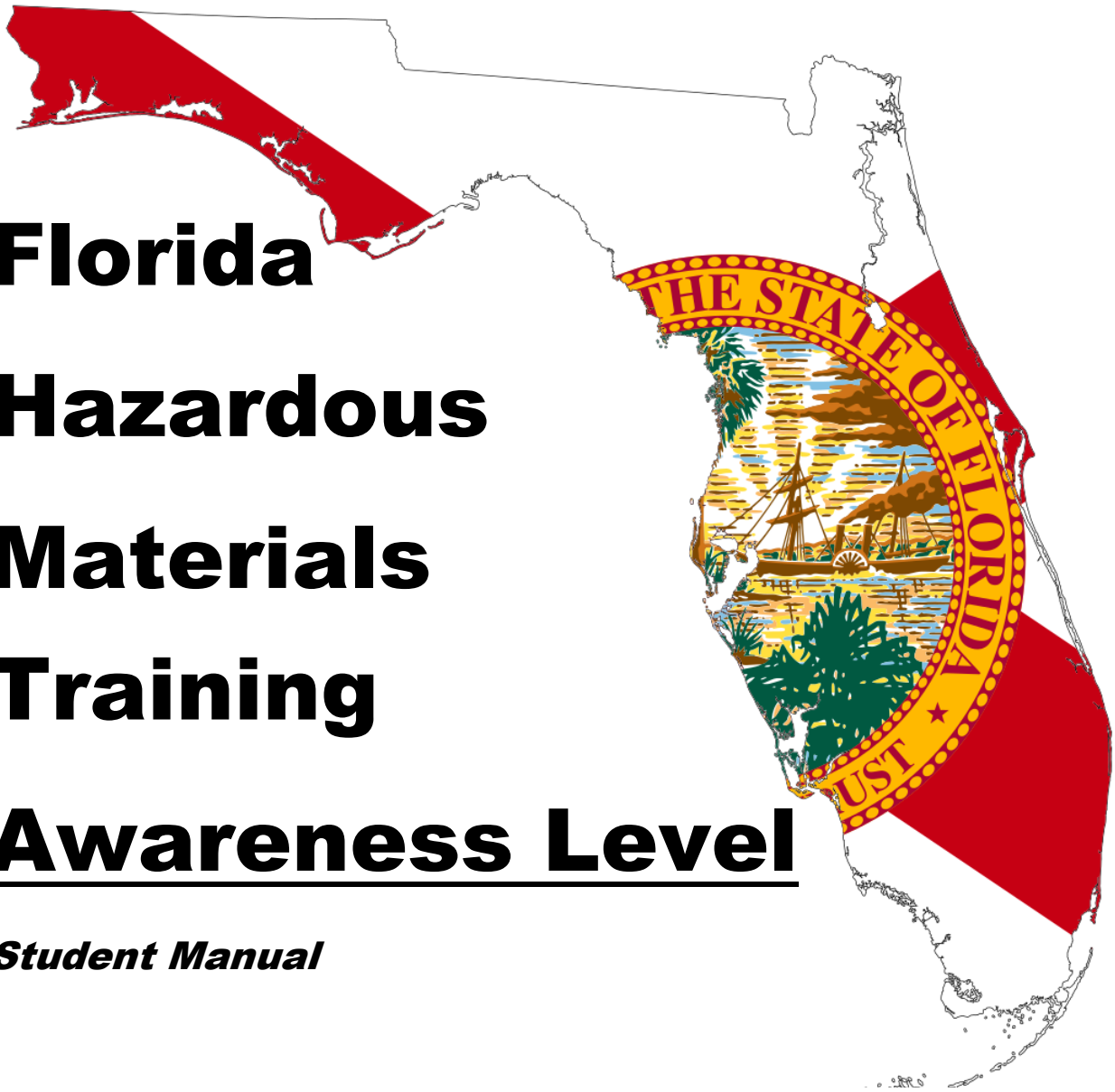

Florida Hazardous Materials Training

Awareness Level

Student Manual

Based on: NFPA 472 - Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents and **NFPA 1072 – Standards for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications 2017 Edition**
OSHA CFR 29, 1910.120, Hazardous Materials Waste Operations and Emergency Response.

Developed for Florida SERC.
https://floridadisaster.org/dem/response/technological-hazards/serc/

About this training program

This comprehensive awareness training program was developed directly from the NFPA 472, Competency of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents 2018 Edition, NFPA 1072, Standards for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications 2017 Edition and incorporated components of OSHA 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response.

Introduction

This Awareness Training Program was produced for the Florida State Emergency Response Commission (SERC). SERC is made up of representatives from the hazardous materials industry, emergency responders, and civilian experts.

The Hazardous Material Awareness program is developed for both industry and emergency response personnel. Completion of these standards ensures that personnel "…who, in the course of their normal duties, could encounter an emergency involving hazardous materials/weapons of mass destruction (WMD) and who are expected to recognize the presence of the hazardous materials/WMD, protect themselves, call for trained personnel, and secure the area," are properly trained. In addition, the completion of this program serves as added proof of documented training for industry and emergency response personnel, the Authority Having Jurisdiction (AHJ) under Florida Law, and the organization they represent as accepted best practice. Personnel trained to these standards and competencies help make Florida a great place to live and do business while ensuring a safe, trained, and competent response to a hazardous materials incident.

Completing the Knowledge and Skills Competencies

Successful completion of this program and associated tasks indicates the student has completed all required training and demonstrated competency in each section. Completion of this program and the Florida SERC Awareness Competency Check-off, is confirmed by the instructor's signature by each applicable section within the document. It is understood that numerous instructors may be used to conduct the course and provide competency assessment. Each will be required to sign off in the Awareness Competency Check-off to document successful completion of the training program.

Course Units

The course is divided into four units following the NFPA 472 Standard. The following timeline is recommended as a guideline for presentation of the course materials.

Course Timeline

Introductions of students/instructors	**10 minutes**
Overview of course materials	**10 minutes**
Section A – Analyzing the Incident	
Unit One – Recognizing the Presence of Hazardous Materials/WMD	**2 hours**
Unit Two – Identifying Hazardous Material/WMD	**3 hours**
Section B – Implementing the Planned Response	
Unit Three – Isolating the Hazard Area	**1 hour**
Unit Four – Initiating the Notification Process	**30 minutes**

Material needed for this course:

2020 or later Emergency Response Guide

Pen and Paper

Student Manual

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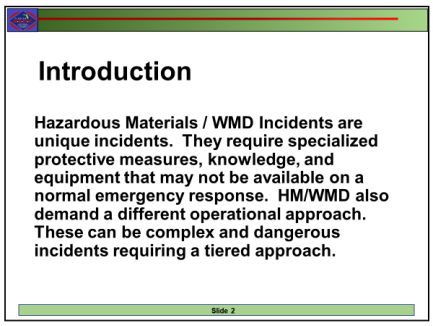
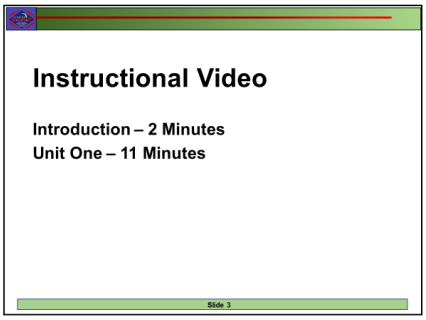
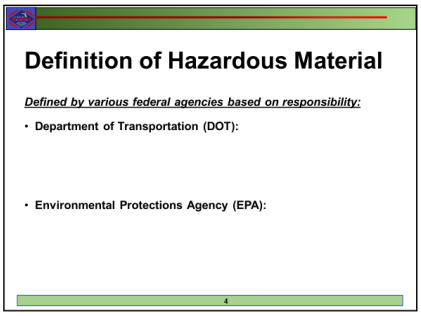
Introduction

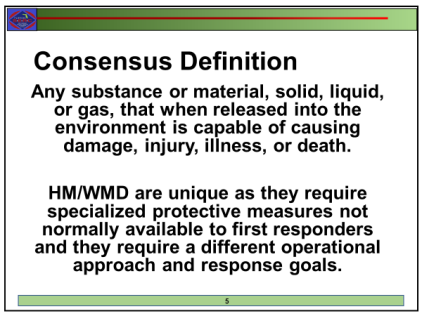


Hazardous materials incidents are unique as they present a number of complex issues from flammability, toxicity, contamination, environmental damage, persistence, and explosion hazards. Because of these many factors it is important to recognize that an incident involving hazardous materials or weapons of mass destruction be handled quickly and proficiently otherwise, lives could be lost. This program is intended to provide training on the first level of response; the Awareness Level Person.



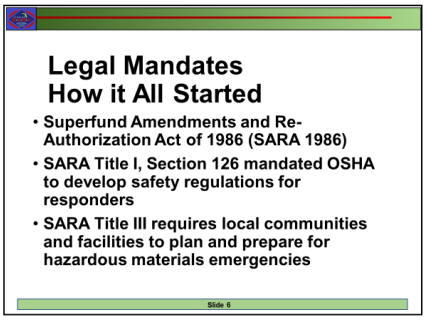
There are several reasons that enforcement agencies need an official definition of the term hazardous materials. The most important reason is to enforce the laws that are in place to protect people, animals, and the environment from those who would improperly use or dispose of them. There are three examples of the legal definitions from the Department of Transportation, Environmental Protection Agency, and OSHA. All are written with the intent of enforcing the laws written to keep hazardous materials use, transportation, and storage safe.

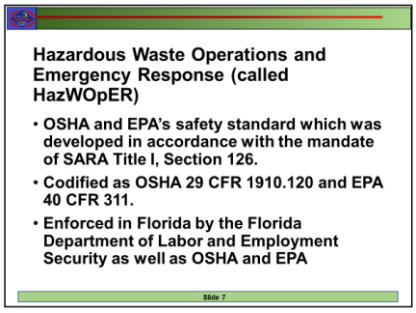




Of course, agency definitions focus on their ultimate responsibilities. DOT with transportation of hazardous materials, EPA with environmental contamination, and OSHA on worker safety. Ultimately, there should be a definition that encompasses all aspects of a hazardous material. The Consensus Definition is an assembly of definitions into one concise and meaningful definition. In addition, it is rational to discuss the reason these materials require special attention. Because of the hazards they present, specialized equipment, training, and personal protective equipment are needed to mitigate emergencies involving hazardous materials/WMDs.

