
- Educational programs
- Website
- Leadership workshop
- Advocacy
- Awards Program
- Regulatory updates
- Chapters



**Be Back at 3:15 SHARP!**



# Now Let's Talk About Air Shipping

## Same Process:

- Identify
- Classify
- Package
- Mark/Label
- Document – EXCEPT

Where's Placarding?



# DGR – Sections of the Book

1. Applicability

2. Limitations

3. Classification

4. Identification

5. Packing

7. Marking & Labeling

8. Documentation

9. Handling

10. Radioactive Material

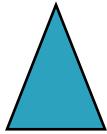
Appendices and Other

# DGR Reminders

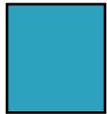
- ▶ Early each year when you get your new DGR, always go to the section marked “Significant Changes and Amendments in the (new) Edition” to see if any of the summarized changes impact your shipments.
  - ▶ See page xxiii.
- 

# DGR Reminders

See page xxv.



Change to an item



Addition of a new item

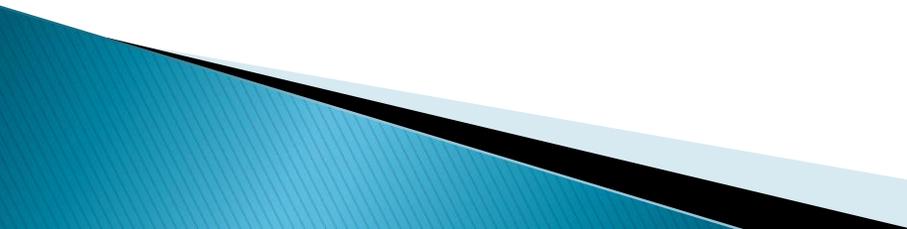


Cancellation of an item

# Checklists Available

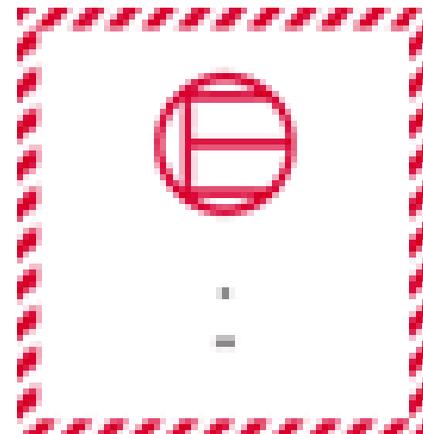
- ▶ Dangerous goods acceptance checklists appear at the end of the DGR.
  - ▶ See pages 1057 – 1061.
- 

# Section 2 – Limitations

- ▶ “Excepted Quantities” – 2.6 (p. 29–32)
  - ▶ “Limited Quantities” – 2.7 (p. 32–34)
  - ▶ List of State and Operator Variations  
(usually USG and FX for many shipments)  
(p. 35)
- 

# More about Excepted Quantities

- ▶ Dangerous Goods in Excepted Quantities 2.6
  - See Table 2.6.A for quantity limitations.
  - See Figure 2.6.B for mark used in lieu of shipper's declaration of dangerous goods.
  - Packaging is not UN-spec.



# More about Limited Quantities

- ▶ Dangerous Goods in Limited Quantities 2.7
  - Packing instructions preceded by the letter “Y” apply to Limited Quantity shipments.
  - Limited Quantities normally are shipped in non-specification packaging.
  - All requirements are identical to fully-regulated packages EXCEPT the use of non-spec. packaging.

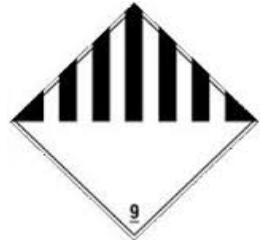
# Section 3 – Classification

- ▶ Class 1 Explosives
- ▶ Class 2 Gases
- ▶ Class 3 Flammable Liquids
- ▶ Class 4 Flammable Solids
- ▶ Class 5 Oxidizers / Organic Peroxides



# Classification

- ▶ Class 6 Toxics & Infectious Substances
- ▶ Class 7 Radioactives
- ▶ Class 8 Corrosives
- ▶ Class 9 Miscellaneous



# Section 4 – Identification

- ▶ **Selecting a Proper Shipping Name (PSN)**
  - Check for its name.
  - Check MSDS for synonyms.
  - Check for chemical family.
  - Check for use names.
  - Compare its properties with hazard class definitions; if it meets a definition use the n.o.s. designation for that hazard class (p. 171).

