

## **Module 10: Hazardous Materials**

### **Topic 1: Introduction**

#### ***Module introduction***

**Fighting wildland fires is a tough and dangerous job. You know you will face smoke and heat, and these alone are enough to brave. Unfortunately, when *hazardous materials* are present, your job gets tougher. You will need to use your head and your training to detect, identify and react properly to hazardous materials in the field.**

**In this module, we'll discuss:**

- **Identification of hazardous materials**
- **Guidelines for reacting to incidents involving hazardous materials**
- **Steps wildland firefighters can take to respond to hazardous materials incidents**

Narration script: You enter wildland fire situations well prepared, geared up and ready for action. Your actions are intended to save lives, structures and the environment. However, in the wildland you may encounter a hazardous material incident—one that you know little about. In such situations, you will need to rely on experts and proven processes to do your job right. Hazardous materials are all around you, and you rely on them in your daily life, but when mixed with fire, they can easily ruin your life. As a rule, it is best to treat every fire as a potential hazardous materials situation.

## Topic 2: D.E.C.I.D.E

### ***Hazardous materials introduction***

The dangers wildland firefighters face include not only heat and smoke, but less-obvious *hazardous materials* (HazMats) as well. A routine containment could easily turn in to a disaster without a good understanding of how to identify and respond to hazardous materials.

To prepare yourself, investigate the following safety topics:

- Recognize the presence of HazMats
- Isolate the HazMat scene

**You will investigate each of these issues in turn.**

Narration script: Safety on the fireline also involves thinking about hazardous materials. If you ever go through extensive HazMat training, you will learn that one foundational principle is to: “Treat every incident as a HazMat incident until proven otherwise.” Wildland incidents AND urban/interface situations fit into this category. The secret is all about being prepared. So, investigate the items on this screen as we focus on HazMat safety.

### ***Commonly found HazMats***

You may encounter HazMats during a *wildland fire*, especially in the *wildland/urban interface*. In fact, HazMats may even have started the fire. When in doubt, try to check with knowledgeable people on the scene. Be sure to check out any placards, container labels, and shipping papers from trucks and rail cars you encounter.

**HazMats to watch for in the wildland include:**

- Barrels of agricultural pesticides in farm structures
- Propane in large tanks at fuel distribution points
- Illegal hazardous waste dumps (which we’ll talk about in a little bit)

**In the wildland/urban interface, always suspect the presence of HazMats in:**

#### **Residences**

**Look for these types of HazMats in residences:**

- Propane tanks
- Chemicals, such as garden fertilizers and pesticides
- Paints
- Cleaning agents
- Fuel cans and the fuel tanks on lawn mowers and equipment
- Synthetics, such as plastics, man-made fabrics, and building materials
- Ammunition and reloading supplies
- Vehicles—may contain as much as 300 pounds (135 kg) of plastic

## **Farms and Ranches**

**In addition to all the HazMats you will find in residences, look for these additional HazMats on farms and ranches:**

- **Propane tanks**
- **Fuel storage tanks, such as aboveground gasoline and diesel tanks, safety cans, and fuel tanks on farm machinery**
- **Bulk chemicals, such as fertilizers and pesticides**
- **Explosives, such as dynamite and blasting caps**

Narration script: Hazardous materials can take on all forms, shapes, and sizes. The hazardous stuff you'll often find out in the wildland are industrial-sized chemicals and fuel. In the wildland/urban interface, it's usually the same stuff, only in smaller quantities. Just be aware that hazardous materials are out there, in the country and in the interface.

## ***Illegal HazMat scenes***

**Now you know that you may find HazMats when fighting wildland fires. But you also may come across a more insidious kind of HazMats—the illegal kind.**

**Be on the lookout for:**

- **Illegal dumps—often contain hazardous chemicals or substances**
- **Clandestine drug labs—may contain several different toxic and explosive chemicals which also can start or contribute to the growth of wildland fires**
- **Illegal marijuana “farms”—may also put you at risk, though not necessarily from hazardous chemicals**

**Clandestine operations such as drug labs and marijuana farms are often located in rural areas to reduce the chances of detection. Other hazards to beware of include armed guards, attack dogs, and potentially lethal booby traps that are often used to protect these operations.**

Narration script: The sad truth is that you could encounter illegal drug labs, marijuana farms or other illicit drug-related industries when fighting wildland fires. Stumbling into a methamphetamine lab—or simply opening one of the “death bags” containing waste from such a lab—can ruin your life. In these situations, leave EVERYTHING alone and call law enforcement. And stay out of the area because you never know when there might be booby traps.