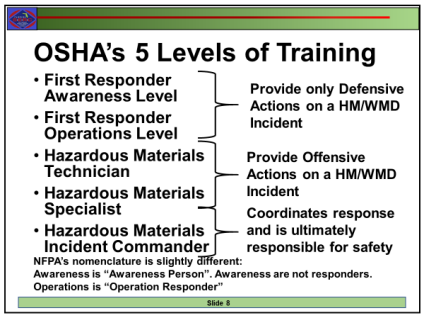
The United States Federal Superfund law is officially known as the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The federal Superfund program is designed to investigate and clean-up sites contaminated with hazardous substances. Superfund Amendments and Reauthorization Act (SARA) was passed in October of 1986. SARA made multiple important changes and additions to CERCLA to guarantee its success moving into the future.





Hazardous Waste Operations and Emergency Response is a set of guidelines produced by the Occupational Safety and Health Administration (OSHA) which regulates hazardous waste operations and emergency response to hazardous materials in the United States. This document along with its sister document EPA 40, CFR 311 provide guidance and direction for training and operations at the site of a hazardous materials incident.

Within the OSHA and EPA document (it is also found in the NFPA consensus standards), is guidance on the level of training needed to provide actions on a hazardous material scene. They recognize 5 levels of training:



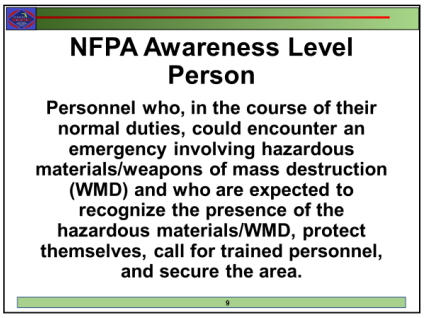
First Responder Awareness. At this level the functions of a responder trained at this level are recognition, identification, Isolation and Evacuation, and Notification. NFPA defines this level as Awareness Level Person.

First Responder Operations. These are emergency responders who are dispatched to the incident in an effort to further control the incident. Both Awareness and Operations trained responders operate in a defensive manner. NFPA defines this level as an Operations-trained Responder.

Technicians have more extensive training and respond to provide offensive operations to control the spill or leak.

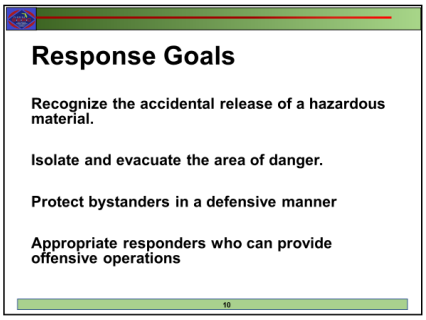
Specialists are those trained with specialized skills or expertise who would respond to assist.

Incident Commanders are there to provide objective driven guidance and safety.

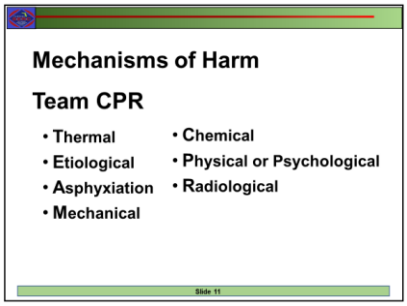


The Awareness Level Person can be any person working in a setting where hazardous materials are used, stored, or made. These individuals must understand the harm that can occur if the hazardous material escapes from its container. In addition, these awareness trained personnel must know how to react if an incident occurs. This program will provide the education and practice to recognize a hazardous materials emergency and react in a manner that will save lives, reduce injuries, preserve the environment, and reduce the overall effects of the

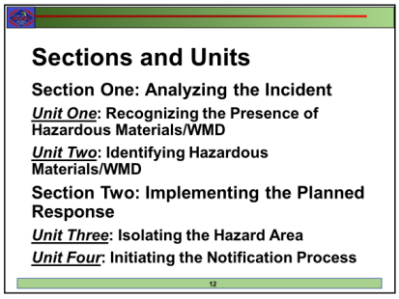
incident. The goals of an Awareness Level Person are to act quickly to recognize a hazmat incident, start protection efforts of isolation and evacuation of those in danger, and notifying more advanced responders who have the training and ability to mitigate the incident.



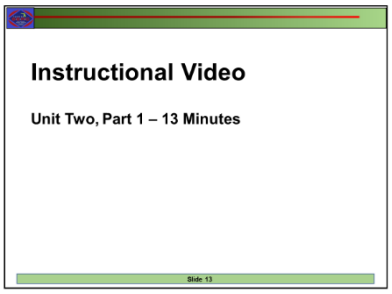
The response goals of an Awareness Level Person are both comprehensive and limited. First and foremost, they are trained to recognize the occurrence of hazardous materials/WMD incident. Once they have recognized that an incident has occurred, or is occurring, they are trained to isolate the event. By performing some quick defensive actions, the Awareness Level Person can provide protection for those in danger by performing an evacuation from the area to keep bystanders safe. This is done in a defensive manner without entering the hazard area. And finally, they have the ability to contact the appropriate response agencies who can provide offensive operations to mitigate the incidents. Therefore, the goals of an Awareness Level Person are to "Recognize, Isolate, Protect, and Notify.



As previously discussed, hazardous materials/WMDs have the ability to cause harm to people, animals, and the environment. The easy to remember these mechanisms of harm is through the acronym T-E-A-M C-P-R. This acronym stands for Thermal, Etiological, Asphyxiation, Mechanical, Chemical, Physical/Psychological, and Radiological

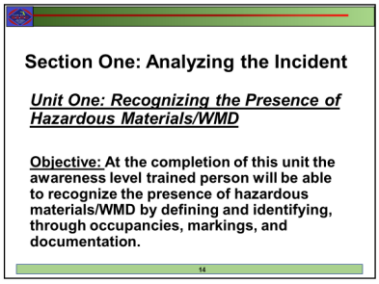


This training program is scheduled for eight hours. In an effort to follow NFPA's 472 standard It is broken down into four units. Unit One is Recognizing the Presence of Hazardous Materials/WMD. In this unit the student will learn about recognition by looking for clues such as placards, labels, container shapes and sizes. Unit Two gives direction on identification of the hazardous material/WMD and will focus on marking and placards, and documentation required to identify the material involved. Unit Three provides information on isolation and evacuation and Unit Four provides guidance on who gets notified of a hazardous materials incident and how the notification process takes place.



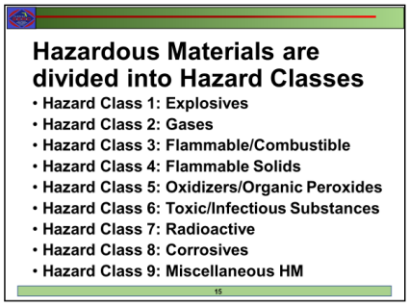
Section One – Analyzing the Incident

Unit One – Recognizing the Presence of Hazardous Materials/WMD

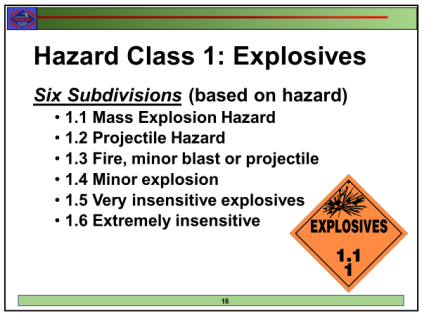


The Objective for Unit One is: At the completion of this unit the Awareness Level Person will be able to recognize the presence of hazardous materials/WMD by defining and identifying through occupancies, marking, and documentation. The first goal of an Awareness Level Person is the recognition that a hazardous material or WMD incident is taking place. This unit will focus on completing that goal.

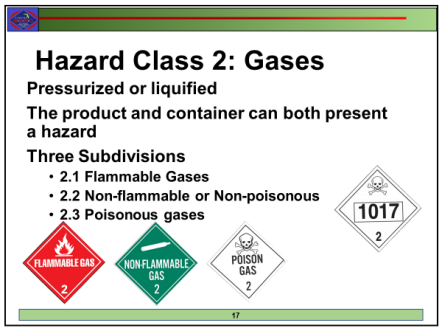
Hazard Classes



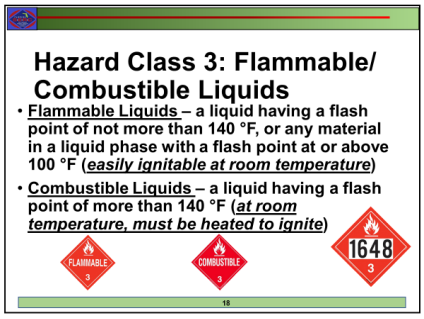
Hazardous Materials are divided into nine hazard classes. Each represent a different kind of hazard. This program will review each of the nine hazard classes in detail. The hazard classes also correspond to the placarding and labeling systems used by DOT in the transportation of hazardous materials and in package hazard identification. This will also be reviewed in future units. Both the placard and labeling systems are used to help an Awareness Level Person in identifying the presence, hazard, and name of a hazardous material.



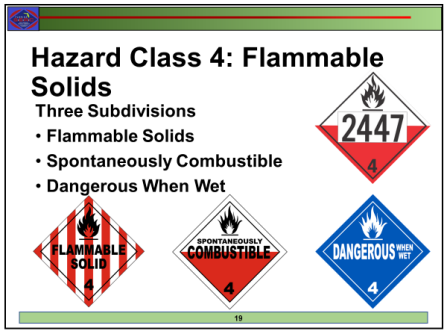
Hazard Class one identifies Explosives. These materials can cause massive damage. They are categorized into six sub classes from 1.1 which can easily explode to hazard class 1.6 which is extremely insensitive and usually takes a smaller explosive to activate its potential. Black powder, gun powder, and other blasting agents are found in hazard class 1.1. Cartridges for weapons would fall into Hazard Class 1.3. Ammonium Nitrate/Fuel Oil mixture (ANFO) fall into hazard class 1.5. This is the material used to demolish the Alfred P. Murrah Federal Building in Oklahoma City during a domestic terrorist attack on April 19, 1995. This material requires a significant other explosive charge to activate its potential.



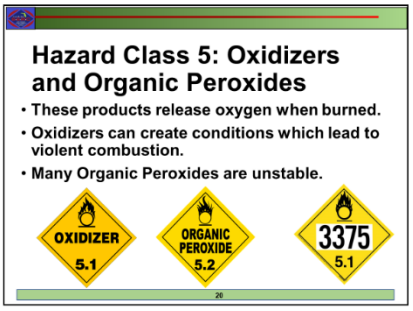
The Gases Hazard Class includes all compressed gases. These can include flammable gas, non-flammable gas, and poisonous gas. The first hazard in this class is the overall expansion ratio when these gases are released and the pressure some are transported under. In addition, these placards can be one of three colors. Flammable is red, non-flammable is green, and poisonous gas is white. These placards may have the name or the chemical UN ID number in the middle of the placard. Common chemicals found in Hazard Class 2 are Propane (red), Oxygen (green), and Arsine (white). It is interesting that Anhydrous Ammonia is placarded with a green non-flammable gas placard although it is also poisonous and flammable. This chemical has long been discussed by hazardous materials responders and is well known for its misleading placard.