# Identification

- Column F: Excepted Quantities designation
- Column M – Special Provisions–
  - Always, always read these! p. 371
- Column N – ERG Code–
  - NEVER USE THESE CODES! THEY'RE NOT THE "ERG" YOU'RE FAMILIAR WITH! p. 188
- Always note the special symbols in the left margin – they're listed in Appendix B (p.823) if you forget what they mean.

# Section 5 – Packing

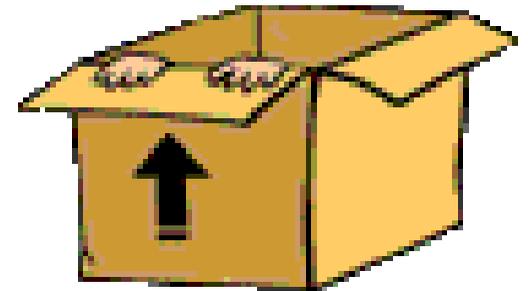
Secure closure?

Capable of withstanding conditions incident to transportation?



# Packing

- ▶ Check State and Operator variations referenced on the instructions.
- ▶ Remember the difference in “single” and “combination” packaging – LTD QTY packages are NEVER single packagings.

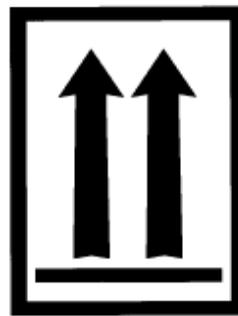
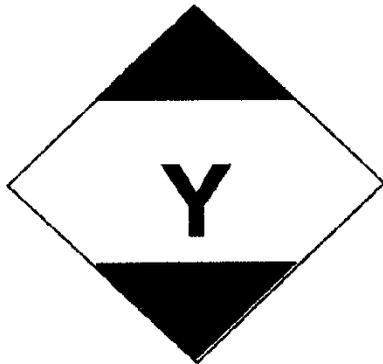


# Section 7 – Marking & Labeling

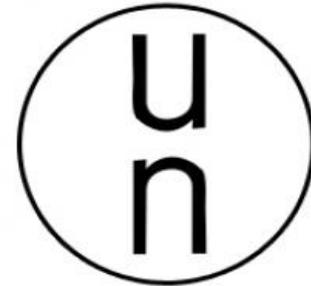
- ▶ Markings Required by 7.1.4.
  - Proper shipping name.
  - Corresponding UN or ID number(s) preceded by the letters UN or ID.
  - TO and FROM information

# Marking & Labeling

- ▶ Other Markings
  - Limited Quantity
  - Orientation arrows (two) for liquids
  - RQ
  - UN specification marking on the outer packaging (if not LTD QTY)



Package orientation



# Marking & Labeling

- ▶ Hazard class labels must bear the class or division number in the bottom corner of the label.
- ▶ Labels must be placed on the package on point.
  - if the package dimensions prevent a “diamond” placement, you may rotate 45 degrees to a “square” placement.
- ▶ Labels must be near the proper shipping name and the address information.



# Section 8 – Documentation

**SHIPPER'S DECLARATION FOR DANGEROUS GOODS** (Provide at least three copies to the airline.)

Shipper		Air Waybill No.			
Consignee		Page of Pages Shipper's Reference Number			
<p>Two completed and signed copies of this Declaration must be handed to the operator</p> <p><b>TRANSPORT DETAILS</b></p> <p>This shipment is within the limitations prescribed for: (delete non applicable)</p> <table border="1"> <tr> <td>PASSENGER AND CARGO AIRCRAFT</td> <td>CARGO AIRCRAFT ONLY</td> </tr> </table> <p>Airport of Departure</p> <p>Airport of Destination:</p>		PASSENGER AND CARGO AIRCRAFT	CARGO AIRCRAFT ONLY	 <p><b>WARNING</b></p> <p>Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.</p> <p>Shipment type: (delete non-applicable) NON-RADIOACTIVE RADIOACTIVE</p>	
PASSENGER AND CARGO AIRCRAFT	CARGO AIRCRAFT ONLY				
<b>NATURE AND QUANTITY OF DANGEROUS GOODS</b>					
Dangerous Goods Identification					
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group		
<b>Additional Handling Information</b>					
Emergency Telephone Number					
<p>I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable International and National Governmental Regulations. I declare that all of the applicable air transport requirements have been met.</p>		<p>Name/Title of Signatory</p> <p>Place and Date</p> <p>Signature (see wording above)</p>			
<p>FOR RADIOACTIVE MATERIAL SHIPMENT ACCEPTABLE FOR PASSENGER AIRCRAFT, THE SHIPMENT CONTAINS RADIOACTIVE MATERIAL INTENDED FOR USE IN OR INCIDENT TO RESEARCH, MEDICAL DIAGNOSIS, OR TREATMENT.</p>					

