Florida Awareness Level
Hazardous Materials
Training Program

Instructor Guide

Developed by the
Florida Division of Emergency Management
funding provided by the
U.S. Department of Transportation
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Video credits found within the accompanying DVD/Video

Additional Supporting Materials

In addition to this program in its entirety, the following supporting materials can be obtained from the Florida Division of Emergency Management website: floridadisaster.org

- OSHA Interpretive Quips for 29 CFR 1910.120
- OSHA HAZWOPER paragraph (q) enforcement instructions “CPL2-259”

The video “Surviving the Secondary Device” is available from the Florida Division of Emergency Management or your Local Emergency Planning Committee.
Hazardous Materials Awareness Level Training Program

Unit 1 - Preparation for Response

Developed by the Florida Division of Emergency Management
First Responder Awareness Level Training

UNIT 1 – “Preparation for Response”

INSTRUCTOR GUIDE

Required Materials:

Student Note Taking and Activities Guide for each student

PowerPoint Presentation Slides 1 - 18

DVD/Video Tape Unit 1

Copies or samples of employer Emergency Response Plans (ERP) and and Local Emergency Planning Committee (LEPC) Plans

Current copy of the Emergency Response Guidebook (ERG) for each student
Preparing for Response

(Slides 2 - 3)

I. Introduction
First responders at the Awareness Level are those individuals who are likely to witness or discover a release of hazardous material and are trained to initiate an emergency response sequence.

A. Terminal Objectives
Upon completion of this unit, the student should be able to identify the regulatory requirements that apply to first responders of hazardous materials incidents and the role of the first responder at the awareness level.

B. Enabling Objectives
The student should be able to define the term hazardous materials and identify what constitutes as a hazardous materials incident. The student should be able to identify the training requirements of OSHA 29 CFR 1910.120(q) and EPA 40 CFR 311, the role of the first responder at the awareness level and the role of the Local Emergency Planning Committee (LEPC) and the State Emergency Response Commission (SERC) with regard to hazardous materials emergency response planning.

This portion of the program is intended to introduce the student to the concepts of hazardous materials emergency response. This is to include the definitions of hazardous materials and extremely hazardous substances. It is incumbent upon the instructor to be able to augment the instruction with the definition of hazardous waste. Students must be able to recognize when they are confronted with a hazardous materials incident. In order to do this they must first understand what a hazardous material is...and its potential impacts on life safety.

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II. Hazardous Materials

A. Definitions:

1. U.S. Department of Transportation (DOT) - first defined nationally in 1975 as a "...substance or material which has been determined ..., to be capable of posing an unreasonable risk to health, safety, and property when transported....".

2. U.S. Environmental Protection Agency (EPA) & Occupational Safety and Health Administration (OSHA) - "any substance that can produce an adverse effect on the health or safety of the persons exposed...".
(Slide 5)

3. Simplified Definition - Any substance or material, solid, liquid or gas, that when released to the environment is capable of causing damage, injury, illness or death.

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B. Extremely Hazardous Substance (EHS)

EPA defines an EHS as a hazardous material which would present a significant risk to the surrounding community and/or environment should it be released. These materials have the potential to migrate offsite of the release and move throughout the environment, presenting an immediate health and safety hazard.

For the purpose of this program the student will be held responsible only for the definitions of hazardous substances and hazardous materials as defined above. They do need to be acquainted with the definitions of hazardous waste in the context of emergency response and first responder safety.

For instructor information purposes, the following definitions are provided:

Hazardous Waste: EPA uses the term hazardous waste for chemicals that are regulated under the Resource Conservation and Recovery Act (RCRA). These materials exhibit hazardous characteristics described in 40 CFR 261.33 or 49 CFR 170-179. Hazardous wastes pose the same threat that the original hazardous materials posed based on their usage.

Extremely Hazardous Substances: this term defines those chemicals which must be reported to the appropriate agencies if stored in quantities exceeding the Threshold Planning Quantity. The list of extremely hazardous substances is identified in 40 CFR 355.

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C. Hazardous Materials Incident:

1. Definition - An emergency created by the release or potential release of a hazardous material in an unplanned or unexpected manner.

   a. Emergency response to a hazardous materials incident is an effort by first responders from outside the immediate release area to an ongoing, uncontrolled release of a hazardous substance.

   b. An incidental release is one which does not pose a significant safety or health threat and can be controlled at the time of release by personnel in the immediate release area.
2. Unique Characteristics:

   a. May require the use of personal protective equipment (PPE) not
      available to the on-scene first responder and which he may not be
      trained to use

   b. Usually requires different operational approaches from “normal” or
      “routine” duties and different skills and attitudes

   c. Differs from routine incidents in that it may pose a significant risk to the
      first responder

   d. Intentional chemical releases may be used to cause injury or death to
      first responders and persons in the vicinity of a release

   e. Those most susceptible to the effects of a hazardous material are the
      ones who treat the incident as routine

   f. First responders are injured by hazardous materials due to complacency
      and lack of recognition

   g. Greater potential for long term health issues

   h. May require multiple response agencies

   i. May involve unseen or unpredictable hazards

| Students must understand their capabilities and limitations based on their agencies’ emergency response plan (ERP) and their level of training. It is not the intent of this program to inhibit a responder from performing a rescue of a viable victim; but, to provide them with the tools necessary to make an educated decision regarding their personal safety in compliance with state and federal regulations and in accordance with their level of training. |

| The instructor should be able to relate appropriate examples based on the discipline being addressed, to ensure enhancement of program perspectives. |

| It is important to emphasize that even though an incident is recognized as involving a hazardous material and the proper response has been initiated, the first responder must proceed with regard for the other hazards which may be present. |

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Hazardous Materials Awareness Level Training
III. Mechanisms of Harm at Hazardous Materials Incidents:
Hazardous materials incidents may be harmful in many ways. The acronym TEAM CPR explains the type of hazards that may be encountered.

A. T.E.A.M. C.P.R.

1. T – Thermal:
   a. Exposure to extremes in temperature
   b. Heat from fires or releasing chemical reactions
   c. Extremes in cold such as those identified with liquefied gases and cryogenic liquids

2. E – Etiological:
   a. Injury or harm caused by human disease causing agents
   b. Bacteria and viruses

3. A – Asphyxiation (can be subdivided into simple and chemical):
   a. Simple - oxygen deficient atmosphere which can be caused by displacement or consumption of ambient oxygen
   b. Chemical - many toxic substances, such as carbon monoxide, cause pathological changes within the body by preventing the body from properly using oxygen

4. M – Mechanical - physical hazards which may be present at the incident include:
   a. Flying debris from explosions
   b. Trips and falls on uneven ground
   c. Excessive noise conditions resulting in loss of hearing

5. C – Chemical:
   Negative effects from exposure to chemicals or toxic materials include: poisoning from pesticides and biological toxins, respiratory system injury from a substance such as chlorine and corrosive damage from contact with acids and alkaline materials
6. P – Psychological:
   Mental harm caused by fear of the unknown and/or witnessing a violent death

7. R – Radiological:
   Exposure to materials which spontaneously emit ionizing radiation.

The student must focus on all of the hazards that may be present in the event of a hazardous materials release. The acronym of TEAM CPR may help in appreciating this aspect. Many hazards may be present, especially in the event of a transportation incident.

Being able to recognize and possibly identify that a hazardous material incident has occurred, the next step is to ensure personal safety and initiate the proper response. It is important that the instructor know and understand the participants' Emergency Response Plan (ERP) and Standard Operating Guidelines (SOGs). The ERP and SOGs define an appropriate individual reaction to a hazardous materials incident.

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IV. Duty to Act
   A. Standard of Care
      There is a level of competency anticipated during the performance of a service or a duty. The concept of the “Standard of Care” dictates that responders act appropriately when serving the public.

      Numerous laws, regulations and standards are in place and influence the responder’s actions at hazardous materials incidents.

      Failure to follow these standards would result in violation of the “Standard of Care”.

   B. The Duty to Act
      Only local public safety responders can provide the critical first decisions at a hazardous materials incident.

      Past experience has shown that decisions made during the first critical minutes which are based upon safety and public protection, greatly reduce the risk of first responder injury.

      No other agency (state or federal) is in a position to make the critical first decisions.
C. Influences on the “Duty to Act”
Tied directly to the employer’s emergency ERP.

Only local responders and public employees can provide this service.

The employer’s ERP and SOG have defined procedures in the event of an emergency.

