Materials for this unit:

- You should have a copy of the Emergency Response Guidebook, either in print or online, plus - paper and a pen or pencil

- The current electronic copy is available at:
  https://www.phmsa.dot.gov/hazmat/library/erg
- CERT safety protocol for hazmat
- Reading Placards
- Using the Emergency Response Guide (ERG)
- Response within CERT abilities
HAZMAT Stats

Pipeline and Hazardous Materials Safety Administration
Office of Hazardous Material Safety
All Incidents

Select chart measure:

Incidents

Chart showing data from 2003 to 2012 with categories for USCG-WATER, FRA-RAILWAY, FMCSA-HIGHWAY, and FAA-AIR.

Texas = 13407
● CERT team members must protect themselves and others, doing the greatest good for the greatest number

● CERT training is not sufficient to:
  ▪ deal directly with a hazardous substance, or
  ▪ rescue people affected by the substance

● MOVE AWAY and keep others safe
HAZMAT CERT Tasks

- OBSERVE – size up the incident
  - Location, wind direction, people affected
  - Substance involved
- REPORT
- EVACUATE & SET UP A PERIMETER
- DECONTAMINATION – consult ERG, use tepid/cold water, blot dry
- TRIAGE – any injuries
While CERT members should not get close to a hazmat incident, that does not mean they should abandon victims.

- Verbal support may be possible until professional responders arrive
- Victims may be talked into moving to a decontamination area
- The ERG also has suggested first aid cautions for each substance
If you recognize event as potential terrorism incident

- Notify OEM or 911 of potential terrorist incident
- Isolate the scene and deny entry
- Scan for secondary devices
- Do not drive through spills or clouds
- Position vehicles headed away from the incident for a quick departure
- Look for physical indicators:
  - Debris field
  - Casualties
  - Dead animals and vegetation
  - Unusual odors, color of smoke, vapor clouds
- Protect crime scene and evidence
CERT Team should wear full Personal Protective Equipment (PPE) to protect against accidental minor exposure, provide very limited protection, and keep out particulates & smoke

- Nitrile & work gloves
- Helmet
- Goggles
- Work boots or Galoshes (if available)
● CAUTION

- In any HAZMAT situation involving explosives or terrorist potential **DO NOT use radios or cell phones** within the evacuation zone and preferably within at least a half mile

- These electronic devices may:
  - Cause an static charge to build
  - Activate a radio frequency trigger device
● Observe ERG evacuation distances
● Evacuate upwind, uphill, upstream
NFPA 704* Response Guide Numbers

FLAMMABLE
4 Extremely flammable.
3 Ignores at normal temperatures.
2 Ignores when moderately heated.
1 Must be preheated to burn.
0 Will not burn.

REACTIVE
4 May detonate. Vacate area if materials are exposed to fire.
3 Strong shock or heat may detonate. Use monitors from behind explosion resistant barriers.
2 Violent chemical change possible. Use hose streams from a distance.
1 Unstable is heated. Use normal precautions.
0 Normally stable.

HEALTH
4 Too dangerous to enter vapor or liquid.
3 Extremely dangerous. Use full protective clothing.
2 Hazardous. Use breathing apparatus.
1 Slightly hazardous.
0 Like ordinary material.

Avoid use of water

* NFPA = National Fire Protection Association
Note that in the ERG, some of the explosive substance Guides say:

“Move people out of the line of sight of the scene and away from windows”

Does that translate into “TAKE COVER” for you?
Table of Placards

- Find the early pages of the ERG that depict the different placards used in the transport of dangerous goods. Should the placard on a vehicle be damaged, the general appearance gives a clue about the goods.

- Each group of placards is associated to a 3-digit guide number (**ORANGE** Section).

- **Caution**: The recommended guides should be considered as a last resort if the material cannot be identified by any other means.
TABLE OF PLACARDS AND INITIAL

USE THIS TABLE ONLY IF MATERIALS CANNOT BE SPECIFICALLY IDENTIFIED BY

RESPONSE GUIDE TO USE ON-SCENE

USING THE SHIPPING DOCUMENT, NUMBERED PLACARD, OR ORANGE PANEL NUMBER

111 112 114 134
DANGER EXPLOSIVES EXPLOSIVES

1.5 1.6 121 143
BLASTING AGENTS EXPLOSIVES

118 123 122 155
FLAMMABLE GAS

125 127 128 158
OXYGEN COMBUSTIBLE

FUEL OIL

INHALATION HAZARD

DANGER

DO NOT ENTER

INHALATION
HAZARD

MARINE POLLUTANT
Rail Car and Road Trailer ID Charts

- Find the pages that depict the general shapes of railcars and road trailers used in the transportation of dangerous goods. Their shape is another clue.