# Emergency Response Phone Number

- ▶ Required by USDOT in 49 CFR 172.604
  - ▶ Contract providers include 3E, Chemtel, Infotrac, and Chemtrec. Do you know how your company complies?
- 

## Exercise 5 – Brayco 460

- ▶ Assume you have 2 L of Brayco 460 that fills the reservoirs in a piece of equipment. How is the equipment shipped by air?

# Brayco 460

- ▶ Review the MSDS for information to make shipping determinations.
  - It's oil (p. 1)
  - It's an irritant (p. 1)
  - FP is >140 degrees F (p. 2, 132 °C = 269 °F)
  - No toxicity data provided (p. 4)
  - No pH implications (p. 4)
  - NOTE SECTION 14:
    - Not classified as hazardous for transport (DOT, TDG, IMO/IMDG, IATA/ICAO)

# Brayco 460

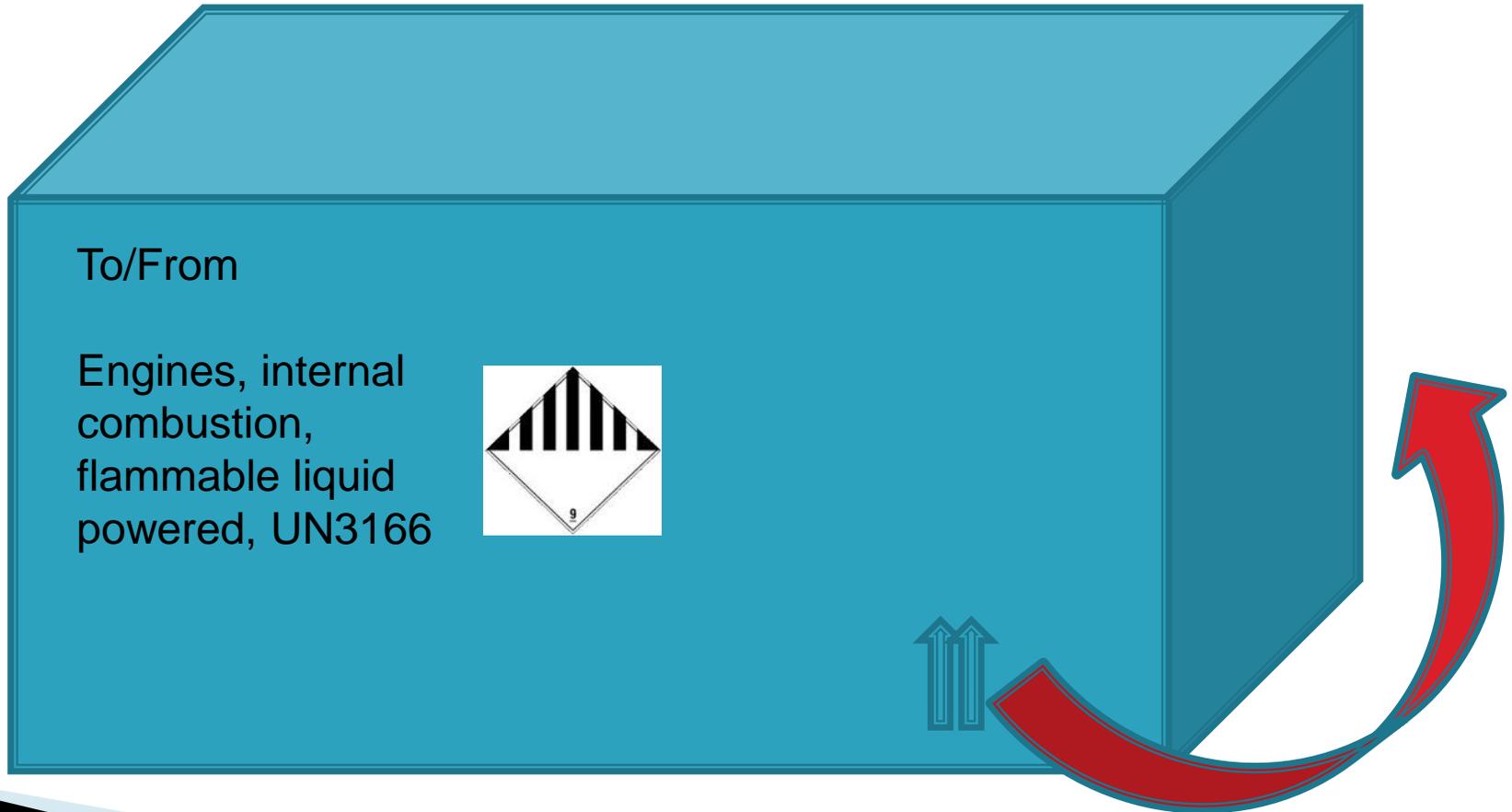
- Keep SDSs updated
- Don't always trust the transportation section – review the physical characteristics of the material
- Don't forget to check for RQs!