First responders should not exceed the level to which they are trained and equipped.

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D. Roles of the First Responder at the Awareness Level
First responders at the awareness level have four responsibilities which are expressed as Goals:

1. Recognition/Identification - the first responder’s ability to recognize that an incident involves a hazardous material(s), and if possible, to identify the material(s) (if it can be done at no risk to the first responder)

2. Isolation – the first responder’s ability to isolate the involved area, restrict access to the area and remove un-injured and un-contaminated persons from the area

3. Protection - the first responder’s ability to ensure personal safety and safety of the uninvolved public. Protection may include the use of PPE and evacuation of nearby occupancies (if the first responder is so trained and properly equipped)

4. Notification – the first responder’s ability to notify the next level of response as defined in the employer’s ERP.

If the first responder completes these goals using a sound decision making process, the outcome of the incident can be greatly enhanced.

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E. Emergency Response Guidebook (ERG)
The first responder’s initial actions should be based upon the recommendations of the ERG.

Responders should not exceed their level of protection and training!

Do not go into great detail concerning the use and format of the ERG. This information will be covered in detail in unit three of this program.
1. **Origin:** Developed by DOT as a cooperative effort with Canada, Mexico and Argentina

2. **Goal:** Aid first responders in quickly identifying a hazardous materials incident and taking the appropriate actions to ensure life and health safety of those potentially impacted by the release.

3. **Purpose of the ERG:**
   a. Aids in identification of hazardous materials
   b. Outlines basic actions for the first responder
   c. Recommends areas of protective action
   d. Serves as an initial safety plan for first responders
   e. Provides national and international emergency contact phone numbers

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**V. EPCRA and HAZWOPER**

**A. Emergency Planning and Community Right-To-Know Act (EPCRA)**

1. Mandated the development of SERC and LEPCs.

2. Florida has 11 LEPCs set in the Regional Planning Council areas.

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3. LEPCs are required to maintain regional hazardous materials plans with information regarding facilities storing or using Extremely Hazardous Substances (EHSs) in reportable threshold planning quantities.

4. Emergency release notification is to be made to the Florida State Warning Point at 1-800-320-0519 or 1-850-413-9911 (24 hour).

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**B. Hazardous Waster Operations and Emergency Response (HAZWOPER)**

1. A regulation developed by OSHA and codified in 29 CFR 1910.120
2. A mirror regulation adopted by EPA in 40 CFR 311 to ensure enforcement in states that do not have an OSHA approved plan.

3. Both private companies and governmental agencies must comply with this regulation.

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4. Levels of Training - five levels of training are identified by HAZWOPER regulations include:

   a. Awareness – First Responders or facility personnel who are likely to witness or discover a hazardous substance release and who have been trained to initiate an emergency response sequence by notifying the authorities of the release.

   b. Operational – First responders who respond to hazardous materials emergencies and take defensive actions to contain the release and keep it from spreading.

   c. Hazardous Materials Technician – First responders who respond to a spill and take offensive actions to control the leak.

   d. Hazardous Materials Specialist – First responders who have specialized knowledge and respond to support the Hazardous Materials Technician.

   e. Hazardous Materials Incident Commander - Those command personnel who will assume command of the incident above the level of the first responder. They are trained to the Operational Level with additional training in the methods necessary to implement the employer’s emergency response plan.

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5. Modes of Operation - Operations at a hazardous materials incident are performed in two modes depending on the level of training of the first responder or facility personnel performing the operation:

   a. Defensive mode - is when the level of training, available equipment, or degree of the incident prohibit further involvement in controlling the incident. It may involve activation of remote shut-offs.

   b. Offensive mode - Offensive operations are those which place the first responder in close proximity or contact with the hazardous material, its
vapors or gases. Offensive operations should only be taken after a thorough risk versus benefit analysis has been conducted. Then, only properly trained and protected technician level responders are to engage in such operations. The offensive mode puts the first responder at risk and demands an increased level of knowledge and experience.

Show Video Segment Units 1 - 4

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VI. Review of Unit
Take a few minutes to review the information covered in this unit and ensure the understanding of the information by the students. Use this opportunity to discuss the way the participant’s organization has complied with the requirements and reinforce what is expected.

- Definition of hazardous materials
- How hazardous materials incidents differ from other emergencies
- The seven hazards which can be found at a hazardous material incident (TEAM CPR)
- Concepts of “Duty to Act” and “Standard of Care”
- The four roles of the awareness level first responder
- EPCRA and how it relates to the employer’s ERP
- The 5 levels of training
- Two operational modes and how they apply

Activity 1.1 – Preparation for Response
Hazardous Materials Awareness Level Training Program

Unit 2 - Hazard Identification

Developed by the Florida Division of Emergency Management
First Responder Awareness Level Training

UNIT 2 - “Hazard Identification”

Detecting the Presence of Hazardous Materials

INSTRUCTOR GUIDE

Required Materials:

- Student Note Taking and Activities Guide for each student
- PowerPoint Presentation Slides 19 - 50
- DVD/Video Tape Unit 2, Parts 1 and 2
- Copies or samples of employer Emergency Response Plans (ERP) and LEPC Plans
- Current copy of the Emergency Response Guidebook (ERG) for each student
Detecting the Hazardous Material

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I. Introduction

A. Terminal Objective
Upon completion of this unit, the student will be able to identify the hazards posed by hazardous materials incidents. The student should also be able to identify those situations when hazardous materials are present given incident scenarios involving a fixed facility or transportation related situation.

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B. Enabling Objectives
The student shall be able to:

1. Identify the six clues to the presence of hazardous materials
2. Demonstrate the ability to identify the hazard classes of hazardous materials
3. Identify a hazardous material by class, name or identification number

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C. Four Goals of Awareness Level Response

1. Review the four goals of Awareness Level Response
   a. Recognition and Identification
   b. Isolation
   c. Protection
   d. Notification
II. Six Clues to Recognizing Hazardous Materials

A. Limitations of the Human Senses

1. Some human senses can put the responder at great risk of exposure.

2. The closer one gets to a hazardous material, the greater the risks.

3. The senses of touch and taste create unacceptable risks.

4. The sense of smell can be unreliable due either to high odor thresholds or olfactory fatigue (deadening of the sense of smell).

5. The human senses which provide the greatest safety are those which occur from a distance or those which occur from common sense created by your awareness of the potential hazards.

6. Use recognition clues that rely on low risk senses.

7. Low risk clues are those which allow anticipation of a hazardous materials event prior to arriving in dangerous proximity of the event.
The above discusses the increased risks to first responders based upon senses normally used for identification. The desired outcome of the program is to get students to think “Hazardous Materials” prior to getting close enough to have to rely on these senses. If they can anticipate that hazardous materials may be present by use of information obtained during response then close proximity to the hazardous material can be limited.

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B. Six Clues

1. Occupancy and Location
2. Container Shape and Size
3. Placards and Labels
4. Shipping Papers and Facility Documents
5. Markings and Colors
6. Human Senses

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C. Clue #1 - Occupancy and Location
The type of occupancy and location provides information concerning the potential hazards without putting the first responder at risk. Hazards can be anticipated by having an early understanding of the potential hazards which may be present.

1. Occupancy refers to the actual structure and its use (examples)
   a. Manufacturing facilities
   b. Storage facilities
   c. Retail establishments
   d. Residential
The instructor should take this opportunity to localize the program by discussing area specific facilities and locations. Information concerning such facilities can be obtained from the LEPC Hazardous Materials Plan.

If the instructor has them available, slides of various facilities and locations could be presented in the class and discussed.

Discuss the general types of hazardous materials that can be found at the different facilities and locations. Additionally, discuss the basic hazards which can be found in drug labs (chemical hazards, “Bad Guy” hazards and traps)

2. Location refers to the general area in which you are located:

   a. Agricultural
   
   b. Industrial parks
   
   c. Business districts
   
   d. Residential areas
   
   e. Transportation corridors - five modes of transportation:

       1.) Rail
       2.) Air
       3.) Marine
       4.) Pipeline
       5.) Highway

Discuss with the students the local transportation corridors and the volumes of materials which are transported. Again, it is suggested that the instructor use slides of local hazards and transport routes for discussion.