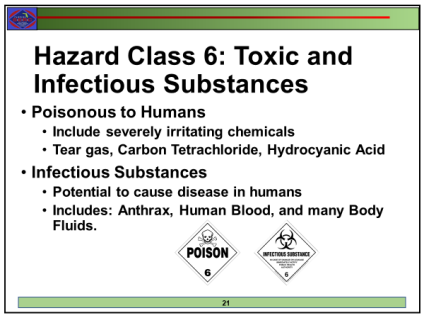
Flammable and Combustible Liquids are found in Hazard Class 3. Flammable liquids have a flash point above 100º F but below 140º F. These are easily ignitable at room temperature. Combustible liquids have a flash point above 140º F. This requires these chemicals to be heated before they can be ignited. The hazard class 3 placards are red in color and may contain the chemical UN ID number in the middle. Common chemicals found in Hazard Class 3 are Alcohols, Gasoline, and Fuel Oil. Remember, the determination of being a flammable or combustible material is determined at room temperature (86 degrees). Some combustibles take on the properties of a flammable when a spill takes place of a hot highway. Highways in Florida easily reach 140 degrees in the summertime and can cause a combustible to give off significant vapors to easily ignite.



There are a number of different color/design placards and labels found in Hazard Class 4. They include the red and white stripped Flammable Solids, Spontaneously Combustible, and Dangerous When Wet placard. Some common chemicals found in Hazard Class 4 include: Sulphur, matches, activated carbon, alkali metals and some metal powders. Calcium Carbide is labeled and placarded as Dangerous When Wet. When water is added to Calcium Carbide the gas given off from the chemical reaction is acetylene. Acetylene has a flammable range of 2.2% to 85%. Magnesium pellets are placarded as a flammable solid. Once the metals found in the group begin to burn, they are very difficult to extinguish and burn at a high temperature. White phosphorous is placarded as Spontaneously Combustible. White phosphorous is usually transported in a liquid to keep it cool. White phosphorous spontaneously ignites at about 86 degrees without an outside ignition source.



Oxidizers and Organic Peroxides are a hazard class containing chemicals that release its own oxygen when under fire conditions. That makes this group of chemicals extremely dangerous. In addition to releasing oxygen in fire conditions these chemicals are also very reactive with numerous other chemicals causing heat and violent reactions. Pay particular attention to these chemicals when they mix with a fuel in hazard class 3. These oxidizers mixed with a flammable or combustible liquid create a fuel that will burn violently and if confined in a container will explode. Common chemicals found in this class include hydrogen peroxide**,** potassium permanganate**,** sodium nitrite**,** ammonium nitrate fertilizers, and oxygen generators.



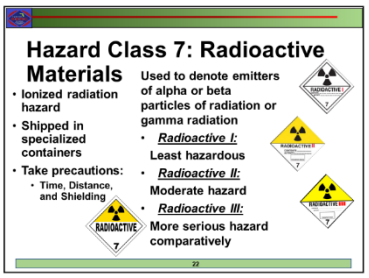
Hazard Class 6 is a material, other than a gas, which is known to be so toxic to humans and may be a hazard to health during transportation. The chemical is presumed to be toxic to humans because it falls within any one of the following categories when tested on laboratory animals

Oral Toxicity: A liquid or solid with an LD50 for acute oral toxicity of not more than 300 mg/kg.

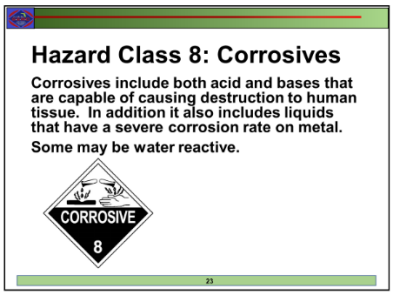
Dermal Toxicity. A material with an LD50 for acute dermal toxicity of not more than 1000 mg/kg.

Inhalation Toxicity: A dust or mist with an LC50 for acute toxicity on inhalation of not more than 4 mg/L; or a material with a saturated vapor concentration in air at 20 °C (68 °F) of more than one-fifth of the LC50 for acute toxicity on inhalation of vapors and with an LC50 for acute toxicity on inhalation of vapors of not more than 5000 ml/m³; or is an irritating material, with properties similar to tear gas, which causes extreme irritation, especially in confined spaces.

Infectious Substance are substances known or reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsia, parasites, fungi) and other agents such as prions ("proteinaceous infectious particle"), which can cause disease in humans or animals.

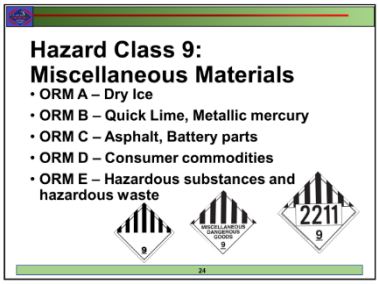


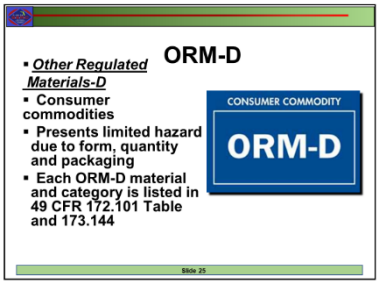
Radioactive material includes any material having a specific activity greater than 0.002 microcuries per gram (µCi/g). The specific activity of a radioactive material determines the danger to humans. Materials transported in this class may include everything from fissile material and medical radiographic diagnostic materials, to smoke detectors containing americium-241. Radioactive I materials do not require a placard in transport but are required to be labeled on all packages. Radioactive II and III are table one materials and require placards regardless of the weight of the material. Much of the nuclear medicine used in hospitals diagnostics falls in the Radioactive I category and is only labeled during transport. But radiation containing pellets and sources used to treat cancer fall into the category of Radioactive II or IIII and are transported in vehicles with full placards and labels.



A corrosive material is a liquid or solid that causes full thickness destruction of human skin at the site of contact within a specified period of time. These corrosive materials also cause significant destruction of steel or aluminum. These chemicals are either classified as an Acid (low pH) or an Alkali/Base (high pH). Some common chemicals transported in this hazard class include: Sodium Hydroxide (high pH), Sulfuric acid, and hydrofluoric acid. When many of these corrosive materials react with steel or aluminum, the process releases hydrogen gas creating a flammable atmosphere.

Hazard Class 9 contain a variety of materials with specific hazards. The miscellaneous hazardous materials category encompasses all hazardous materials that do not fit one of the definitions listed in Class 1 through Class 8 contents or divisions. The miscellaneous hazardous material is a material that presents a hazard during transportation but which does not meet the definition of any other hazard class.

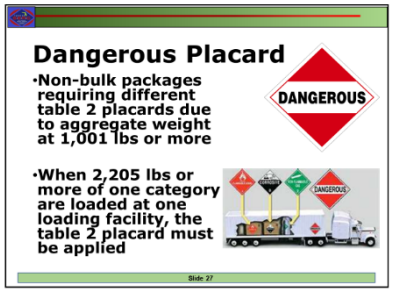




ORM-D is a label for mail or shipping in the United States that identifies other regulated materials for domestic transport only. Packages bearing this mark contain hazardous material in a limited quantity that presents a limited hazard during transportation, due to its form, quantity, and packaging. Examples of ORM-D include: aerosol cans, charcoal, drain openers, lighters, perfumes, soldering flux, and some photographic chemicals.

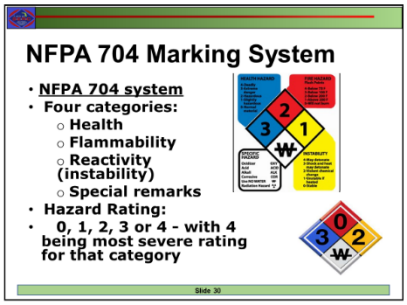
Subsidiary risk labels are similar to DOT labels in the fact that they contain hazard warning. The main difference is that subsidiary risk labels do not contain the class number that they belong to. They are used to identify a secondary hazard in a package. For example, the product may be labeled as a poison but is also flammable. The subsidiary label would indicate the secondary hazard.

Dangerous and other specific hazard markings



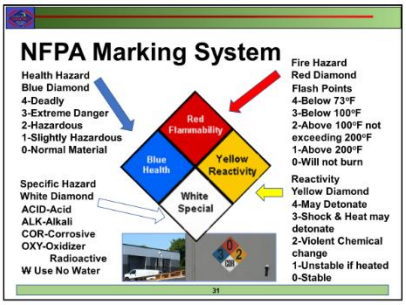
Dangerous Placards are for **mixed loads** where the transport vehicle contains non-bulk packages with two or more categories of hazardous materials that require different placards. When a transport vehicle is hauling a mixed load of Table 2 materials and the aggregate weight is greater than 1,001 pounds then the Danger placard is required. If any one of the mixed hazard classes is more than 2,205 pounds (and loaded at one loading facility, then a second placard for that hazard class must also be displayed.

NFPA 704 Marking System

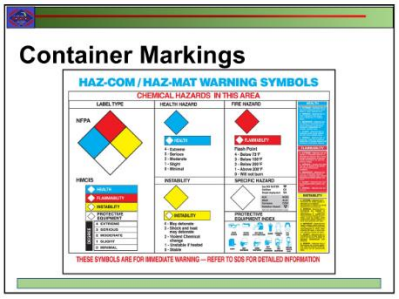


The National Fire Protection Agency (NFPA) 704 Marking System is a standard system for the identification of the hazardous materials found in a facility. The standard (law) requiring its use is maintained by the National Fire Protection Association. This system was first developed in 1960 and revised several times since then. The standard defines the "Safety Square" or "Fire Diamond" used by emergency personnel to quickly and easily identify the risks posed by hazardous materials. This helps determine what, if any, special equipment should be used, procedures followed, or precautions taken during the initial stages of an emergency response.

The NFPA 704 Marking System follows the same color-coded areas as found in the package marking system (HMIS). Blue is the health hazard, red is the fire hazard, and yellow is the reactivity. This system does not necessarily represent only one chemical but instead, the highest hazard in each category in a facility with multiple chemical hazards. The white area provides an abbreviation or pictogram to give emergency responders additional information about the hazard.