# Exercise 6: Jet engine with 0.5 L fuel

- ▶ You're asked to ship a jet engine containing 0.5 L of jet fuel.
- ▶ UN3166, Engine, internal combustion, flammable liquid powered, 9
- ▶ Packing Instruction 950
- ▶ Check the Special Provisions first
  - None apply to your outbound engines

# Jet engine with 0.5 L fuel



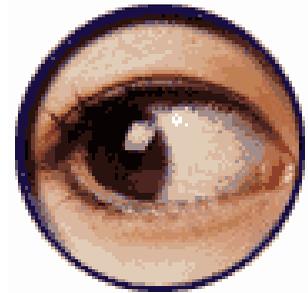
# Hazardous Waste Aspects Review

- ▶ Hazardous waste is hazardous materials by definition (171.8), and therefore hazwaste shippers are subject to all the same requirements as other hazmat shippers.
- ▶ There is significant overlap in the EPA hazwaste regs and the DOT hazmat regs, but they are not identical.
- ▶ Wearing two hats, generator and shipper, is fertile ground for mistakes to be made.



# Data Consistency

- Shipment data appears in many forms between generation and disposition
  - Drum logs
  - Chains of custody
  - Analytical Data
  - Historical/process knowledge
  - Waste profile
  - Hazardous waste manifest
  - Certificate of Disposal

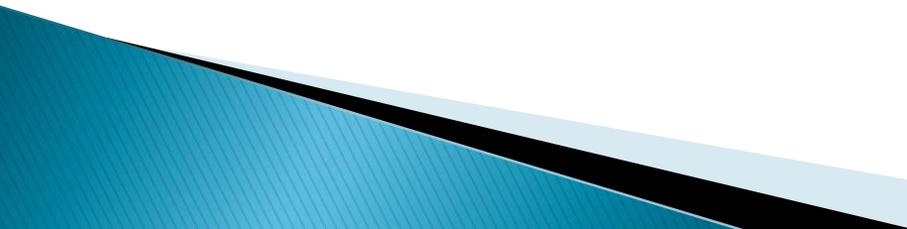


# Identification and Classification

- Waste codes can provide clues to DOT classification: Class 3, Class 5.1 = D001
- But not always: Class 8  $\neq$  D002
- Always check hazard class definitions: hazwaste quite often meets the definitions for classes other than 9.
- Don't forget to check RQ!



# Packaging

- Make sure the packaging you purchase for waste disposal meets the appropriate specification before you fill it.
    - Repackaging is expensive.
  - Pay particular attention to the mass limits.
    - Overfilling a container is dangerous and voids the certification.
  - Pay particular attention to the closure instructions.
    - DOT's new favorite thing to check.
- 

# Marking and Labeling

- EPA's marking is specific language that you are probably placing on your waste containers via a big yellow square. NOT a label.
- Fill out completely although EPA doesn't require it – helpful later.
- Note the spaces for your DOT information on the lower half of many of these. You can place your DOT label immediately beside this marking instead of duplicating the information in separate markings.