- Each shape is associated to a 3-digit guide number in the **ORANGE** Section (Table 1 is the **GREEN** section)

- **Caution:** The recommended guides should be considered as a last resort if the material cannot be identified by any other means.
RAIL CAR IDENTIFICATION CHART

Hopper Car
Dry Bulk 140

Box Car
Mixed Cargo 111

Pressure Tank Car
Compressed Liquefied Gases 117

Low Pressure Tank Car
Liquids 131

CAUTION: Emergency response personnel must be aware that rail tank cars vary widely in construction, fittings and purpose. Tank cars could transport products that may be solids, liquids or gases. The products may be under pressure. It is essential that products be identified by consulting shipping documents or train consist or contacting dispatch centers before emergency response is initiated.

The information stenciled on the sides or ends of tank cars, as illustrated above, may be used to identify the product utilizing:

a. the commodity name shown; or
b. the other information shown, especially reporting marks and car number which, when supplied to a dispatch center, will facilitate the identification of the product.

The recommended guides should be considered as last resort if the material cannot be identified by any other means.

ROAD TRAILER IDENTIFICATION CHART

DOT 406, TC 406, SCT-306 Non-pressure Liquid Tank (MC306, TC306) 131

MC338, TC338, SCT-338 Cryogenic Liquid Tank (TC341, CGA341) 117

DOT 407, TC 407, SCT-307 Low Pressure Chemical Tank (MC307, TC307) 137

DOT 407, TC 407, SCT-307 Low Pressure Chemical Tank (MC307, TC307) 137

COMPRESSION GAS/TUBE TRAILER 117

DOT 412, TC 412, SCT-312 Corrosive Liquid Tank (MC312, TC312) 137

MC331, TC331, SCT-331 High Pressure Tank 117

DOT 407, TC 407, DOT 412, TC 412 Vacuum Loaded Tank (TC350) 137

Mixed Cargo 111

Intermodal Tank 117

CAUTION: This chart depicts only the most general shapes of road trailers. Emergency response personnel must be aware that there are many variations of road trailers, not illustrated above, that are used for shipping chemical products. The suggested guides are for the most hazardous products that may be transported in these trailer types.

The recommended guides should be considered as last resort if the material cannot be identified by any other means.
A) The 4-digit ID Number on a placard or orange panel;
B) The 4-digit ID Number (following UN or NA) on a shipping document or package;

Example of a shipping document
C) The name of the material on a shipping document or package.

Example of a shipping document

Example of a package
1) Look up the material’s 3-digit Guide number in either:

- The ID Number index (YELLOW-bordered pages);
- The name of material index (BLUE-bordered pages);
- Note if the substance is highlighted in GREEN.

As a last resort, if the ID number or the name of material are not available, use the Table of Placards and/or the Rail Car & Road Trailer Identification Charts.
2) Turn to the numbered guide (**ORANGE**-bordered pages):

- Read carefully all the information provided in the **ORANGE** Guide;
- use jointly the **GREEN** Section if the substance is highlighted green in the yellow or blue section
CAUTION: If a reference to a guide cannot be found and the incident is believed to involve dangerous goods:

Turn to GUIDE 111
and use it until additional information becomes available.

If the incident involves explosives:

Use GUIDE 112 for all explosives, except:
For Class 1.4 Explosives, use GUIDE 114.
(Class 1.4 has no significant blast hazard)
Now for some Examples!

➢ For each of the following examples:

– Find the ORANGE-bordered Guide-pages using the information provided;

– Identify the suggested distances / zones in the ORANGE and/or GREEN Sections;

– Describe the main characteristics and hazards of the substance.
Example 1

- A 1000-litre tote container is leaking.
The **YELLOW**-bordered pages indicate that the name of the material is *Sodium hydroxide, solution* or *Caustic soda, solution* and refers to **Guide 154**;

- Substance not highlighted; no need for the **GREEN** Section;
- The **Guide 154** corresponds to *Substances - Toxic and/or Corrosive (Non-Combustible)*;
- As an immediate measure, the Guide suggests to isolate the leak area in all directions for at least 50 metres for liquids.
In **Guide 154**, under the *Potential Hazards* Section, the *Health* hazards precede the *Fire or Explosion* hazards;