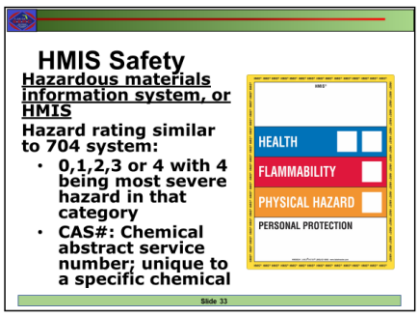


Container Markings

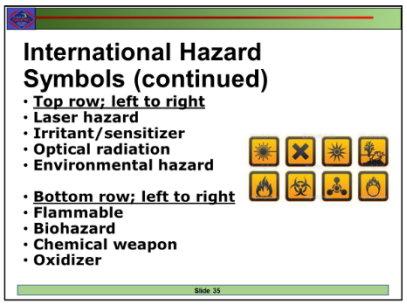


In addition to the DOT label and placards found above in the nine hazard classes there are also additional marking systems used on containers. These are some examples that use a diamond divided into four color categories. Blue representing health hazards, Red for fire hazards, Yellow for reactivity hazard and a White area used to provide additional information. One of these systems is called the Hazardous Materials Identification System or HMIS. Keep in mind that these are used on packaging such as boxes, crates, and other types of storage containers.

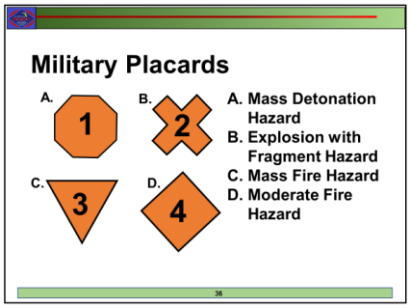
The Hazardous Materials Identification System (HMIS) is a numerical hazard rating that incorporates the use of colors on labels to provide information concerning the hazard of the chemical. The HMIS color label (bar) is similar to the NFPA fire diamond. One of the differences is the yellow part of the NFPA fire diamond is the representation of the reactivity of the chemical. On the HMIS system that section is colored orange and represents the physical hazard and not reactivity. Both the NFPA Marking System and the HMIS were developed when there were no mandates for labeling hazardous chemicals. In 2012, OSHA introduced an updated version of the HazCom standard which mandated the use of the Global Harmonizing System (GHS) on shipping containers and updated requirements for workplace labels. The HMIS color bar is part of this new standard.



International Hazard Symbols are recognizable symbols designed to warn about hazardous or dangerous materials including electrical currents, poisons, and radioactivity. The use of these symbols is often regulated by law. Hazard symbols may appear as a secondary hazard marking to warn of additional hazards or supplemental information in order to specify the type of hazard or level of threat. These symbols are used in lieu of, or in addition to, written warnings as they are quickly recognized and more commonly understood.

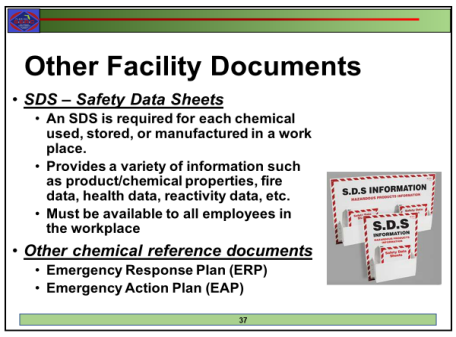


Military Placards/Markings



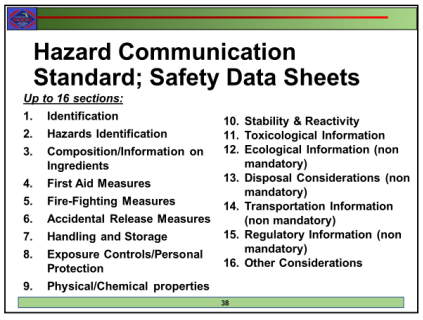
In some cases, a responder may have a hazardous materials emergency involving military materials being transported. In this case the military uses its own placard system that is considerably different than used in the civilian industry. These are examples of military placards that may be seen on military shipments.

Other Facility Documents



In industry, or even an office setting there are other means of identifying hazardous materials. Safety Data Sheets are one reliable way of identifying the chemicals present and gaining important information about the chemical properties. In addition, companies that use, produce, or store hazardous chemicals must also have an Emergency Response Plan (ERP) in place that has been approved through their local Emergency Management. Others may have an Emergency Action Plan (EAP). These plans will identify the location of chemicals used and stored in the facility. If an incident occurs, these procedures may provide critical information to emergency responders.

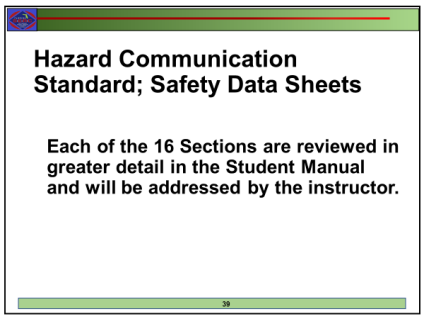
Safety Data Sheets



Safety Data Sheets (SDS) must be maintained and in easy access to all employees who work around hazardous chemicals. The sheets have been standardized to present information in a succinct manner that is easy to read. There is a possibility of 16 categories on a SDS sheet. Not all categories are required but the critical information must be present to inform and guide employees and emergency responders if a hazardous materials accident occurs. The categories are listed in the order that they should be presented on the actual sheet. Emergency responders should ask for the sheets if they respond to an incident involving the spill or release of a hazardous material. SDS's are very specific and only deal with the chemical that is named. The first two sections are self-explanatory. These contain

the name of the chemical, the manufacturer and an emergency contact number. The synonyms are also listed as well as the hazardous ingredients. If the material is considered a trade secret the ingredients will not be listed. The SDS will show the hazard class of each ingredient instead. The Chemical Abstract Service number will also be shown for each ingredient. This is the social security number for that specific chemical and can be used to identify the material.

There is a great deal of additional information found in a SDS concerning flammability/combustibility, health effects from an exposure, chemical properties, accidental release measures, etc. The Awareness Level Person can use some of this information for determining exposure issues, evacuation and isolation parameters, and identification of additional hazards but performing any operations in the spill or leak area is reserved for higher trained hazmat responders.



Section One – Identification

Contains the product identifier used on the label of the material and any other means of identification. This section also contains the recommended use of the chemical and restrictions on use. The name, address, telephone number of the manufacturer, importer, or other responsible party and the emergency phone number can all be found under section one.

Section Two – Hazard Identification

Classification (hazard class and category), label elements (including hazard pictogram, signal word, hazard statement and precautionary statements) and other hazards (example: thermal hazard)

Section Three – Composition/Ingredients information

For a hazardous product that is a substance: the chemical name, synonyms, CAS number, and the chemical name of impurities, stabilizing solvents, and stabilizing additives where classified and that contribute to the classification of the product. For a hazardous product that is a mixture: for ingredients that present a health hazard, the chemical name, synonyms, CAS number, and concentration. Note: Confidential Business Information Rules may apply.

Section Four – First Aid Measures

First aid measures by route of exposure as well as most important symptoms/effects.

Section Five – Fire Fighting Measures

Suitable (and unsuitable) extinguishing media, specific hazards, special equipment, and precautions for firefighters.

Section Six – Accidental Release Measures

Protective equipment, emergency procedures, methods and materials used for containment and clean up.

Section Seven – Handling and Storage

Precautions for safe handling, conditions for storage, including any incompatibility.

Section Eight – Exposure Control/Personal Protection

Exposure limits, engineering controls, and personal protective equipment.

Section Nine – Physical and Chemical properties

Appearance, odor, odor threshold, pH, melting/freezing point, boiling point and range, flash point, upper and lower flammable and explosive limits.

Section Ten – Stability and Reactivity

Reactivity, chemical stability, possible hazardous reactions, conditions to avoid, incompatible materials, hazardous decomposition products.

Section Eleven – Toxicological Information

Description of various toxic effects by route of entry, including effects of acute or chronic exposure, carcinogenicity, reproductive effects, and respiratory sensitization.

Section Twelve – Ecological Information

Aquatic and terrestrial toxicity (if available), persistence and degradability, bioaccumulative potential, mobility in soil.

Section Thirteen – Disposal Considerations

Safe handling and methods of disposal, including contaminated packaging.

Section Fourteen – Transport Information

UN number and proper shipping name, hazard classes, packing group.

Section Fifteen – Regulatory Information

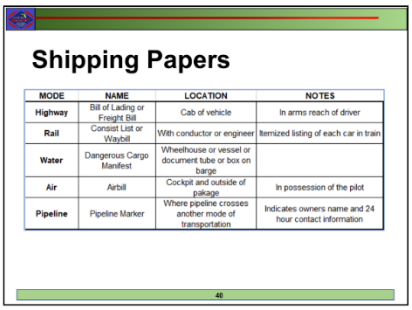
Safety, health, and environmental regulations specific to the product.

Other Information

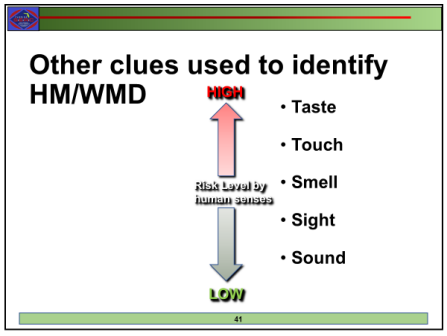
Other information, including date of the latest revision of the SDS.

Shipping Papers

If a chemical is being transported by truck, rail, ship, pipeline, or air there needs to be a means of identifying the chemical while in transit. Each mode of transportation for a chemical is required to have a shipping paper accompany the chemical. Although the shipping papers have different names depending on the mode of transportation, they contain needed information about the chemical. In addition, there may be a SDS for each chemical being transported attached to the shipping papers so emergency responders can get immediate and pertinent information.

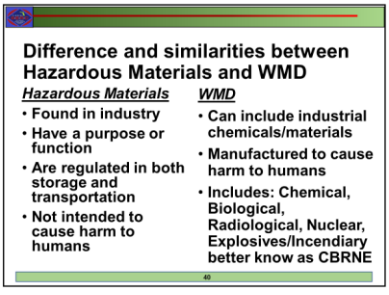


Other Clues (Human Senses) Of course, your first clue of a hazardous materials release may be the smell, or you may hear a whistle or roar indicating the escaping of high-pressure gas. Your senses may be the first to detect a hazardous materials incident. It is NEVER recommended to taste or touch a hazardous material, but it may occur completely by accident causing an exposure. Your senses are always on. It is important to recognize that there are dangers in using your senses to detect a chemical emergency. This slide represents the level of danger in doing so. Taste and touch indicate the highest degree in danger where sight and sound represent the lowest. Remember; NEVER taste or touch a hazardous material.



Differences HM vs WMD

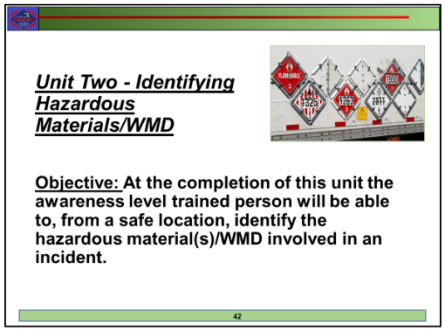
When evaluating the differences between Hazardous Materials Incidents and Weapons of Mass Destruction Incidents there are a number of differences. Although, all responders realize that, at times, it may be difficult to determine the difference. This slide indicates some of the clues that may be present to assist in determining the difference.