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   f. Illegal Operations (Drug Laboratories)

       1.) Drug labs present unique hazards:
       2.) Chemical hazards vary depending upon lab types
       3.) Booby traps are commonly found
       4.) Drug labs can be found anywhere

   g. Clues to the presence of a drug lab:

       1.) Unusual traffic at odd hours
       2.) Heavy chemical odors
       3.) Fortified
       4.) Occupants smoke outside
       5.) Drug labs require special assistance
h. Terrorist activities:

1.) Bomb making labs
2.) Chemical preparation areas
3.) Biological material incubators

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D. Clue #2 - Container Shape and Size

1. Three major classifications of containers
   a. Portable
   b. Fixed
   c. Transportation

2. Containers are designed to ensure that the product does not release and can be generally divided into:
   a. Low-pressure or non-pressurized vessels, and;
   b. Pressurized vessels

3. Vapor Pressure
A basic understanding of vapor pressure is necessary to understand the construction and associated hazards of non-pressurized and pressurized containers.
   a. Vapor pressure is the absolute pressure exerted by a liquid.
   b. All liquids evolve vapor (evaporate).
   c. The rate at which the vapors evolve is dependent upon the vapor pressure.
   d. As the temperature increases, so does vapor pressure.
4. Pressurized containers
   
a. Characterized by heavy steel construction and rounded ends, which equally distribute the pressure against the container walls.

b. An exception to this rule of appearance can be seen in rail transportation. Rail transportation vessels have valves and contentions which are enclosed in a protective steel dome.

c. Common highway containers are the MC/331 (liquefied gas) and the MC/338 (cryogenic) carriers.

Discuss with the student the vapor pressure of various materials. (Note: 760 mm/hg = 14.7 psi. All values are based upon 68 degrees F Acetone = 188 mm/hg, Cresol = 0.24 mm/hg, Chlorine = 99 psi. The higher the vapor pressure, the greater the amount of vapors that will be released and the higher the pressure inside the container. As temperature increases, so does the vapor pressure. If the material is in an enclosed container without adequate venting mechanisms, the container can catastrophically fail. The resulting failure can propel containers several thousand feet. We will see the evacuation distances which are necessary when dealing with fires and closed containers when we discuss “Taking Control”.

5. Non-pressurized or Low-pressurized containers
   
a. Found in a wide variety of configurations.

b. Bags, Bottles, Drums.

c. Common highway containers are the MC/306 - DOT/406 (commonly seen carrying gasoline and other petroleum materials), the MC/307 - DOT/407 (chemical carriers) and the MC/312 - DOT/412 (corrosive carriers).

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E. Clue #3 - Placards and Labels

1. DOT calls for the use of labels and placards
   
a. Labels are found on containers and packaging, such as boxes containing multiple containers

b. Placards may or may not be required on the transporting vehicle depending upon class of material and quantity carried.
c. Absence of a placard does not indicate an absence of hazardous materials. It is estimated that:

1.) 50% of all commercial carriers are carrying hazardous materials.
2.) Only 50% of those are required to display a placard.
3.) As few as 50% of those required to be placarded are properly placarded.

d. Many hazardous materials are subject to what is termed the 1000 pound rule.

1.) Less than 1000 pounds of a particular hazard class loaded in one location is not required to be placarded.
2.) Exceptions to the 1000 pound rule are:

i. Some explosives
ii. High level radioactive
iii. Poisonous gases
iv. Flammable solids, dangerous when wet

To demonstrate this concept to the class you can use the following extreme example: A semi loaded in Georgia with 900 pounds of a poisonous liquid (pesticides) would not require a placard. If the semi continues south and stops in Valdosta and loads another 900 pounds of the same class of material, it still does not require a placard because the total quantity was not loaded at the same location. If, during the same stop, the truck took on 500 pounds of an oxidizer, there is still no placarding requirement because the oxidizer is not the same hazard class as the pesticide. Now there are 1800 pounds of pesticides and 500 pounds of oxidizing materials and no placard indicating any the hazards.

2. Review the DOT Hazard Classification System of the current ERG and divisions of hazardous materials and provide common examples of each hazard class or division.

a. Explain the primary hazards associated with each DOT hazard class and division of the hazardous materials

b. The classes of hazardous materials in accordance with DOT guidelines are summarized in the table, “Hazard Classification System” in the ERG.

c. Hazard Classification System
F. Hazard Classification System

1. Class 1 - Explosives
   a. Orange placard and label with black writing

   b. Six Subdivisions

   1.) Division 1.1 - Mass Explosion Hazard

       Virtually the entire load could detonate instantaneously given the proper initiating source.

       Examples: Dynamite, Trinitrotoluene (TNT) and black powder.

   2.) Division 1.2 - Projectile hazard

       Explosive with a projectile hazard but not a mass explosion hazard.

       Examples: Aerial flares, Detonating cord.

   3.) Division 1.3 - Fire hazard, minor blast and/or minor projection hazard

       Examples: Propellant explosives.

   4.) Division 1.4 - Minor explosion hazard

       Contains very small amounts of explosive materials – not a projectile hazard.

       Examples: Practice ammunition signal cartridges.

   5.) Division 1.5 - Very insensitive explosives

       Has a mass explosion hazard, but requires such a high power initiating source that it is unlikely to self-initiate even if burning.

       Formerly called “Blasting Agents”.

       Examples: Ammonium Nitrate/Fuel Oil Mixtures (ANFO)

   6.) Division 1.6 – Extremely insensitive explosives
c. Explosives Safety

1.) Consider all explosive divisions an extreme hazard when involved in fire.
2.) Engine compartment and tire fires should be fought aggressively by trained personnel provided the fire does not make its way to the storage area.
3.) Always anticipate that you will not be able to get the fire under control and start evacuation early.
4.) Know your response area and where explosives may be in use. There may be no outward indication of their presence as can be seen from the Kansas City disaster.

At this point discuss the Kansas City, Missouri explosion which occurred on November 29, 1988 and killed 6 firefighters. All six firefighters were experienced and had knowledge of hazardous materials. Four of the six had attended nationally recognized hazardous materials training programs.

The fire department was dispatched to a vehicle fire at a construction site just prior to 0400 hours. The two arson fires involved some 30,000 pounds of ammonium nitrate/fuel oil mixtures. The explosives were being stored on-site in two type 5 mobile magazines which closely resemble cargo trailers. Since the explosives were parked on the site, the warning placards had been removed as a standard practice (DOT placards are not required when the vehicle is not actively in transport). The firefighters were apparently either a) unaware of the presence of the materials in the trailers even though information received with the initial call indicated that explosives were on-site, or b) under the impression that “Blasting Agents” would not explode because they were to “insensitive”.

Shortly after their arrival, one of the magazines exploded killing all six firefighters.

It is very important that the instructor reinforce that, from an emergency response standpoint, that all explosives should be considered an extreme hazard when involved in fire regardless of the division.

The Institute of Makers of Explosives recommendations state that you should not attempt to fight a fire that directly involves explosives. If the fire makes its way to the storage area, withdraw and let the fire burn.

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2. Class 2 - Gases

a. Contents are under pressure and are either compressed gases or liquefied gases.

b. Over pressurization can result in container failure with projectile hazards.

c. Three subdivisions

1.) Division 2.1 - Flammable Gases
A flammable gas has a vapor pressure of 14.7 psi or greater at 68 degrees F. Their natural state is gaseous.

Some flammable gases can be liquefied, such as propane and butane.

The only thing which keeps them in a liquefied state is the pressure within the container.

If you release the liquid, it will convert to a gas and expand rapidly.

Other gases are stored as a compressed gas.

Container pressures are generally higher.

The expansion ratio is not as great.

Example: Acetylene, Hydrogen

Several examples exist to reinforce this concept, such as gasoline vs. diesel fuel or, gasoline vs. charcoal lighter fluid. The important concept to instill is that all present fire hazards. The number one role of the awareness level response is to isolate and keep people away and prevent ignition by eliminating ignition sources. No smoking, keep vehicles away and no use of signal flares.

2.) Division 2.2 - Non-Flammable, Non-Toxic Gases

Can be compressed, liquefied compressed or cryogenic.

Cryogenic liquids have three hazards:

Extremely cold temperatures (< -150 Degrees F).

The hazards of the gas itself (inert oxygen displacing).

Very high expansion ratio. A little bit makes a lot of gas. 800 - 1000 to 1 expansion ratios.

Materials in this class do not meet the strict criteria for being either flammable or poisonous.

They may be toxic to humans and under certain conditions can be flammable.
Examples: cryogenic argon, liquid or compressed nitrogen, carbon dioxide.