## ***Isolating HazMat incidents***

**Regardless of what the HazMat is or how it came to be, you must be able to recognize and isolate it. When you discover such materials, report it through the chain of command and request the appropriate resources.**

**Take these steps when you encounter any unidentified or uncontained HazMat:**

**1—Attempt to identify the material by reading any placards or labels through binoculars from a safe distance uphill and upwind of the material**

**2—Isolate the scene and deny entry to everyone until you are relieved by those trained and equipped to handle these situations—move and keep people from the scene but allow enough room to maneuver your equipment**

**3—Warn others in the immediate vicinity**

**4—Notify the *Incident Commander (IC)* of the potential problem so that trained specialists can be brought in**

**Remember and follow this rule: *If you don't know, don't go, it may blow.***

Narration script: The public's curiosity about a fire scene can quickly turn in to a health and safety issue when hazardous materials are present. You may need to establish an extended perimeter on the scene and also make sure you and your team stay out of the increased danger zone.

## **Knowledge Check 1**

Multiple choice—check the box of the answer(s) you choose.

**You spot this potential HazMat scene and try to identify the materials present.**



Caption: still of a house clearly in the urban/wildland boundary with fire impinging on a big propane tank.

**Identify THREE additional steps you need to take.**

**Attack the fire**

**Control the scene and keep everyone out**

**Call animal control**

**Approach the scene to identify other possible HazMats**

**Warn others in the immediate vicinity**

**Notify the IC**

**The correct answers are control the scene and keep everyone out, warn others in the immediate vicinity, and notify the IC.**

## ***Using the Emergency Response Guidebook***

You've learned just a bit about identifying HazMats, isolation, and notification. Now let's get into more detail by getting familiar with the Emergency Response Guidebook (ERG).

The ERG is one of your best resources for HazMat information. The guide is divided into colored sections telling you what you are dealing with, and how to deal with it:

### **White Pages**

The white pages in the ERG (table of placards) show basic placards and their colors.

Match the placard on the scene exactly with the placard in the ERG, then use the three-digit guide number next to the sample placard to go to the proper place in the numbered guide of the ERG's orange section. Make sure to follow the procedure in the orange section.

### **Yellow Pages**

The yellow section of the ERG lists hazardous material identification numbers, also known as UN/NAs, in ascending order. After you locate the number you know, you will also find the corresponding material name and ERG guide number.

Follow the guide number to the proper place in the orange section, and then follow the listed procedure.

### **Blue Pages**

The blue section of the ERG alphabetically lists many materials you may encounter. After you find the name you are looking for (possibly from a shipping label), you will see a corresponding UN/NA and guide number for the ERG orange section.

Use the guide number to get to the proper information in the orange section, and then follow the listed procedure.

### **Orange Pages**

The orange section of the ERG gives specific information on the hazards associated with the identified material, including:

- Health hazards
- Fire or explosion hazards

The orange section also includes public safety actions to take, including:

- Protective clothing requirements
- Evacuation distances in feet and meters

This section also tells responders the emergency response actions to take for dealing with fires, spills or leaks and first aid.

## Green Pages

The green section of the ERG identifies evacuation distances and materials that produce toxic gases when they are mixed with water.

Evacuation distances are shown for day and night scenarios, when toxic concentrations differ because of atmospheric conditions.

Narration script: The emergency response guide is much more than a good doorstep. The guide provides information that could save lives and help you to prevent extensive damage to the environment.

## Knowledge Check 2

Matching—select the match you choose from the pull down list.

Match each section of the ERG with the appropriate content description.

Blue section

Yellow section

White pages

Orange section

Green section

The correct matches are as follows:

Blue section: Hazardous material names listed alphabetically

Yellow section: Identification numbers (UN/NA) listed consecutively

White pages: Placards and colors

Orange section: Hazards of an identified material

Green section: Evacuation distances

## Approach guidelines

A well-trained firefighter knows not to throw caution to the wind. HazMat situations are no different. You must know what you are dealing with before you can deal with it!