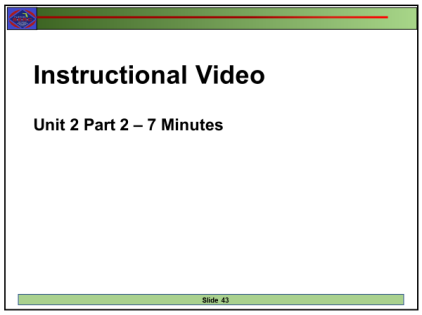
In today's society there has been many examples of terrorist activities involving the use of WMD material. We have learned over the years about the type of targets favored by terrorists to make a political or social statement. This slide lists some of those locations but it is important to note that all first responders exercise great care at the scene of any hazardous materials incident, especially if it is suspicious in nature.

Complete Unit One Exercise(s)

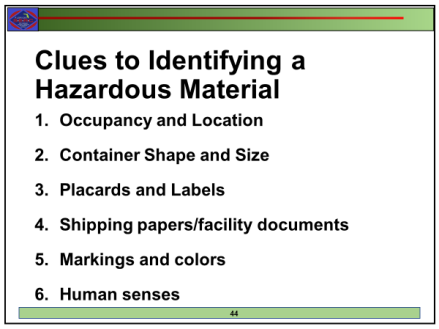
Unit Two – Identifying Hazardous Materials/WMD



The Objective for Unit Two is: At the completion of this unit the Awareness Level Person will be able to, from a safe location, identify the hazardous material(s)/WMD involved in an incident. This section will overview the clues used to identify a chemical during an incident. Occupancy and location, container shape and sizes, and placards and labels will be presented. All of these will assist the Awareness Level Person in identifying the hazardous material/WMD material involved.



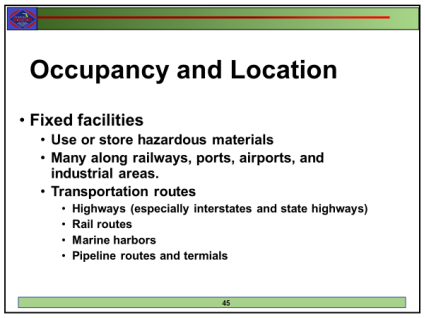
Clues to Identifying Hazardous Materials



There are many clues that can be used to assist in identifying a hazardous material. This slide identifies six of those clues that can be used to assist the Awareness Level Person in identifying the chemical/WMD involved so a plan of defensive actions can take place.

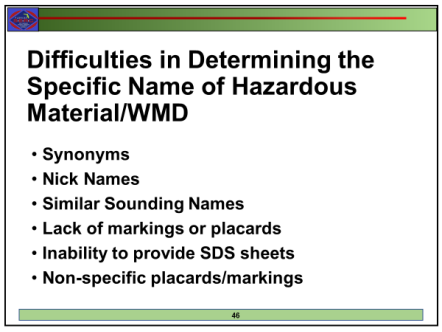
Shipping Papers. facility documents, markings and colors, and human senses were all covered in Unit One – Recognizing the Presence of Hazardous Materials/WMDs.

Occupancy and Location



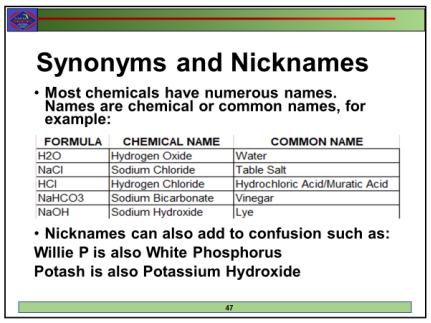
Along with the other clues already reviewed, the occupancy and location also provide clues concerning what kind of chemical might be involved in an incident. Fixed facilities who use and store chemicals are always a potential for an accident/incident involving hazardous materials/WMD. This slide has a list of industrial sites that may increase the probability of a hazardous materials incident. It is very important that a responder recognize areas where hazardous chemicals are used or stored but remember that many incidents take place while being transported. Major highways, city streets, railroads, and loading docks and parking lots of end user facilities are all possibilities for a hazardous materials incident.

Difficulties in determining the chemical name

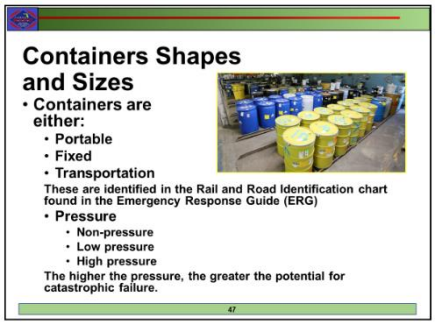


At times it may be difficult to obtain the name of chemicals especially during an incident involving a spill or release. But, to make matters worse, there may be multiple official names for the same chemical. For instance, Acrylonitrile is also Vinyl Cyanide. In the chemical world there are synonyms, nicknames, trade names, chemical names, and other names that, when pronounced, sounds just like another chemical name but is spelled differently. In addition, there may be a lack of required markings or documentation to add to the problem. The next slide will demonstrate some of the issues with chemical names vs trade or common names.

Here are some examples of synonyms and nicknames that can create some confusion when attempting to determine the name of the chemical involved. Simple pronunciation may also cause issues. Names that sound very similar, especially over the phone, such as Hydrofluoric Acid and Hydrochloric Acid can cause serious response issues. These are very different acids with significantly different levels of toxicity and must be handled in different ways.



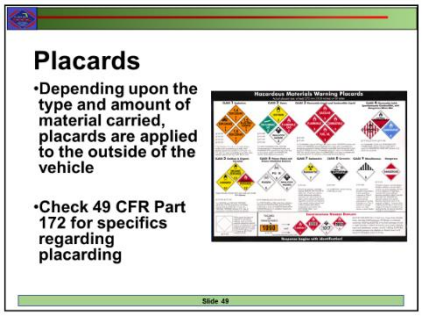
Containers Shapes and Sizes



There are many different types of containers used to store and transport hazardous materials. Most will be appropriately marked with the name or UN number of the chemical. Others may not. It is important to recognize liquid containers, pressurized gas containers, liquified gas containers, and cryogenic containers. Each of these present its own hazard and issues with them must be taken care of by technician level responders.

Placards and Labels

Placards are required for all Table 1 materials and for all Table 2 materials when they are transported in quantities over 1001 pounds. If there is a mixed load in a vehicle and the total quantity of Table 2 materials is over 1001 pounds, then a Dangerous Placard is used. In this case there are over 1001 pounds of corrosive material, over 1001 pounds of oxidizer material, and over 1001 pounds of other Table 2 materials, requiring all three placards.



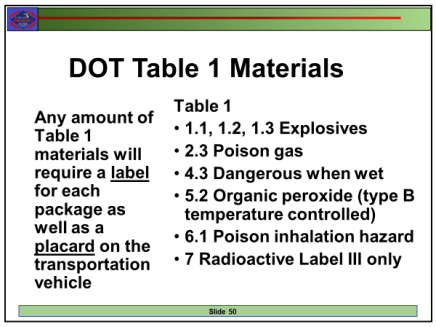


Table 1 materials are those hazardous chemicals that have the potential to create extremely dangerous events during an incident. These are considered to be the most dangerous of the hazard classes. Therefore, during transport, they are placarded regardless of the amount being shipped. In addition, the ERG treats them specifically with a separate isolation and evacuation chart (green pages). The ERG brings attention to these chemicals by highlighting them in both the yellow and blue pages. Table 1 materials could also be used as weapons of mass destruction so special care needs to be taken by emergency responders to incidents involving these materials.

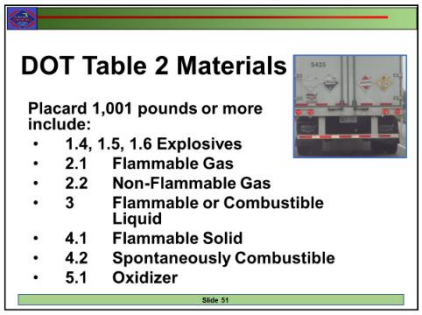
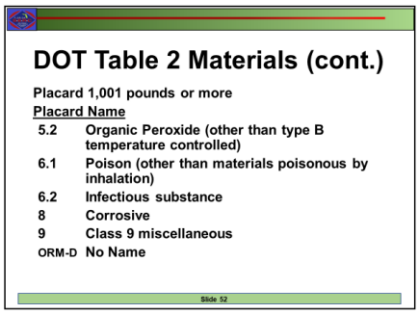
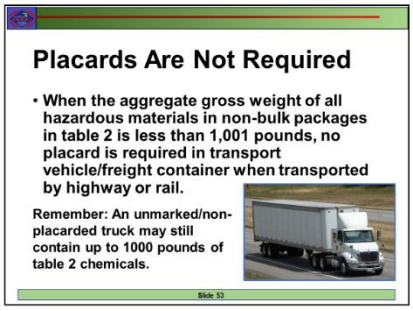


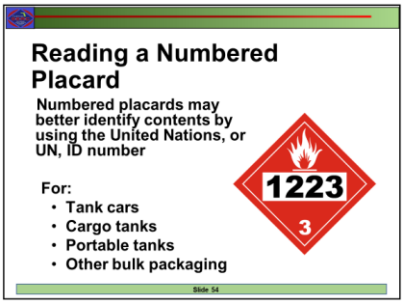
Table 2 materials are not as hazardous as Table 1. Table 2 materials do not need to be placarded for transport until 1,001 pounds of aggregate weight is reached. In the case that it is a mixed load of Table 2 materials, a Dangerous Placard is used to identify the hazard.

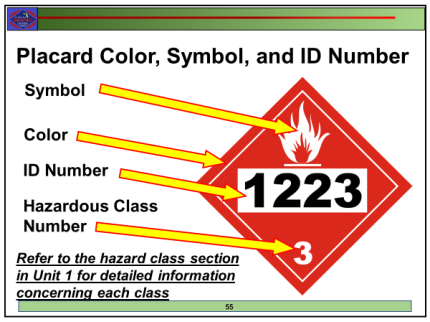




Placards are not required on some shipments of hazardous materials. When the aggregate weight of any single Table 2 materials does not reach 1,001 pounds then a placard is not required. This can be particularly dangerous to emergency responders who may not know that there are hazardous materials in a vehicle that is involved in an incident. In fact, it could contain up to 1000 pounds of a hazardous material and legally, not be required to have a placard.