Take a few moments to discuss the hazards of cryogenics, although they are considered “non-flammable” and “non-poisonous”, many of these materials can have both properties.
A good example is anhydrous ammonia (ammonia gas without water). This liquefied gas is used extensively in agriculture as a fertilizer and as a commercial refrigerant in large installations. It is one of the most commonly manufactured hazardous materials in the United States.
Although placarded in Division 2.2, anhydrous ammonia is flammable in the proper concentrations which can be achieved in closed structures and is immediately dangerous to your health and safety at 300 parts per million (a very small amount). Reinforce that placards and labels may not truly represent all of the potential hazards of a material.

3.) Divider 2.3 – Toxic Gases

A gas stored in a compressed or compressed liquefied state.

The gas has the potential to travel longer distances.

If it is a liquefied gas, it will have a higher expansion ratio and therefore will create a large vapor cloud.

Examples: anhydrous ammonia, chlorine, methyl bromide, hydrogen fluoride, sulfur dioxide.

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3. Class 3 - Flammable and Combustible Liquids

Flammable liquids release enough vapors at room temperature to support combustion if given an ignition source.

Combustible liquids generally need some warming prior to releasing enough vapors to support combustion.

Many of these materials also have varying degrees of toxicological hazards as well, such as the benzene content of gasoline.

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4. Class 4 - Flammable Solids

Three Subdivisions
a. **Division 4.1 - Flammable Solids**

Wetted explosives - Have enough water, alcohol or pasticizer content to suppress explosive properties.

Self reactive materials - Can react with the release of heat if exposed to high temperatures during transport, friction or if contaminated.

Readily combustible - Can ignite with friction.

Examples: sulfur, magnesium, nitrocellulose.

b. **Division 4.2 - Spontaneously Combustible Materials**

Pyrophoric - Will ignite on contact with air for less than 5 minutes.

Self-Heating - Liable to slowly self-heat on contact with air.

Examples: white phosphorus, charcoal briquettes.

To reinforce this concept, discuss the process of combustion and that fires require oxygen. Normal air is made up of 21% oxygen; however, if a chemical compound which releases large quantities of oxygen comes in contact with a combustible material, it can actually start the combustion process. If the material is already on fire, it will greatly enhance combustion.

Ask the students to envision burning fuel oil and then think about ANFO (the blasting agent we discussed earlier). The addition of the proper amount of ammonium nitrate to the fuel oil allows the fuel oil to combust much more rapidly and completely.

c. **Division 4.3 – Dangerous When Wet / Water Reactive Substances**

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5. **Class 5 – Oxidizing Substances and Organic Peroxides**

Two Subdivisions

a. **Division 5.1 – Oxidizing Substances**

Those materials which may, mostly by releasing oxygen, cause or enhance the combustion of other materials.

Examples: ammonium nitrate, pool chemicals like calcium hypochlorite.
b. **Division 5.2 - Organic Peroxides**

Organic peroxides have a bivalent -O-O- structure in the compound. That means there is a lot of oxygen in the molecule and attached to each end is an organic compound which may have varying degrees of combustible characteristics.

Therefore, there is a fuel and lots of available oxygen.

Organic peroxides can be VERY unstable and can detonate depending upon their type.

Examples: benzyl peroxide, methyl ethyl ketone, peroxyacetic acid.

(Slide 32)

In order to demonstrate this concept, the instructor can discuss the Fire Triangle and that fire requires three things, a fuel (reducing agent), oxygen (oxidizer) and heat (energy). Organic peroxides, by their chemical makeup, contain fuel and oxygen, all they require is energy. Depending upon the type of organic peroxide, that energy could be as little as warming the material up to room temperature.

6. **Class 6 - Toxic and Infectious Substances**

Two Subdivisions

a. **Division 6.1 – Toxic Substances**

Materials, other than gases, which are toxic or presumed toxic to humans.

Includes severely irritating materials.

The words “poison” or “poisonous” are synonymous with the word “toxic”.

Examples: “tear gas”, hydrocyanic acid, carbon tetrachloride.

b. **Division 6.2 - Infectious Substances**

AKA Etiological.

Viable microorganism or its toxin which can cause disease in humans or animals.

Bacterial, viral and their toxins.
Human blood and body fluids should be considered infectious and therefore first responders need to have training in universal precautions and infection control.

Examples: anthrax, botulism, tetanus.

(Slide 33)

Depending upon the background of the instructor, you can use this opportunity to discuss the important concepts of infection control and universal precautions. However, it is not intended that this discussion replace any legally required training in the employer’s infection control program.

7. Class 7 - Radioactive Materials

Radioactive materials are any materials which emit ionizing radiation with an activity of greater than 0.002 microcuries per gram.

Discuss exposure versus contamination and the three principles of radiation safety. As long as contamination is avoided, exposure stops when you get away from the material.

- Time: Dose is directly proportional to duration of exposure.

- Distance: Dose is indirectly proportional to the square of the distance from the source.

- Shielding: Ionizing radiation is absorbed in varying amounts by materials. The greater the mass placed between the source and the responder, the less the exposure.

Radioactive materials are further classified as Radioactive I, II and III; with III having the highest specific activity.

Packaged in either type B or A containers. Both types of containers are designed to withstand impacts and damages of varying magnitudes with Type A packaging being the strongest.

(Slide 34)

8. Class 8 - Corrosive Materials

Those materials which can cause irreversible damage to human tissue.

In addition, the fumes or vapors from many of the materials are also very hazardous.
Examples: nitric acid, sodium hydroxide (caustic soda or lye), hydrochloric acid.

(Slide 35)

9. Class 9 - Miscellaneous Hazardous Materials

Miscellaneous hazardous materials are those which either:

a. Cause extreme annoyance or discomfort to flight crew members during air transport, or

b. Those materials which are not classified into one of the other eight categories but are subject to DOT transportation regulations.

Examples: molten sulfur, PCBs (poly chlorinated biphenols), hazardous wastes.

(Slide 36)

10. Pesticide Labels

EPA regulations require that containers of pesticides be labeled with specific information. Of importance are:

a. Product Name

b. Active Ingredients

d. Signal Words

1.) Caution
2.) Warning
3.) Danger
4.) Precautionary Statements
G. Clue #4 - Shipping Papers and Facility Documents

1. Shipping papers must itemize all hazardous materials during any mode of transport. Location and names of the shipping papers depend upon the mode of transportation.

2. Identify entries on sample shipping papers that indicate the presence of hazardous materials.
   a. Identify the name of the shipping paper with the mode of transportation
   b. Identify the person responsible for having the shipping papers in each mode of transportation
   c. Explain where the shipping papers are found in each mode of transportation
   d. Identify where the papers can be found in an emergency in each mode of transportation

Show Video Unit 2 Part 1
Activity 2.1 – Shipping Papers Matrix

Use the table below and a marker board to demonstrate this information. The students have a blank representation of this table in their student workbooks and should complete the information as you present it to them.

<table>
<thead>
<tr>
<th>MODE</th>
<th>NAME</th>
<th>LOCATION</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway</td>
<td>Bill of Lading or Freight bill</td>
<td>Cab of vehicle</td>
<td>Must be within arms reach of driver and on driver's seat or door pocket when un-attended.</td>
</tr>
<tr>
<td>Rail</td>
<td>Consist List or Waybill</td>
<td>With conductor or engineer</td>
<td>Consist list shows an itemized listing of each car within the train.</td>
</tr>
<tr>
<td>Water</td>
<td>Dangerous Cargo Manifest</td>
<td>Wheelhouse of vessel or in a document tube or box on a barge</td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>Airbill</td>
<td>Cockpit and attached to outside of packages</td>
<td>In the possession of the pilot.</td>
</tr>
<tr>
<td>Pipeline</td>
<td>Pipeline Markers</td>
<td>At any point which a pipeline crosses another mode of transportation (except in small distribution systems)</td>
<td>Indicates the owner's name and 24 hour emergency contact information. Note: contents of many pipelines change regularly.</td>
</tr>
</tbody>
</table>

3. Facility Documents

a. Material Safety Data Sheets (MSDSs) - Employers are required by law to maintain MSDSs for any hazardous substance which is stored, manufactured or used in the work place.

There are two exceptions to this requirement under Florida Law.