- This type of substance is toxic by inhalation / ingestion / skin contact and may cause severe injury or death;
- Effect of contact or inhalation may be delayed;
- Fire may produce irritating, corrosive and/or toxic gases;
- This type of substance is non-combustible.
A tanker truck carrying the following product rolled over and is leaking from the top hatch.
The **YELLOW**--bordered pages indicate that the substance is *Diesel fuel* or *Fuel oil*, and refers to Guide 128;

Substance not highlighted; no need for the **GREEN** Section;

The Guide 128 corresponds to *Flammable Liquids (Non-Polar / Water-Immiscible)*;

As an immediate precautionary measure, the Guide suggests to isolate spill or leak area for at least 50 metres in all directions. If the spill is large, the Guide suggests to consider an initial downwind evacuation of at least 300 metres;

ID No. is 1202
At **Guide 128**, under the **Potential Hazards** Section, the **Fire or Explosion** hazards precede the **Health** hazards;

- This type of substance is flammable and vapours may form explosive mixture with air;
- Most vapours are heavier than air, they will spread along the ground and collect in low or confined areas;
- Containers may explode when heated;
- Inhalation or contact with material may irritate or burn skin and eyes.
Example 3

- A truck displaying this placard is on fire on the side of the road.
Solution for Example 3

- The placard indicates the material is an explosive of class 1.4G;
- According to the Table of placards, Guide 114 must be used when explosives in class 1.4 are involved;
- Explosives are not highlighted; there is no need to refer to the GREEN Section (see Explosives in the BLUE Section);
- In case the truck is involved in a fire, the Guide suggests to isolate for 500 metres in all directions and to initiate an evacuation, including emergency responders, for 500 metres in all directions;
At **Guide 114**, under the *Potential Hazards* Section, the *Fire or Explosion* hazards precede the *Health* hazards;

- This type of substance may explode and throw fragments at a distance of 500 metres or more if fire reaches cargo;
- Fire may produce irritating, corrosive and/or toxic gases.
A tanker truck is involved in a road accident.
The ID No. is 1072;
The YELLOW-bordered pages indicate that the product is Oxygen, compressed and refers to Guide 122;
Substance not highlighted; no need for the GREEN Section
The Guide 122 corresponds to Gases - Oxidizing (Including Refrigerated Liquids);
As an immediate precautionary measure, the Guide suggests to isolate spill or leak area for at least 100 metres in all directions;
In case of a large spill, the Guide suggests to consider an initial downwind evacuation of at least 500 metres;
At **Guide 122**, under the **Potential Hazards** Section, the **Fire or Explosion** hazards precede the **Health** hazards;

- This type of substance does not burn, but will support combustion;
- Some may react explosively with fuels;
- Containers may explode when heated;
- Vapours may cause dizziness or asphyxiation without warning.
Example 5
Solution for Example 5

- There is no ID No. and the DANGER placard indicates a mixed load of dangerous goods;
- In this case, refer to **Guide 111, Mixed Load / Unidentified Cargo**;
- As an immediate precautionary measure, the Guide suggests to isolate the area for at least 100 metres in all directions, until the contents of the vehicle is known;
- In case of fire, the Guide suggests to isolate for 800 metres in all directions and to consider an initial evacuation of 800 metres in all directions;
At **Guide 111**, under the *Potential Hazards* Section, the *Fire or Explosion* hazards precede the *Health* hazards;

Until the vehicle content is known, all hazards must be considered: flammability, corrosivity, toxicity…
A rail car is leaking at a well-known facility in your area, where chlorine cars are handled.
The product involved is Chlorine;

- The \textcolor{blue}{BLUE}-bordered pages indicate that the ID number is 1017, refers to \textcolor{red}{Guide 124} and the substance is highlighted;
- The \textcolor{red}{Guide 124} corresponds to \textcolor{green}{Gases – Toxic and/or Corrosive – Oxidizing};
- Because the substance is highlighted and there is a spill situation, the Initial Isolation and Protective Action Distances must be taken from the \textcolor{green}{GREEN} Section;
- For ID 1017, the \textcolor{green}{GREEN} Section suggests refers to Table 3 which says for large spills use 500 metres as an Initial Isolation Distance;
For ID 1017, the **GREEN** Section suggests, for large spills during the day, 2.1 miles as a Protective Action Distance in moderate wind; The Emergency Responders will have to decide which Protective Action will be pursued: evacuation, shelter in place, or a combination of both;