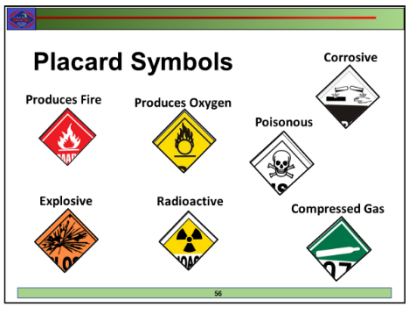
Placards are 10 ¾"x10 ¾" in size. They must be affixed to all four sides of a vehicle transporting hazardous materials. This includes tank cars, cargo tanks, portable tanks, and other bulk transports. Placards provide a number of clues to the responder. The color, symbol, hazard class, and name or number all give responders information concerning the chemical.





Placards and labels are probably the quickest and safest way to identify a chemical. Many clues are found on each placard. The color of the placard indicates certain clues, the symbol also indicates chemical properties. The hazard class number informs the responder of the classification of the chemical and the UN number will allow the Awareness Level Person to utilize the emergency response guide to identify the chemical and provide guidance on initial actions needed to reduce injury and keep bystanders safe.

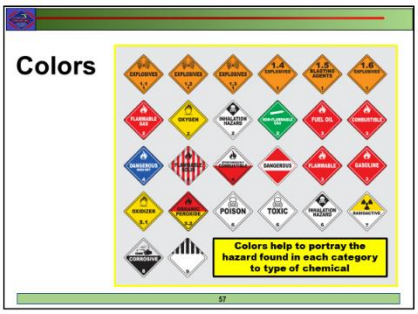
Placard Symbols



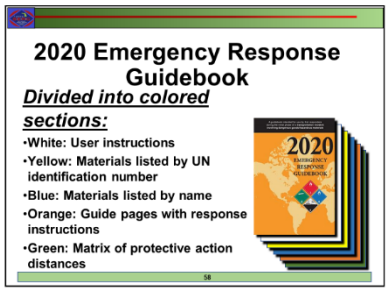
There are numerous symbols found on placards and labels. This slide indicates the seven symbols found on the 9 hazard class placards. There are addition symbols that will be discussed that also may be found on labels affixed to packages. Symbols are used to provide a quick visual reference to the hazard that the chemical presents. For example, the fire symbol logically displays that the chemical labeled with this emblem will burn. The skull and crossbones display that the chemical labeled is poisonous.

Placard Colors

There are also a number of differing colors and color combinations used in the nine hazard class placards and labels. These colors should alert the Awareness Level Person as to the hazard present during a hazardous materials incident. The colors include orange, red, yellow, green, blue, white, black and combinations of all of these. Recognition of the color and color combinations are essential to assist in identifying the hazardous material involve.

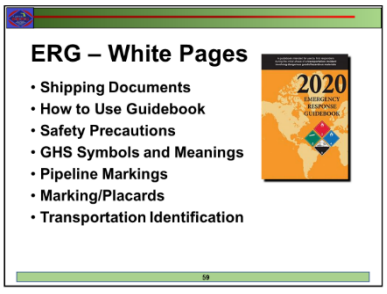


Using the Emergency Response Guidebook (ERG)

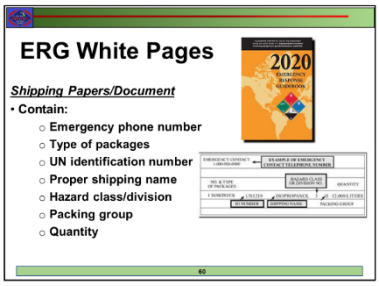


One of the keys to quickly identify the hazardous material is familiarity with the use of the Emergency Response Guidebook. The book is developed to be easy to use and provide quick and accurate information concerning identification, isolation, evacuation, and PPE. The book is organized in color coded pages each with specific information to assist the public, worker, or responder. The initial White pages give information on the use of the book. The Yellow pages are chemicals listed by their UN number providing the Guide Page number to access for specific response information. The Blue pages give chemicals in alphabetic order along with the Guide Page numbers to access for response information. The Orange pages are the emergency response pages. They provide guidance for isolation, evacuation, first aid, PPE, and other useful response information. The Green pages provide specific protective action distances for chemicals with special hazards. Each of these sections will be reviewed individually. While reviewing the ERG the instructor will direct each of the students through each section and provide examples for the students to use to demonstrate how the guidebook can be used. It is important that the Awareness Level Person is able to proficiently use the ERG as their goals and responsibilities on a hazmat incident can only be completed with the basic information provided through this guidebook.

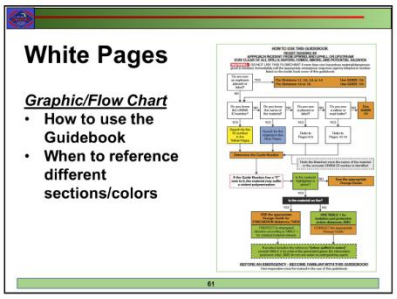
White Pages



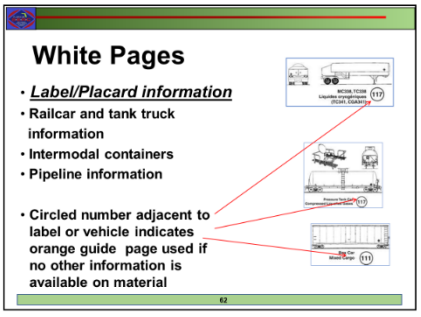
The White pages are informational pages. Contained in these pages is information on shipping documents, directions on use of the Response Guide, safety precautions, Global Harmonization System Symbols and meanings, Pipeline markings, markings/placards, and transportation identification. Although critical response information is found later in the book familiarity with the use of the White pages will provide guidance information to the responder concerning identification of the chemical and how to get to the response information is the quickest and most accurate way. Each of these will be reviewed in class as you page through the book.



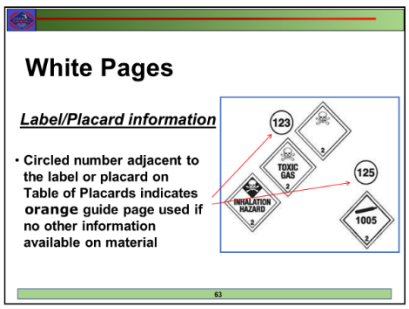
The shipping papers section covers the information typically found on these documents including contact information. Shipping papers are required any time a chemical is transported. These papers are located with a responsible party and provide critical information during a hazardous materials incident taking place during transportation. They provide the name of the shipper, amount being transported, and emergency contact information. This information is critical when an incident takes place during transport.



The White pages also have a detailed flow chart that demonstrates how to use the guidebook based on the information that the responder has. Whether they have a chemical name, UN identification number, the type of highway or railroad container, or just the placard category, the flow chart guides the user on how to gain initial information. Responders must be familiar with this flow chart prior to an incident taking place. During a hazardous emergency, the chart can be confusing if it has not been reviewed in advance and known to the responder.



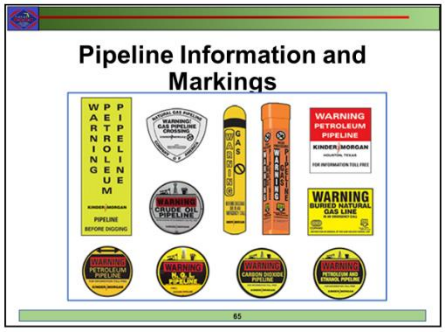
The same process used for placards/labels is also used in the White pages for both highway tankers and railway tankers. First, the responder identified the type of truck or railway tanker, then matches it with the pictograph in the book. Once that is done, the responder is directed to the Guide Page number located in the circle next to the pictogram for response guidance. The Guide Page will provide initial response guidance.



The label/placard information section guides the user to an Orange Guide Page based on the type of placard and label that is displayed when a UN identification number has not been identified. There are diagrams of placards and labels displayed in the White pages that a responder can match with what they visualized at the incident. Once the placard is matched with the diagram in the book, the responder is provided a Guide Page Number to refer to. The responder can them go to the Guide Page located in the circle next to the placard/label diagram for response information.

The same process used for placards/labels is also used in the White pages for both highway tankers and railway tankers. First, the responder identified the type of truck or railway tanker, then matches it with the pictograph in the book. Once that is done, the responder is directed to the Guide Page Number located in the circle next to the pictogram for response guidance. The Guide Page will provide initial response guidance.

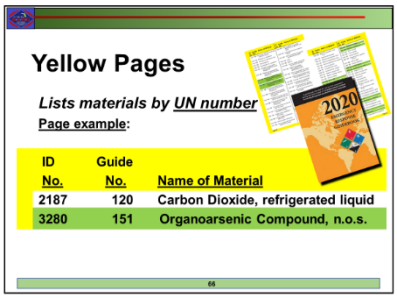
In addition to the international placard/labels the Guidebook also provides diagrams of the Global Harmonization System (GHS) placards/labels with their meanings. These pictograms are often found on packages and containers arriving in the U.S. from other countries. In some cases, international shipments of chemicals in large containers such as intermodal containers also display these GHS markings. Each is somewhat self-explanatory and displays the hazards presented by the chemical that is marked.

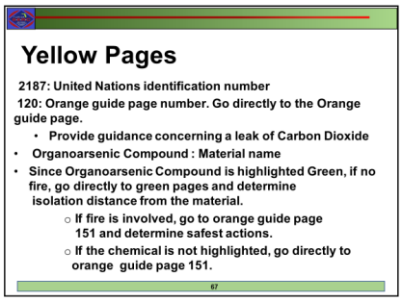


When pipelines are used to transport hazardous materials, they have required markings to identify their location. These markings identify the location, direction of travel and appropriate cautions and warnings. Most of the times these markers have the chemical being transmitted down the pipeline and have an emergency contact number if an incident has occurred. These markers may also indicate the pressure of the pipeline and whether the pipeline to transporting a gas or liquid. Today, pipelines are very frequently used as the cost of transporting chemicals through a pipeline is much less expensive, considerably safer, and more reliable than transportation by truck, train, or ship.

Yellow Pages

The next section of the Emergency Response Guidebook is the Yellow pages. In the Yellow pages. Chemicals are listed in numerical order by their UN identification numbers. If a placard or label on a container displays the four-digit number, it can be used to identify the chemical or chemical classification of the material found inside of the container. The responder can then identify the appropriate Orange Guide Page for appropriate response actions.