**HAZARDOUS WASTE**

STATE AND FEDERAL LAW PROHIBIT IMPROPER DISPOSAL. IF FOUND, CONTACT THE NEAREST POLICE OR PUBLIC SAFETY AUTHORITY, THE U.S. ENVIRONMENTAL PROTECTION AGENCY, OR THE CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL.

GENERATOR INFORMATION:

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_ PHONE \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

MANIFEST TRACKING NO. \_\_\_\_\_

EPA ID NO. \_\_\_\_\_ OR WASTE NO. \_\_\_\_\_ ACCUMULATION DATE \_\_\_\_\_

WASTE NO. \_\_\_\_\_

CONTENTS COMPOSITION

PHYSICAL STATE:  SOLID  LIQUID HAZARDOUS PROPERTIES:  FLAMMABLE  TOXIC  CORROSIVE  REACTIVE  OTHER

**HANDLE WITH CARE!**

USE PROPER SHIPPING NAME AND UN OR NA NO WITH PRECEDES

LabelMaster® 800.831.0055 www.labelmaster.com

# Documentation

- Waste profile – who completes this? Nice when completed by your vendor, but check it CLOSELY. It is Generator's responsibility to properly characterize waste, not the vendor.
- Hazardous Waste Manifest – Also nice when the vendor does it for you, but it is your responsibility to make sure it's accurate.
- Don't forget your LDR or PCB cert!
- Keep for at least three years, paper or electronic.



The image shows a sample of a Hazardous Waste Manifest form. It is a complex document with multiple sections and a table. The top section contains fields for the generator's name, address, and contact information. Below this is a section for the transporter, followed by a section for the receiver. A large table in the middle is used for listing the waste, with columns for waste description, quantity, and other details. The bottom section contains fields for the generator's signature and date, and the transporter's signature and date. The form is titled 'Hazardous Waste Manifest' and includes a reference to the Resource Conservation and Recovery Act (RCRA).

# A Common Hazwaste Example

You are disposing 30 gallons of old paint. You have analytical data that shows the flash point of this liquid is 102 degrees F. Your disposal vendor has supplied you with a preliminary profile to review and the DOT information has been filled in for you:

***RQ, NA3082, Hazardous waste, liquid, n.o.s.,  
9, III (D001)***



# Classification



Note the **flash point** of 102 degrees F. This material falls within DOT's definition of Class 3 Flammable Liquid and must have a Class 3 proper shipping name.

- *Here's the rule: a material cannot have a Class 9 name (like "hazardous waste, solid, or liquid") if it meets any other hazard class definition.*

Furthermore, a liquid that has been assigned a **"D001" code** must also be Class 3 because much of the definition of EPA-ignitable is the same as DOT-flammable.

- *Another rule: examine the waste codes assigned by the generator and compare that information to DOT hazard class definitions to verify your DOT selections. And to verify proper code choice.*

# RQs and Manifest Entries

What about the RQ selection? Is it RQ because of a specific constituent in the paint? Or because of the code? Or because the vendor routinely calls everything “RQ”? Make sure you concur with the selection.

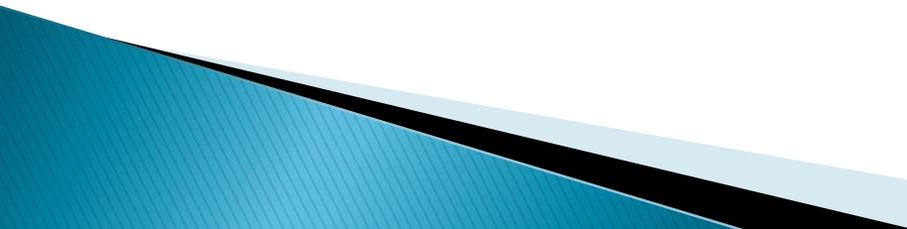
If you know the concentration of the actual constituent, and it appears on the RQ table, calculate the actual amount in the container – is it RQ?