1.) Those materials which are on site only to be resold to the public.
2.) Employers of less than 3 employees.
b. MSDS design is guided by the standard OSHA Form 20 and must contain the following information:

1.) Section 1 - Product Identification  
2.) Section 2 – Physical Data, physical/chemical properties  
3.) Section 3 – Chemical Ingredients  
4.) Section 4 – Fire and Explosion Hazard Data  
5.) Section 5 – Health Hazard Data  
6.) Section 6 – Reactivity Data  
7.) Section 7 – Spill or Leak Protection  
8.) Section 8 – Special Protection Information  
9.) Section 9 – Special Precautions

Activity 2.2 – MSDS

4. Other Facility Documents

a. Facility Emergency Response Plans (ERP)

Required for facilities which utilize extremely hazardous substances over a certain quantity.

ERPs describe the materials on site and the emergency response that employees will engage in if there is an emergency involving the products.

b. Facility Emergency Action Plans (EAP)

Indicates the emergency procedures that employees should use in the event of an emergency. The EAP may indicate the hazardous materials present. Generally calls for employees to evacuate rather than make a response to the emergency.

OSHA calls for two types of documents. The EAP is for those facilities with employees who will not engage in emergency operations (such as firefighting or spill control). The EAP simply calls for the alerting of other employees, evacuation procedures and methods of accountability. An ERP is found at those facilities with responding employees. Most importantly, the ERP describes the roles, responsibilities, personal protective equipment and training requirements for all employees who will engage in the emergency response. A sample ERP for Spanish Moss is provided on the CD, although using a local facility’s ERP is encouraged.
H. Clue #5 “Markings and Colors”

1. Container colors
   a. Many organizations have established standardized color coding for containers. Such as the Compressed Gas Association.
   b. Compliance is not mandatory.
   c. Colors of containers may vary depending upon the supplier.
   d. The colors of containers are not uniform statewide.

2. Markings other than Placards and Labels
   a. Items such as company names and other unique markings may provide clues to the presence of hazardous materials.
   b. Familiarity with your community and the hazardous materials suppliers in your area can be very helpful.

3. Identification Number
   a. Established by DOT as an identifier of the hazardous material being transported.
   b. May be found in three locations during transport:
      1.) Shipping papers
      2.) On the placard
      3.) Orange rectangular panel
   c. This four digit ID number can be cross-referenced in the yellow index of the ERG.
   d. Many Identification Numbers have numerous materials listed.
e. Example is # 1993 which lists other combustible liquids.

f. Again, the Identification number can be found on the orange panel, the placard or on the shipping papers.

Have the students look up the ID number 1993 and note that there are 8 materials listed for this number. Although each material is different, the common characteristic is that they are all combustible liquids of some type. In some cases, multiple listings under a single ID number may also indicate that the materials are all the same but in differing concentration. Also draw their attention to a material listed as “N.O.S.” (Not Otherwise Specified). This indicates that the material meets the specific definition for a hazard class but the name of the product in itself is not specifically listed by the Department of Transportation.

Have the students turn to the page in the ERG which depicts a sample of the shipping papers, placard and orange panel. Describe to the students the information obtained from each of these items. Draw their attention to the identification number which can be found in the examples and have them locate the name of the material in the yellow index.

It is important to reinforce that the identification number may not always be on the outside of the vehicle. The number is required on the placard when the transporting vehicle and the container are one in the same. (i.e. tankers). The orange panel may be used in place of displaying the number on the placard, or may be used when a material is regulated during transport but does not have a specific placard assigned (i.e. Molten Sulphur).

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4. NFPA 704 Marking System - Diamond

The National Fire Protection Association (NFPA) has developed a standardized facility marking system which is commonly called the “704” system. This system is not mandatory unless the local jurisdiction adopts the standard by ordinance. This large symbol is placed on the exterior of structures or storage facilities to indicate products stored.

a. NFPA 704 design

1.) Diamond in shape and divided into four segments.
2.) Starting at the 9 o’clock position and working clockwise there are:
   i. Health – Blue
   ii. Fire – Red
   iii. Reactivity - Yellow
   iv. Other Information - White
3.) In each area a number from 0-4 is placed to indicate the relative hazard of the material.
   i. 0 = No Hazard
   ii. 4 = Highest Hazard

4.) The white “other information” area indicates various special hazards to the material.
   i. “Oxy” = Oxidizer
   ii. “W” = Water Reactive, do not use water
   iii. “ALK” = Alkaline
   iv. “ACID” = Acid

Again, the 704 system is a voluntary standard unless required by local ordinance.

5. Military Markings
   First responders need to familiarize themselves with the specialized hazards that they may be called upon to respond to at military installations.

6. Special Hazard Communication Markings

7. Pipeline Markings

8. Container Markings

(Slide 43)

I. Clue #6 - The Human Senses

1. Use of human senses can place first responders at an increased risk of exposure, depending upon which senses are used to identify a chemical.

   a. Low Risk Senses - Sight and Sound
      1.) Changes in pressure release
      2.) Presence of smoke and/or fire
      3.) Presence of liquids, gas leaks or vapor cloud
      4.) Condensation lines
      5.) Chemical reactions
      6.) Mass Casualties

   b. High Risk Senses - Smell, Touch and Taste
      The responder should be aware of unusual odors and should not discount them.
2. “Odor Threshold” is the level at which the normal person will be able to detect the smell of a material.

   a. Some materials have odor thresholds greater than that at which over exposure can occur. The first responder may be exposed to a toxic concentration before they are able to smell it.

   b. Some people have a genetic inability to detect certain materials with smell. A good example is cyanide; approximately 15% of the population cannot smell cyanide.

   c. Olfactory Fatigue: Some chemicals, such as hydrogen sulfide, can deaden the sense of smell after one or two breaths at low concentrations. The first responder may initially smell the material and the odor will appear to fade when in fact the concentration is getting higher.

(Slide 44)

III. Identifying the Material by Name

   A. The Need to Identify

      a. Once recognized and classified, the next step is to identify.

      b. Actual identification is helpful to fully assess the problem. However, awareness level responders should never put themselves at risk to accomplish this task.

      c. Safety decisions can be made without the actual identity of the material.

   B. Various Methods of Identification

      a. Employees and Bystanders

         Employees, vehicle drivers and bystanders may be able to identify the product involved.

      b. Printed Documents

         1.) Shipping Papers

            i. Shipping papers will list the common name of the materials and the Identification Number.

            ii. This name or number can be used to find the proper guide page in the ERG.

            iii. Awareness Level Responders should never place themselves at risk in order to obtain shipping papers.
2.) MSDSs
   i. Will list the product name in the first section.
   ii. May list the hazardous ingredients by common name in the
       “Hazardous Ingredients Section”.
   iii. There may be more than one hazardous ingredient.

3.) Facility Pre-Plans
   Facility pre-plans, specifically, the employer’s ERP or the LEPC Plan,
   will identify the chemicals stored and/or used at fixed facilities if the
   facility falls under planning requirements.

c. Identification Numbers

  1.) The Chemical Abstract Service (CAS) number registers known chemical
      compounds and assigns a CAS number for each.
  2.) Can be thought of as the “Social Security Number” for a particular
      compound.
  3.) This number is frequently identified on the MSDS for the product.
  4.) Is of great value to Operational and Technician Level Responders.
  5.) Is of little value to the Awareness Level Responder.

C. Operational Decisions

  1. Awareness level responders can make the necessary safety decisions
     without knowing the specific name of a material if necessary.

  2. Awareness level responders should never allow the lack of the material
     name to slow their decision making process.

  3. Identifying the product's hazard class will enable you to make the right
     decision safely.

IV. Criminal or Terrorist Activity Involving Chemical or Biological Agents
(Slide 45)

A. Weapons of Mass Destruction (WMDs)

  1. First Responders must be vigilant to the presence of WMDs.

  2. The five classifications of WMDs are:

     a. Chemical

     b. Biological

     c. Radiological
d. Nuclear

e. Energetic (Explosives and Incendiary)

(Slides 46 & 47)

B. Target Locations

1. Many locations are potential targets from criminal or terrorist activity using hazardous materials.

2. First Responders may intentionally be targeted to increase the impact of the attack.

3. The following are examples of potential targets:
   a. Public assembly areas
   b. Government buildings
   c. Mass transit systems, i.e. subways, buses
   d. Areas of significant economic impact, i.e. regional shopping centers
   e. Religious or controversial organizations
   f. Telecommunications facilities
   g. Historic or symbolic sites
   h. Industrial facilities
   i. Transportation facilities i.e. airport terminals, ports
   j. Military facilities

C. Indicators of Criminal/Terrorist Activity

1. First responders should be aware of the indicators of possible criminal or terrorist activity.

2. The following are examples of indicators to be aware of:
   a. Hazardous materials or lab equipment that is not relevant to the facility occupancy
   b. Intentional release of hazardous materials
c. Unexplained patterns of sudden illness or deaths

d. Unusual security, locks, bars on the windows, covered windows and barbed wire

e. Unscheduled outdoor spraying

f. Abandoned spraying (dissemination) device

g. Unusual presence of natural indicators such as discolored or dead vegetation or sick or dead animals.