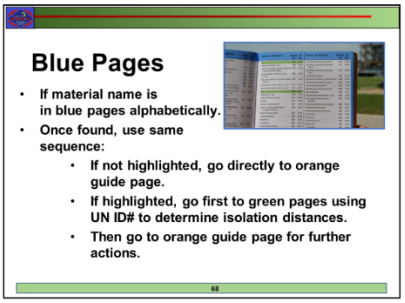




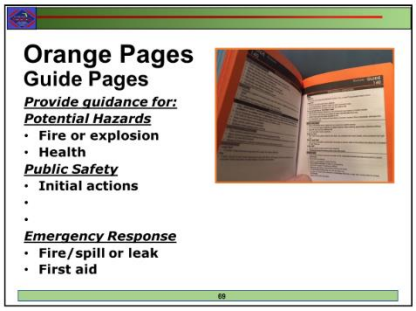
Here is an example of how to use the Yellow pages. The container has the UN ID number of 2187. Identify 2817 in the Yellow pages and find that the chemical is Organoarsenic Compound. First note that the chemical is highlighted in green. This will be discussed in a moment. It also directs the user to Guide Page 151. First, go to Guide Page 151 to access most information. Because Organoarsenic Compounds are highlighted in green the user must access the green pages using the UN ID number. The green pages provide isolation and evacuation distances for small spills and large spills.

Blue Pages

The Blue pages are similar to the Yellow pages except the chemicals are listed in alphabetic order. In the case that the responder has the name of the chemical it can be easily accessed by finding the name in the Blue pages. Then the user is directed to the appropriate guide page. Like the Yellow pages some of the chemicals are highlighted. In the case of a highlighted chemical, the UN ID number is used to access the Green pages for isolation and evacuation distances for both small and large spills.



Orange Pages

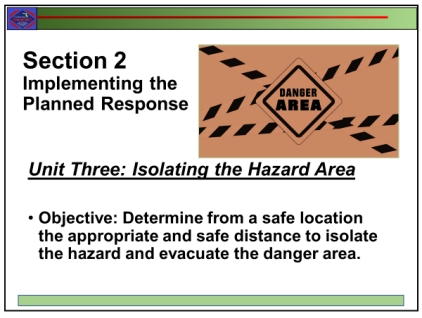


The Orange pages represent the actual guides regarding how to initially handle the chemical. Each Orange page has information concerning what kind of hazards are an issue with the chemical and what kind of actions need to be taken to keep the public and responders safe. Then what kind of emergency response is immediately required to reduce the potential harm. In the Orange pages there are guidelines for isolation and evacuation, what kind of minimal PPE is recommended, and first aid measures if anyone gets exposed.

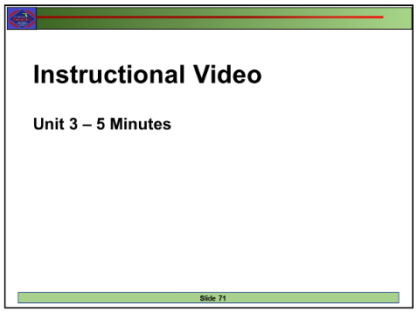
Complete Unit Two Exercise

Section Two – Implementing the Planned Response

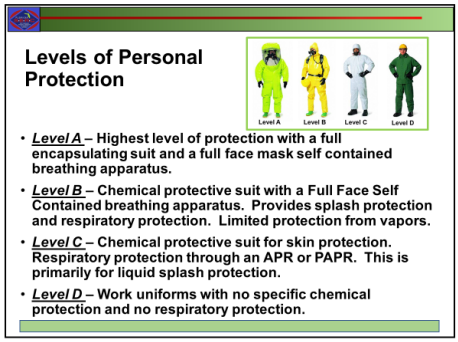
Unit Three – Isolating the Hazard Area



The Objective of Unit Three is: Determine from a safe location the appropriate and safe distance to isolate the hazard and evacuate the danger area. This unit will present resources for personal protection and discuss how exposures take place. Part of isolating the hazard is wearing PPE. In addition, this unit will guide the Awareness Level Person how to determine the isolation and evacuation distances. The correct use of the ERG will provide the safe isolation distances for both Table 1 and Table 2 materials.

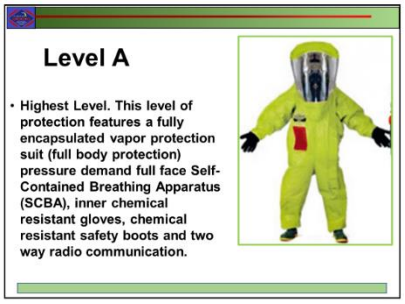


Levels of Personal Protective Equipment (PPE)



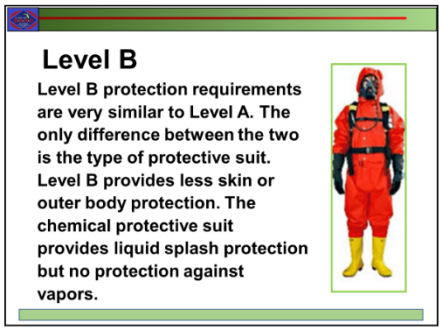
Hazardous Materials personal protective equipment is available in different levels. These are listed from Level A to Level D. Level A is the highest level of protection while Level D represents the lowest level of personal protective equipment. The selection of the level of chemical protection needed is directly dependent on the chemical and physical properties of the material involved in the incident. As the level of protection increases, dexterity, vision, and heat effects on the body are detrimentally affected as well. Decisions on what level protection to use must be determined by the amount of the chemical, location of the incident, and the chemical/physical properties of the chemical involved in the incident.

Level A



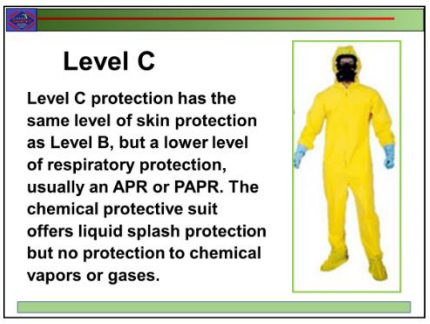
Level A is fully encapsulated protective equipment with an air supply on the inside of the suit. This allows the highest level of protection. The suits are made of various types of chemical protective material. It is important to note that there is not any one material that protects a responder from every chemical. Extensive training is required to both select the appropriate chemical protective suit and to wear the suit under emergency situations. All suits present with their own set of hazards including limited visibility, limited flexibility, high stress because of confinement, and limited self-help if there is a failure of the suit or failure of the breathing apparatus.

Level B



Level B is similar to Level A in that it provides a very high level of chemical protection. Level B is not fully encapsulating but does provide protection over every surface of the body. One of the main differences in Level B is the breathing apparatus is worn outside of the suit. The Level B suit is used for liquid chemical emergencies as it does not provide appropriate protection from vapors and gases. But it does allow for the change of an SCBA air tank without completely removing the chemical protective garment.

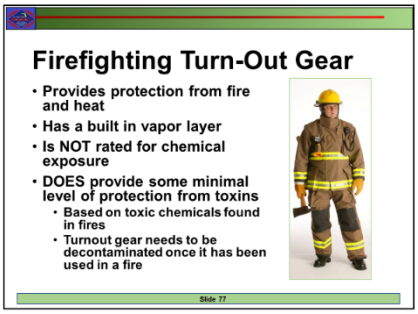
Level C



Level C protection is a chemical protective suit that protects the surfaces of the skin. The biggest difference between Level C and B is the breathing apparatus. Instead of being a positive pressure demand breathing apparatus (SCBA), the Level C suit is worn in conjunction with a filtered mask. This may include an Air Purifying Respirator (APR) or a Powered Air Purifying Respirator (PAPR) using filters that are specific for the chemical involved. Since there are many filter selections, there may be times that selecting the exact filter needed to provide adequate protection is cumbersome and difficult. In industry where the number of different chemicals may be limited, Level C may be used for a rapid response. When emergency responders from the fire departments are involved in the response, it is much more common for them to respond with Level B or even Level A protection.

Level D

Level D protection is similar to a work uniform. It includes overalls, safety shoes, gloves, and eye protection. It does not include any respiratory protection. This level of protection is often found in laboratories and fixed facilities where regular air monitoring is performed and the biggest concern is splash protection from low volatility chemicals.

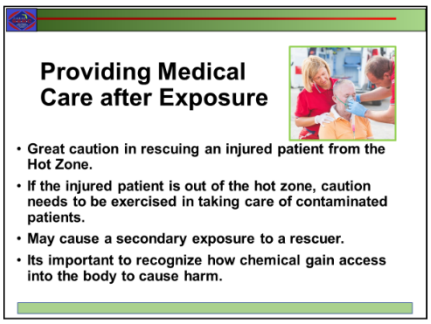


Although firefighter turnout gear is not rated as any level of chemical protection it would probably fall in the Level D category. Firefighter turnout gear covers all exposed skin and does not provide protection from vapors or gases. The gear does have a vapor barrier that prevents, or hinders, chemicals from gaining easy access. Turn out gear needs to be worn anytime a flammable liquid or gas is involved in the incident and fire is a possibility or probability.

How to Treat Chemical Exposures

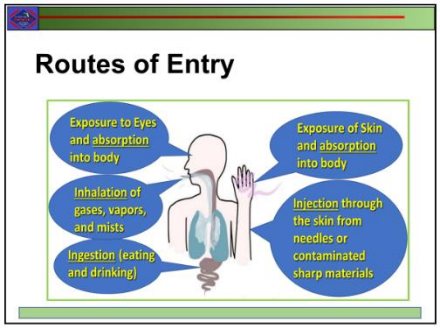
If a chemical exposure takes place the person exposed should be immediately move out of the area of the chemical. Quickly, all exposed clothing should be removed and separated from the victim. Then the victim needs to wash all skin that was exposed to the chemical. If the eyes are involved irrigation of the eyes will both reduce the injury and relieve the pain being generated from the chemical. As soon as possible, make contact to receive more advanced care by EMS or a definitive healthcare facility. If there are questions about the chemical,

the Regional Poison Control hotline should be called to get definitive guidance on how to treat the exposed person.

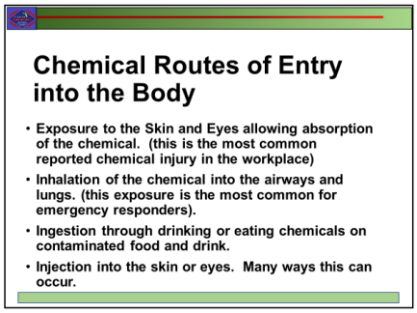


When a person gets exposed to a chemical caution needs to be exercised to not make the situation worse. First, if the victim is incapable of self-rescue and is still in the hot zone (in close proximity to the leaking or spilled chemical), the rescue should only be done by trained persons wearing appropriate PPE. Directly after exposure the victim may be contaminated and present a hazard to anyone providing care. Washing off the contaminated patient is necessary to both reduce the exposure and keep the rescuer safe. In addition, it is important for the rescuer to recognize the routes that chemicals take to gain access into the body and create injury.