If you know only the code, not the actual concentration, then you have to compare the waste weight to the RQ amount for the code (yes, they have RQs too!).

If neither of these is true but the vendor selected “RQ” anyway, make him change it.



# DOT Security Awareness

- ▶ March 25, 2003: DOT implemented new requirements for security training and security plans
  - ▶ All hazmat employees must receive security awareness training
  - ▶ Hazmat employers shipping certain high-hazard materials must develop a security plan and provide training to the employees on aspects of that plan.
- 

# Security Conditions

- ▶ Employees should remain alert as the company's first line of defense
  - ▶ Employees should report suspicious activities or objects
  - ▶ ALL Employees are responsible for facility security, not just management.
- 

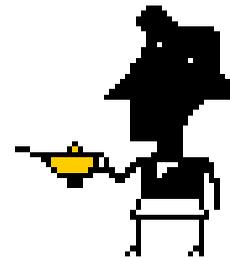
# Defeat the Top Three!

- ▶ DOT Training Requirements
  - 49 CFR 172.704
- ▶ Must you register?
  - 49 CFR 107.601
- ▶ Emergency Response Info and phone
  - 49 CFR 172.600



# Getting Information and Help

- ▶ DOT Hotline: 800.467.4922
- ▶ FedEx: 800.GO.FEDEX, ask for “Dangerous Goods” (Dr. Roy Parker for Class 7 questions)
- ▶ Edgewater Technical Associates
  - Linda H. Lawhorn, CHMM CDGP
    - 865.771.1011
    - Linda.Lawhorn@EdgewaterTech.net



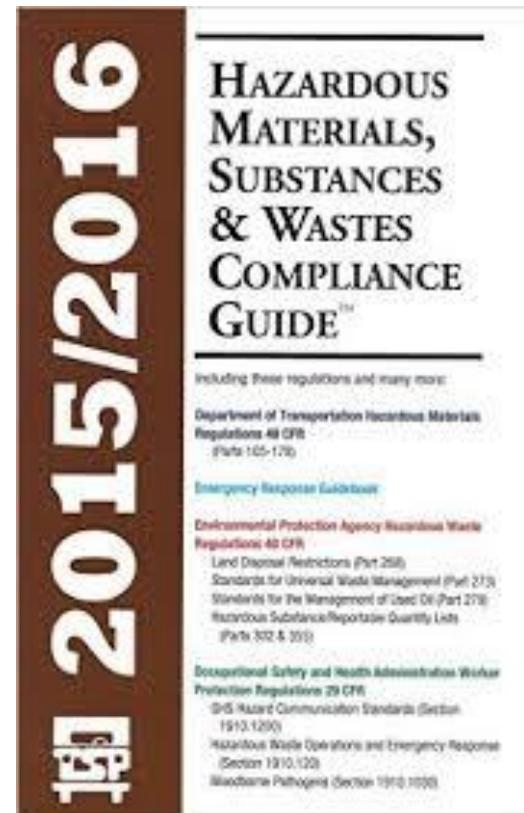
# CHALLENGE TIME



- ▶ Books and notes AND the instructor are available to you during the test.
- ▶ We'll go over it afterwards so you can make corrections.
- ▶ Make sure to have your supervisor sign your completion certificate which will be mailed to you SOON.
- ▶ Make sure to keep your test and completion certificate in a convenient location, along with your slide copies, in case a regulator wants to see what you learned.

ONE MORE THING...

# DOOR PRIZE!



## HAZARDOUS MATERIALS, SUBSTANCES & WASTES COMPLIANCE GUIDE™

Including these regulations and many more:

Department of Transportation Hazardous Materials  
Regulations 49 CFR  
(Parts 165-176)

### Emergency Response Subdivisions

Environmental Protection Agency Hazardous Waste  
Regulations 40 CFR

Land Disposal Restrictions (Part 258)  
Standards for Universal Waste Management (Part 273)  
Standards for the Management of Used Oil (Part 278)  
Hazardous Substance/Reportable Quantity Limits  
(Parts 302 & 303)

Occupational Safety and Health Administration Worker  
Protection Regulations 29 CFR

OSHA Hazard Communication Standards (Section  
1910.1200)  
Hazardous Waste Operations and Emergency Response  
(Section 1910.120)  
Bloodborne Pathogens (Section 1910.1030)