- At **Guide 124**, under *Potential Hazards*, the *Health* hazards precede the *Fire or Explosion* hazards;
- The **Guide 124** indicates that this product is toxic and may be fatal if inhaled or absorbed through the skin.
A drum is leaking in a puddle of water.
Solution for Example 7

- The ID Number is 1689;
- The **YELLOW**-bordered pages indicate that this substance is *Sodium cyanide*;
- It refers to **Guide 157** and the substance is highlighted;
- The **Guide 157** corresponds to *Substances – Toxic and/or Corrosive (Non-Combustible / Water-Sensitive)*;
- The substance is highlighted and there is a spill situation: Table 1 / the **GREEN** Section must be used to determine the Initial Isolation and Protective Action Distances;
Under ID No. 1689, the GREEN Section suggests distances specifically when the product is spilled in water. If this is not the case, the initial isolation and evacuation distances must be taken from Guide 157, under Public Safety.

Since the product is leaking in water, the GREEN Section suggests an Initial Isolation Distance of 30 metres in all directions for a small spill and 100 metres in all directions for a large spill;

Additionally, the Protective Action Distances for day and night will have to be taken from the GREEN Section;
The **Guide 157** indicates that this type of substance is toxic and non-combustible, but fire will produce irritating, corrosive and/or toxic gases;

For a water-reactive substance (mention **when spilled in water** in Table 1), refer to the last pages of the **GREEN** Section (Table 2), where the TIH gases produced are listed, for each water-reactive substance; in this case the gas produced is HCN or Hydrogen cyanide;

Searching for Hydrogen cyanide in the **BLUE** Section, there is a reference to **Guide 117**, which correspond to **Gases – Toxic – Flammable (Extreme Hazard)**.
NOTE: In the GREEN section (Table 1), you must use the Initial Isolation and Protective Action Distances (IIPAD) for the water reactive material itself (when spilled in water) (in this case UN1689) and not the IIPAD for the generated TIH gas (Hydrogen cyanide).

Be prepared to move back though!
A drum containing this substance is punctured and is leaking on the ground.
The **YELLOW**-bordered pages indicate that this substance is called *Boron tribromide*;

It refers to **Guide 157** and is highlighted;

The **Guide 157** correspond to *Substances – Toxic and/or Corrosive (Non-Combustible / Water-Sensitive)*;

Since the substance is highlighted and there is a spill situation, the **GREEN** Section must be used to determine the Initial Isolation and Protective Action Distances;

For this product, the **GREEN** Section presents 2 separate entries for ID No. 2692: the 1<sup>st</sup> one applies when the product is spilled on the ground and the 2<sup>nd</sup> one, when it is spilled in water;
In this case, the product is spilled on the ground and the Initial Isolation Distance suggested in the GREEN Section is 30 metres in all directions for a small spill and 60 metres in all directions for a large spill;

Additionally, the Protective Action Distances for day and night will have to be taken from the GREEN Section;

The Guide 157 indicates that this type of substance is toxic and non-combustible, but a fire will produce irritating, corrosive and/or toxic gases.
An alert for Sarin gas was activated in a building.
The product involved is Sarin;
The **BLUE**-bordered pages indicate that the ID No. is 2810;
It refers to **Guide 153** and the substance is highlighted;
The **Guide 153** corresponds to *Substances – Toxic and/or Corrosive (Combustible)*;
Since the substance is highlighted and there is a spill situation (type of dispersion is unknown), the **GREEN** Section must be used to determine the Initial Isolation and Protective Action Distances;
In the **GREEN** Section, there are multiple entries for ID No. 2810; select *Sarin (when used as a weapon)*;
The **GREEN** Section suggests an Initial Isolation Distance of 60 metres in all directions for a small spill and 400 metres in all directions for a large spill; these distances will have to be adapted considering that the incident takes place inside a building;

Additionally, the Protective Action Distances for day and night will have to be taken from the **GREEN** Section, and adapted;

The **Guide 153** indicates that this type of substance is toxic and the effects of contact or inhalation may be delayed;

The **Guide 153** also indicates that the substance is combustible, may burn, but does not ignite readily; a fire may produce irritating, corrosive and/or toxic gases.
HAZMAT Summary

- OBSERVE
- REPORT
- EVACUATE
- SET A PERIMETER
- DECONTAMINATE
- TRIAGE
Almost done,
Now, Please take the quiz by clicking on this link:

HAZMAT Quiz