Routes of Entry



Chemicals can cause injury through a variety of routes. The most commonly reported injury in the workplace is getting a chemical on the skin or in the eyes. The thinner that the exposed skin is, quicker the chemical can make access. The face, neck and groin area have the thinnest skin so exposures to these areas create a greater affect, while the thickest is on the feet and hands so the affect will be delayed or lessened because of the thick skin. The eyes are protected by a thin layer of tissue that is easily destroyed by acids and alkalis. Immediate irrigation is necessary to reduce the injury.



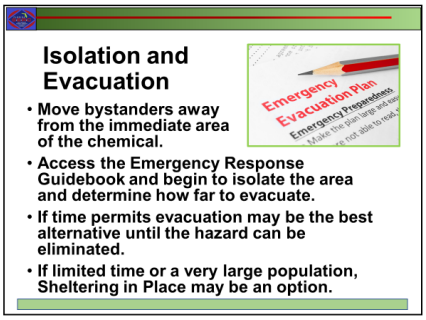
The second most common exposure is to inhale the chemical. If a chemical is released in the air or is vaporizing, victims need to immediately leave the area. Any responder entering the area needs to wear appropriate PPE. Unfortunately, inhalation injuries occur very quickly and if the exposure is significant, definitive care at a hospital becomes critical. Inhalation injuries can cause a lifetime of symptoms created by the tissue damage from the exposure.

Ingesting can take place by eating contaminated food or drink. There are many reported incidents of chemical ingestion because of improper storage of chemicals in unmarked containers such as beverage bottles. This is an illegal practice and should never be used because of the danger of an accidental ingestion.

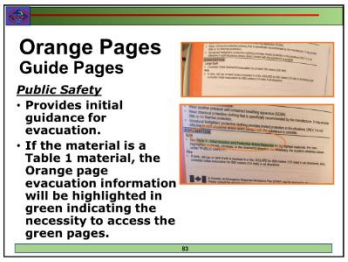
The least common form of chemical exposure (except from a hypodermic needle stick) is injection but it does take place from sharp objects and high-pressure gases exposed to skin. In any of these cases the symptoms may be localized to the area of exposure or/and be systemic causing illness away from the point of exposure.

Isolation and Evacuation Practices

When a hazardous materials emergency occurs the first priority is to move any people at risk away from the spill or leak. This action needs to take place as soon as the emergency is identified. As soon as possible the responder should access information in the emergency response guide to determine how far those at risk should be moved away from the leak or spill.

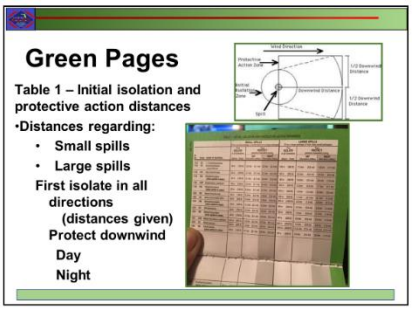


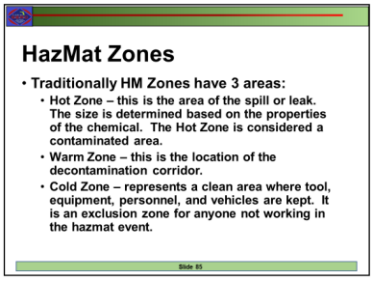
Orange and Green Pages Isolation/Evacuation



To determine the appropriate distance for known and unknown chemicals the Awareness Level Person should access the information found in the Emergency Response Guide. Once a determination of the chemical is found by either using the UN ID number or the chemical name the guidebook will direct the user to a Guide Page Number (Orange Pages). These Guide Page will provide the initial isolation and evacuation distances.

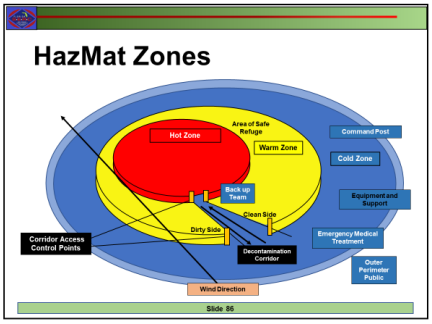
If the chemical is highlighted either Yellow (in the Yellow pages) or Blue (in the Blue pages), then the responder will go to the Green pages to determine the isolation and evacuation distances. The chemicals that are highlighted are considered to be Table 1 materials. Table 1 materials are especially hazardous, produce extensive vapors or gases, and require larger evacuation distances.





Typical hazmat scenes are set up into functional zones. Most important of these zones is the Hot Zone. The Hot Zone represents the area of contamination from the chemical. It is the area that no one enters without personal protective equipment. If work is done in this area, it much be performed by a Technician Level Responder. There are some exceptions to this general rule. If the Hot Zone was created by a flammable/combustible liquid such as gasoline, an Operations Level Responder can spread absorbent and provide other mitigation activities.

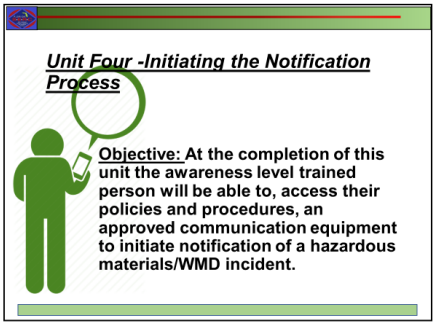
The Warm Zone is identified as an area between the Hot Zone and the Cold Zone. The only function that takes place in the Warm Zone is decontamination. The Warm Zone should not be contaminated with the chemical from the spill. In the decontamination corridor there will be some contamination on the Hot Zone side but as a responder leaves the Hot Zone, decontamination will take place that will reduce the contamination as the responder moves toward the Cold Zone. When the responder reaches the Cold Zone, they should be clean from chemical contamination.



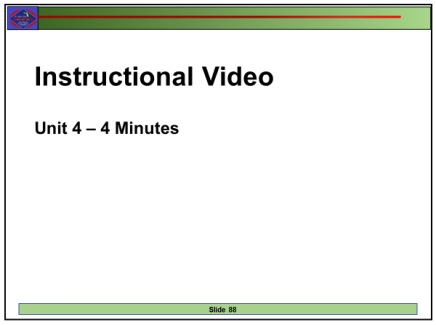
The Cold Zone is the location of staged equipment and apparatus. The Command Post should also be located in this area. It is important to note that the Cold Zone does represent an exclusion zone. The general public is not to be in this area. Anyone not associated with the incident should not be in the Cold Zone. Occasionally, industry representatives, media, and PIOs are in the Cold Zone but they are always escorted while in the Cold Zone.

Complete Unit Three Exercise

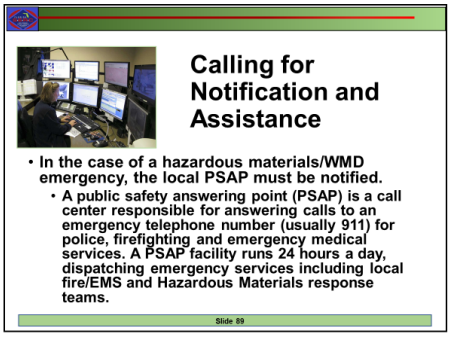
Unit Four – Initiating the Notification Process

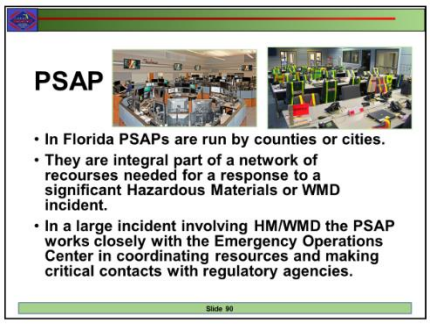


The objective for Unit Four is: At completion of this unit the awareness level trained person will be able to, access their policies and procedures, approved communication, an initiate notification of a hazardous materials/WMD incident.

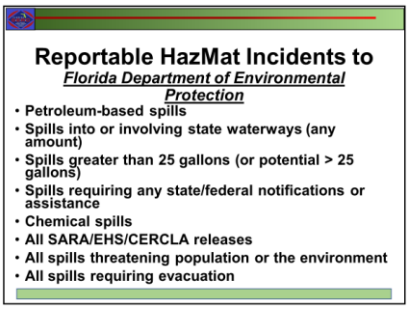


Once an Awareness Level Person is aware of a HM/WMD incident emergency contact needs to be made. If the incident takes place at the person's work site, the first steps in notification are found in the employer's Emergency Operations Plan/Procedure. At some point early in the event a call to 911 (emergency response line) needs to take place. The call is usually funneled through a center call, the Public Safety Answering Point or PSAP. The PSAP will dispatch the appropriate emergency response services based on the information that the caller provides to the PSAP operator.

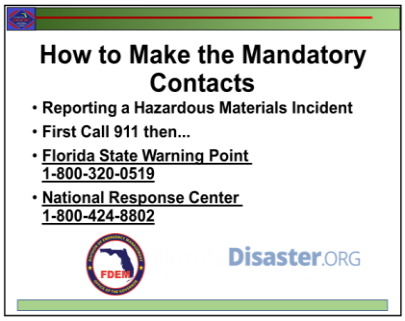




PSAPs are generally operated by counties or cities and are usually a function of either the Fire or Law Enforcement Agency. The call takers (also called dispatchers) are generally highly trained in gaining important information about the incident and, following general guidelines, dispatching the initial emergency response units. A HM/WMD incident requires response from both Law Enforcement and Fire agencies. In some cases, city/county/state environmental agencies are also notified and may be automatically responded to the incident. As more agencies become involved in the incident, the Incident Command System will be organized to coordinate the response and work to mitigate the incident.



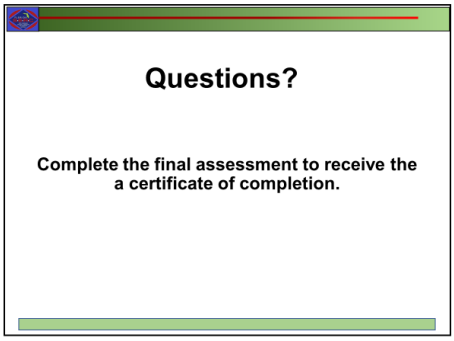
The State of Florida Department of Environmental Protection has identified hazardous materials incidents that qualify for reporting to them. A spill of chemicals of this type or location requires that agencies get contacted within a short period of time. This is critical to get a timely response, cleanup, and area made safe for the public to use.



As an Awareness Level Person, the first call should be directly to 911. The Public Safety Answering Point (PSAP, dispatch/911 center) will ensure that there is an appropriate emergency response to the hazardous material/WMD incident. Most PSAPs will make the appropriate contacts and contact the State Watch Office. The State Watch Office is maintained through the Florida Division of Emergency Management.

Complete Unit Four Exercise

Complete the final assessment and you will be provided a certificate of completion.



Complete Final Assessment