(Slide 48)

D. Chemical versus Biological Incident

1. Chemical incidents can be identified by the following:

   a. Rapid onset of medical symptoms characteristic of chemical exposure
   b. Natural indicators
   c. Chemical residue and odors
   d. Indications of a hazardous materials release, i.e. plume or cloud

2. Biological incidents can be identified by the following:

   a. Gradual onset of medical symptoms without obvious odors or colors
   b. Wide spread migration of the illness
   c. Infectious individuals transmitting to others

Show Video Unit 2 Part 2

(Slide 50)

V. Summary

A. Goals of Recognition and Identification

1. Recognize

2. Classify

3. Identify
B. Six Clues to the Presence of Hazardous Materials

1. Occupancy and Location
2. Container Shape and Size
3. Placard and Labels
4. Shipping Papers and Facility Documents
5. Markings and Colors
6. The Human Senses

Activity 2.3 - Clues to the Presence of Hazardous Materials
Hazardous Materials
Awareness Level Training Program

Unit 3 - Taking Control
First Responder Awareness Level Training

UNIT 3 - “Taking Control”

INSTRUCTOR GUIDE

Required Materials:

Student Note Taking and Activities Guide for each student
PowerPoint Presentation Slides 51 - 67
DVD/Video Tape Unit -3
DVD/Video Tape – “Surviving the Secondary Device”
Current copy of the Emergency Response Guidebook (ERG) for each student
Taking Control

(Slide 51)

I. Introduction

A. Terminal Objective
   Upon completion, the student shall be able to properly identify the actions to be taken in order to protect responders and civilians during hazardous materials emergencies.

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B. Enabling Objectives
   The student shall properly identify:

   1. Actions to be taken to isolate the incident.
   2. The procedures necessary to activate the ERP.
   3. The procedures for implementing protective action distances.

**Note to instructor:** This unit relies heavily upon the participant understanding his or her responsibilities in accordance with the LEPC plan, the employer’s ERP and any applicable local Standard Operating Guidelines (SOGs).

As each jurisdiction may differ in their operational recommendations and plans, it is impossible to include those documents in this instructor guide. Therefore, the instructor will need to provide actual or sample plans from the employers of the participants or area organizations.

It is important that the instructor reinforce the need to have an ERP for hazardous materials emergencies. This plan identifies the roles and responsibilities of all employees within the agency. Once this plan has been developed, SOGs should be implemented for each agency in order to understand the expectations of the first responders as outlined by the ERP.

An ERP is mandated by the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA). Should agencies not have an ERP the LEPC Plan for their District is the default plan. All SOGs which are developed must reflect and not conflict with the LEPC plan.

**You need to provide for the class:**

- Copies of the Employer ERP or LEPC Plan (which ever applies)
- Copies of any applicable SOGs

Should these documents be unavailable, employers should be urged to develop, implement and train on these documents as they are in violation with numerous standards and regulations. A sample of an ERP is provided with the course materials, the LEPC Plan can be obtained from the Florida Division of Emergency Management or your district’s LEPC.
II. The ERG

(Slide 53)

A. Origin

1. Developed jointly by:
   a. U.S. Department of Transportation
   b. Transport Canada
   c. Secretary of Communications & Transport (Mexico)
   d. In collaboration with CIQUIME of Argentina

2. Goal

   Aid first responders in quickly identifying a hazardous materials incident and taking the appropriate actions to ensure life and health safety of those potentially impacted by the release.

   a. Updated every four years
   b. Duplicated and distributed free of charge by US DOT.
   c. Distributed by the county Emergency Management Agency or LEPC at the local level.

3. Purpose and Limitations

   a. Assist responders in making initial decisions upon arriving at a hazardous materials emergency.
   b. Personnel using this guidebook must be properly trained to use and interpret the information provided.
   c. Mainly designed for use during transportation emergencies (Highway and Rail).
   d. May have limited value for use in fixed facility incidents.
   e. The guide instructions are based upon single chemical involvement and do not take into consideration simultaneous release of multiple chemicals.
f. Does not address all possible circumstances that may be associated with a hazardous materials incident.

III. How to Use the ERG

(Slide 54)

A. Recognize that you are dealing with a Hazardous Material

1. Methods of Identification

   a. Four Digit Identification number on the orange panel or placard, or
   
   b. Four Digit Identification number on shipping papers or package, or
   
   c. Find the name of the material on shipping papers, package or by interviewing persons involved.
   
   d. Use the placard pictorial pages to select the appropriate guide page if a placard can be identified by color, symbol and hazard class number.

   If you cannot find a name, ID number or visualize a placard and you believe a hazardous material is involved, use Guide Page 111 until further information can be obtained.

B. Look Up the Guide Page Number in either:

1. The yellow bordered numerical index.

2. The blue bordered alphabetical index.

3. Obtain the three digit guide page number.

   a. If there is a “P” next to the guide page number, then the material may be capable of undergoing violent polymerization.

   b. If the index entry is highlighted, look for the ID number and Name in the table of protective action distances (green bordered pages) and begin protective actions immediately.

4. If you cannot identify the material

   a. Match the placard or label. If you cannot find a name or an ID number then turn to the table of placards located on the pages prior to the index and use the guide page number for the particular placard or DOT label.
b. If you still cannot select a guide page, use guide 111 for all unknown materials (the first guide page of the book)

(Slide 55)

C. Basic Protective Actions

1. Approach
   Basic precautions to be taken to protect yourself and others in a hazardous materials incident:
   a. Always approach an incident from upwind and uphill
   b. If you cannot approach from both, upwind always takes priority
   c. If you cannot approach from upwind then stay even further away
   d. Stay back 500 feet and use binoculars to identify labeling
   e. Avoid tunnel vision, look for all hazards
   f. Relay hazards and safety information to others

2. Main Objectives
   a. Isolate the area without entering the area
      1). Keep people away including unprotected responders.
      2.) Keep everyone upwind.
      3.) Keep out of low lying areas.

(Slide 56)

b. Techniques for Isolation and Restriction to Incident Scene
   1.) Roadblocks and traffic re-routing
   2.) Perimeter control
   3.) Personnel accountability system
   4.) Establish Work Zones
      i. Hot Zone (Incident Scene)
      ii. Warm Zone (Decontamination/Entry Corridor)
      iii. Cold Zone (Safe Area)

(Slide 57)

c. Evacuate the immediate area or Shelter-In-Place (SIP)
1.) Evacuate – move all people from the threatened area to a safer place
   i. Door-to-door notification
   ii. Emergency Alert System (EARS)
   iii. Public address (loud speakers)
   iv. Provide evacuation route information
   v. Identify and notify of a collection point
   vi. If known, provide shelter/mass care information

2.) SIP – Advise people to seek shelter inside a building and remain inside until the danger passes
   i. Turn off HVAC (air conditioning)
   ii. Close all windows and doors
   iii. Seal all openings
   iv. Stay inside until otherwise notified

(Slide 58)

d. Initiate the Incident Command System (ICS) to identify those authorized to enter the scene

1.) The senior emergency response official on the scene implements ICS
2.) Review the ICS specified in the ERP and the organizations SOGs
3.) HAZWOPER requires the appointment of a safety officer
4.) ICS implementation is required under HAZWOPER and the National Incident Management System (NIMS)

(e. Evaluate the priorities for the incident, Life, Incident, Property, Environment (LIPE)
   1.) Life
      i. People’s health and wellbeing
      ii. Immediate and long term health hazards
      iii. Cancer, asphyxiation, tissue destruction and chemical burns

   2.) Incident – control through establishing ICS, hazard zones and taking appropriate protective actions

   3.) Property
      i. Immediate destruction of property
      ii. fire and/or explosion
      iii. long term contamination

   4.) Environment
      i. Pollution to water, air and land
      ii. Death and/or injury to wildlife
f. Routes of Entry for Human Exposure

1.) Absorption through the skin and eyes – most frequent route
2.) Inhalation – most rapid and dangerous exposure route
3.) Injection – can occur from high pressure leaks
4.) Ingestion – occurs through improper decontamination; secondary contamination takes place during eating, drinking smoking

(Slide 60)

g. Prevent Direct Contamination
Avoid direct contact with the product, its gases and vapors or smoke from any fire.

h. Prevent Secondary Contamination
Contamination of persons or equipment as a result of coming in contact with items or persons who have not been properly decontaminated.

1.) Do not allow anyone or anything to leave the area without being evaluated for decontamination needs.
2.) This evaluation needs to be performed by qualified individuals and properly protected personnel.

The role of preventing the spread of the actual material is an operational level competency. However, preventing the spread of contamination through means of secondary contamination (e.g. persons leaving the area without being decontaminated) can be achieved by awareness level responders.

It is important that persons and equipment be isolated and carefully evaluated for contamination. If contaminated persons or equipment are allowed to leave the incident site they could extend the contamination to unaffected areas.

Victims must be encouraged to move to a safe upwind and uphill location and remain isolated until they can be assessed. Depending upon the material involved, failure to isolate these people can place the community at risk and increase exposure to the chemicals released.

EMS personnel should not transport patients to a hospital until necessary field decontamination has taken place. Failure to decontaminate patients in the field has resulted in the closure of emergency rooms of hospitals both large and small due to secondary contamination.
(Slide 61)

i. Specific Actions for Suspected Criminal or Terrorist Incidents
   1.) Take self protective actions
   2.) Be alert to secondary devices
   3.) Communicate suspicions during the notification process
   4.) Establish work control zones and access control points
   5.) Document the initial observation
   6.) Attempt to preserve evidence

If available, Show Video “Surviving the Secondary Device” (optional)

(Slide 63)

D. Using the Guide Page
   The three digit guide page is broken into three sections:

   Potential Hazards
   Public Safety
   Emergency Response

   The hazard class and any pertinent identification information are listed at the top of each page.

1. Potential Hazards

   Generally speaking, the greater hazard is listed first (Fire and Explosion versus Health). This can be demonstrated by comparing guide 119 to guide 118. The materials addressed by guide 119 would be considered more toxic.

   Read both “Fire/Explosion” and “Health” to gain an understanding of the hazards you will face.

a. Fire / Explosion Hazards

   1.) Pay heed to adjectives such as “Highly” or “Extremely”. They are intended to get a point across to you.
   2.) Note the bold “P” in the fire and explosion hazard area of guide 119. Polymerization is a potential of these materials.
   3.) Discuss polymerization. Refer students to the glossary in the current edition of the ERG and review polymerization.
   4.) Note the statement “Containers may explode when heated”.
   5.) Discuss the concept of BLEVE.

b. Health Hazards
Toxic materials can enter the body through:

1.) Inhalation
2.) Absorption through the skin and eyes
3.) Ingestion
4.) Injection from high pressure chemical releases

2. Public Safety

a. Notification

1.) Activate the ERP and get help on the way.
2.) Additional information can be obtained from the emergency contact number of the shipping papers or by contacting CHEMTREC at 1-800-424-9300. These numbers are listed inside the back cover of the ERG.
3.) CHEMTREC assistance includes:
   i. Providing immediate advise to first responders
   ii. Contact made to the shipper, manufacturer and other sources for more detailed assistance
   iii. Assures proper follow-up
4.) Discuss the role of the County Warning Point and the State Warning Point and how their ERP calls for the Warning Point Notification.
5.) Advise other responders of:
   i. Incident conditions
   ii. Material(s) and amount involved
   iii. Safe approach information
   iv. Guide page in use
   v. Resources that are needed
   vi. Actions being taken

The instructor should direct the students to the applicable portions of their employer’s ERP, the LEPC Plan and SOGs. During this discussion, the instructor should point out the expected roles and responsibilities of the participants within the plan and discuss the notification procedures as outlined by the plans and SOGs.

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b. Isolation

Initial isolation distances are listed in this section. However, if the entry in the index was highlighted, they need to obtain the isolation distances from the Table of Protective Action Distances (green pages).
1.) Review the “How to Use the Table of Initial Isolation and Protective Action Distances” in the ERG.

2.) Review the shapes of recommended initial isolations and protective action zones.

3.) Describe the difference between the isolation distances in the orange bordered ERG pages and protective action distances in the green bordered pages in the ERG.

4.) Orange bordered guide pages provide:
   i. general distances
   ii. immediate evacuation/isolation distances
   iii. fire and explosion hazards

5.) Green bordered guide pages:
   i. represent an inhalation hazard
   ii. provide detailed isolation distances

6.) Isolate the immediate area in accordance with recommendations.

7.) All people leaving the area must be evaluated for decontamination needs.

8.) No one enters the isolation area unless properly protected and trained.

9.) Keep out of low-lying areas.

c. Protective Clothing

1.) The minimum level of protective clothing for use at hazardous materials emergencies is structural firefighter protective clothing with positive pressure breathing apparatus (SCBA).

2.) In many cases, this protection is not even a high enough level of protection.

3.) Awareness level responders are not provided with chemical protective clothing and street clothing and work uniforms will not provide protection for chemical hazards.

4.) Use of chemical protective clothing requires that the user be properly trained in its use.

   Note: The guide page will indicate whether or not firefighter protective clothing will provide limited protection or if specialized chemical protection is required.

5.) The guide book will never recommend the use of street clothing.

d. Evacuation

Once you have isolated the immediate area, the next step is to evacuate or otherwise protect persons downwind or in a radius around the incident.
Evacuation recommendations are based upon whether the incident is a spill or fire.

**Spill:** If the entry in the index was highlighted, then you need to consult the table of protective action distances in the green section of the book for spill protective distances.

**Fire:** Fire evacuation distances are always expressed as a radius due to the potential for explosion or BLEVE.

Nighttime distances are always greater due to the potential for unstable atmospheric conditions and temperature inversions. During unstable conditions, there is no wind to aid in diluting or dispersing the gases or vapors. In addition, if the area is a low lying area or a valley or an urban area with tall buildings, the distances may need to be increased due to a decrease in air movement and mixing. The ERG provides in depth information concerning the protective action distances.

**Protective Action Zones:**
There are two options for protective actions:

1.) **Evacuate** if the incident is going to be long in duration or, if there is a potential for massive fire or explosion.
2.) **Shelter-in-Place:** If there is no hazard of massive fire or explosion, if it is impractical to evacuate (population density, hospitals) or if evacuation would expose persons to greater hazards.

Have students turn to the appropriate page in their ERG and discuss with them the options of evacuation and sheltering in place. Then have the students turn to the green guide pages and locate cyanogen ID number 1026. Discuss with them the meaning of each column.

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**e. Fire**

*If a fire involves a material that, prior to the fire, was classified a hazardous material then, the fire is a hazardous material incident.*

1.) Only properly trained and protected persons should attempt to fight a fire which directly involves hazardous materials.
2.) **Defensive** fire attack can be accomplished by operational level trained personnel provided they have the necessary protection and training.
3.) **Offensive** fire attack must be conducted by technician level personnel.
4.) Awareness level first responders should not attempt to attack a fire which involves hazardous materials.
5.) Normal fire extinguisher training is not sufficient training to fight a fire that directly involves hazardous materials.
6.) The fire section provides advice to operational level responders and higher for fire attack considerations.
7.) Review the information provided on Guide 119 (orange pages).
8.) Review typical ignition sources found at hazardous materials incidents, such as flammable liquids or gases:
   - Fires
   - Flares
   - Vehicles
   - Smoking

f. Spill or Leak

Awareness level responders do not engage in spill or leak control activities due to the lack of training and protective equipment.

Generally speaking: Spill control can be performed by operational level personnel provided they avoid direct contact with the product and are properly protected.

Leak control is performed by technician level responders.

Remote shut-offs can be activated by operational level responders.

Personnel engaging in these activities must be properly trained and protected.

g. First Aid

1.) This portion of the ERG outlines the basic first aid principles for victims of exposure.
2.) Awareness level first responders are not properly protected to come in direct contact with persons who present a significant risk of secondary contamination.
3.) Victims who are contaminated and conscious should be encouraged to move to an isolated area and await medical assistance by those who are properly trained and protected.
4.) If victims are unconscious as a result of exposure to the hazardous materials, rescue by untrained and unprotected personnel should not be attempted.
5.) Discuss the precautions necessary when providing emergency medical care to victims of hazardous materials incidents as:
   i. identify the hazardous material
   ii. decontaminate victims prior to contact
iii. use barrier protection “BSI”
iv. use disposable equipment if possible
v. if contaminated, ensure that you and your clothing are fully decontaminated as soon as possible

h. Decontamination
   Discuss local decontamination procedures

E. Review the First Responder’s Role at the Awareness Level
   1. Recognize the presence of hazardous materials
   2. Secure the area and control access
   3. Protect yourself and others
   4. Call for trained personnel
   5. Make notification

Activity 3.1 - Finding the Proper Guide Page
While using the instructions on page 1 of the guidebook, have the students complete the questions on their activity 3.1 worksheet.

Activity 3.2 - Determining Protection Measures
Have the students turn to the guide page for “Cyanogen” ID number 1026. Begin to discuss the information provided section by section.

As you discuss the information in the guide page, have the students complete the information in their handout package in activity 3.2. This information should include information obtained both from the guide page and information concerning their employer ERP, LEPC Plan and applicable SOGs.

Show Video Unit 3
(Slide 66)

F. Summary
   1. ERG provides guidelines for the initial safety and protection actions to be taken.
   2. A guide page can be selected by using:
      a. 4 digit material ID number
      b. Material name
      c. Placard comparison
3. Page one of the ERG provides basic instructions.

4. The guide has two indexes (numerical and alphabetical).

5. The orange guide pages provide the safety guidelines.

6. The green pages provide information on isolation and protective action distances.
Hazardous Materials Awareness Level Training Program

Unit 4 - Termination and Final Activities

Developed by the Florida Division of Emergency Management
First Responder Awareness Level Training

UNIT 4 - “Termination and Final Activities”

INSTRUCTOR GUIDE

Required Materials:

- Student Note Taking and Activities Guide for each student
- PowerPoint Presentation Slides 68 - 73
- DVD/Video Tape Unit – 4 and Special Features
- Current copy of the Emergency Response Guidebook (ERG) for each student
Termination

(Slide 67 & 68)

I. Introduction

A. Terminal Objective
Upon completion of this unit the awareness level first responder shall identify those actions to be taken in order to properly terminate their involvement in the incident.

(Slide 69)

B. Enabling Objectives
The first responder shall identify the three actions to be taken during termination and the information that should be obtained during an incident debriefing.

(Slide 70)

II. Reasons for Termination Procedures

A. Required by OSHA

B. Relays important information to the awareness responder

C. Ensures exposures are documented

D. Ensures that future response is improved

III. OSHA Requirements

• OSHA requires that incidents be properly terminated in order to identify operational weaknesses and to improve response and safety.

• The termination process must be documented.

• Any needs for post exposure medical evaluations should be identified.

IV. Relays Important Information to the First Responders

• During the on-scene debriefing process, all first responders are advised of the materials to which they may have been exposed.

• They are advised of the signs and symptoms of over-exposure.
• They are advised of whom to contact if the onset of the signs or symptoms of exposure occurs.

• If they have been exposed to conditions greater than the published exposure limits, they are sent for medical evaluation.

V. Improves Operational Response

The critique and after action analysis phases identify operational strong points and weaknesses.

Methods of correcting the weaknesses are identified by the employer.

Plan of action for improvement are identified and documented.

Plan is implemented and, if required, training issues are addressed.

| The intent of the OSHA requirements is that we learn from our mistakes and enable a continuing learning process which will ultimately improve first responder safety. Many agencies fail to perform these functions. In addition, many agencies are fearful that operational mistakes identified during critique could cause increased liabilities. However, if this process is conducted regularly under quality assurance procedures the findings may be protected in cases of litigation. For any such protection to be offered it must be conducted on a regular basis. |

(Slide 71)

VI. Steps to Proper Termination

A. On-scene Debriefing

All responders should be debriefed prior to leaving the scene.

During this process information is obtained for documentation purposes.

A Hazard Communication briefing is held with first responders to:

- The chemicals they may have been exposed to;
- The signs and symptoms of overexposure;
- The health effects of exposure; and
- The procedures to be taken if these signs and symptoms occur.
B. Incident Critique

Should occur as soon as possible after the incident

Should involve all persons who responded

Should reinforce strong points of response and identify any weaknesses

Should identify actions to be taken to improve future responses

C. After action analysis

An administrative function

Information obtained from the critique is compiled and recommendations for improvement are made.

A method of implementing the necessary changes is identified

A method of tracking the implementation and effectiveness of the changes are developed.

*Show Video Unit 4*

(Slide 73)

**VII. Summary**

- Reasons for incident termination
- Steps to proper incident termination
- On-scene debriefing
- Critique and after-action analysis

**VIII. Final Activities**

The final activities include three incident scenarios and can be found on the DVD/Video Tape under “Special Features”. The activities are provided to reinforce the information provided during the course. The instructor may use any or all of the scenarios depending upon the target audience.

Scenarios:

- Law Enforcement – Leaking Drums
- Fire Rescue/EMS – Motor Vehicle Accident
- Public Works – Chlorine Cylinder Release
**ACRONYMS**

For the purposes of this training program, the following acronyms apply:

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHJ</td>
<td>Authority Having Jurisdiction</td>
</tr>
<tr>
<td>ALS</td>
<td>Advanced Life Support</td>
</tr>
<tr>
<td>BLS</td>
<td>Basic Life Support</td>
</tr>
<tr>
<td>CBRNE</td>
<td>Chemical-Biological-Radiological-Nuclear-Energetic</td>
</tr>
<tr>
<td>DOT</td>
<td>Department of Transportation</td>
</tr>
<tr>
<td>EAP</td>
<td>Emergency Action Plan</td>
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<tr>
<td>EHS</td>
<td>Extremely Hazardous Substance</td>
</tr>
<tr>
<td>EMS</td>
<td>Emergency Medical Service</td>
</tr>
<tr>
<td>EOC</td>
<td>Emergency Operations Center</td>
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<tr>
<td>EOP</td>
<td>Emergency Operations Plan</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
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<tr>
<td>EPCRA</td>
<td>Emergency Planning and Community Right-to-know Act</td>
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<tr>
<td>ERG</td>
<td>Emergency Response Guide</td>
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<tr>
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<td>Emergency Response Plan</td>
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<tr>
<td>FDCA</td>
<td>Florida Department of Community Affairs</td>
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<td>FDEM</td>
<td>Florida Division of Emergency Management</td>
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<td>FDEP</td>
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<td>Florida Department of Health</td>
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<td>Florida Department of Transportation</td>
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<tr>
<td>FOG</td>
<td>Field Operations Guide</td>
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<tr>
<td>IAP</td>
<td>Incident Action Plan</td>
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<td>IC</td>
<td>Incident Commander</td>
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<tr>
<td>ICP</td>
<td>Incident Command Post</td>
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<td>ICS</td>
<td>Incident Command System</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<td>--------------------------------------------</td>
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<tr>
<td>HAZ-MAT</td>
<td>Hazardous Materials</td>
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<tr>
<td>HAZWOPER</td>
<td>Hazardous Waste Operations and Emergency Response</td>
</tr>
<tr>
<td>LEPC</td>
<td>Local Emergency Planning Committee</td>
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<tr>
<td>MSDS</td>
<td>Materials Safety Data Sheet</td>
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<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<tr>
<td>NIMS</td>
<td>National Incident Management System</td>
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<tr>
<td>NOS</td>
<td>Not Otherwise Specified</td>
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<tr>
<td>NRP</td>
<td>National Response Plan</td>
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<tr>
<td>ORM</td>
<td>Other Regulated Material</td>
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<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
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<tr>
<td>PIO</td>
<td>Public Information Officer</td>
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<tr>
<td>RDSTF</td>
<td>Regional Domestic Security Task Force</td>
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<tr>
<td>RPC</td>
<td>Regional Planning Council</td>
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<tr>
<td>SARA</td>
<td>Superfund Amendment an Reauthorization Act</td>
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<tr>
<td>SERC</td>
<td>State Emergency Response Commission</td>
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<tr>
<td>SOG</td>
<td>Standard Operating Guidelines</td>
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<tr>
<td>SOP</td>
<td>Standard Operating Procedures</td>
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<tr>
<td>SWP</td>
<td>State Warning Point</td>
</tr>
<tr>
<td>WMD</td>
<td>Weapons of Mass Destruction</td>
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