Whenever you suspect a HazMat *incident*, your approach should be from this direction:

- Upwind
- Upgrade
- Upstream

But ask yourself if you should even be approaching the incident. The better choice may be to get away!

Narration script: How you approach a hazardous materials scene can make a big difference in your immediate and long-term health.

## Reporting information to dispatch, CHEMTREC, and NRC

HazMat scenes are special situations, so you will need to get help from trained experts.

Provide your dispatch center with as much of the following information as you can *safely* obtain:

- Where the material is
- What the material is
- How much of the material there is
- Potential *exposures* and hazards including, targets downwind, people exposed to the material, and other safety hazards

Once dispatch has this information, they will contact the experts—CHEMTREC and the National Response Center (NRC).

### ***Avoiding hazardous materials***

Your first instinct as a firefighter is to save lives and property, but in HazMat situations, you must first consider if entering the incident could make you part of the problem.

Only responders with proper HazMat *personal protective equipment* (PPE) will be able to deal directly with the incident. Wildland PPE offers you no protection from Hazmats. Your role is only to recognize the threat and deny entry to the scene—even entry by other wildland firefighters.

Therefore, you should:

- Never touch or walk in spilled materials
- Avoid breathing fumes, smoke, or vapors
- Know that odorless vapors or gases can be deadly

### ***The DECIDE process***

Once you become aware of a HazMat situation, you need to make a series of proper decisions to reduce the incident's potential harm.

This series of decisions is summed up with the DECIDE acronym. The process it outlines is an approved set of steps to take in HazMat incidents. The steps are designed to protect you and others, so make sure you follow each one to the letter.

You will investigate each letter in the DECIDE acronym in turn.

Narration script: Guesswork should never be part of the process of dealing with hazardous materials. Much time and effort was put in to creating a set of HazMat response guidelines, known as the DECIDE process. This process helps you know what to do and how to do it when you encounter such materials.



## ***Detect the presence of HazMats***

The first D in the DECIDE process stands for *Detect*. Your first decision in a HazMat incident is to detect any and all hazardous materials present.

In order, the six main detection clues to look for are:

### **Occupancy and Location**

You can sometimes determine the type of HazMats involved in an incident just by associating the type of occupancy or location with the materials manufactured, stored, used, or disposed of there. For example, You would expect to find fertilizers and pesticides at an agricultural supply company.

### **Container Shapes**

The shapes of some containers provide clues they are containing HazMats. For example, containers of pressurized gases often have rounded ends and hazardous liquids come in cylindrical tanks.

### **Markings and Colors**

Information you might find helpful when identifying HazMats includes words or numbers that might be stenciled on a container or building. Even a company name can provide a clue.

### **Placards and Labels**

Diamond-shaped placards and labels are used to provide information about the type and UN/NA number of a chemical.

### **Shipping Papers**

Shipping papers are available for HazMat shipments on all transportation modes. Shipping papers list the name, type, and UN/NA number for chemicals.

### **Senses**

Use extreme caution when using you senses to detect hazardous materials. If you can smell it, you are too close!

But you don't have to use your nose. Long before you get in "smelling" range, look instead for:

- Signs of gas leaks, such as vapor clouds and hissing noises
- Unusual colors of smoke or vapor clouds
- Chemical or corrosive reactions
- Pooled liquids
- Unexplained injuries, illnesses, and dead animals

Narration script: D in the "decide" acronym stands for "detect." You've already done some initial detective work as we have described in the previous screens. Now, it's time to get more details.

## ***Estimate harm***

**E** in the DECIDE process stands for *Estimate*.

After identifying the materials on the scene, you should try to estimate the likely harm of the material could cause *without* intervention. You will want to determine how big the problem is, and how the material might behave.

You may need to use the information you gather from the ERG to help you make this determination.

## ***Choose response objectives***

**C** in the DECIDE process stands for *Choose*. Now that you know what you are dealing with, and how it might affect people on the scene, you must choose a response objective.

There are several response objectives available to responders with higher levels of training. The only response objectives for you to choose are to:

- Stay away from the area
- Notify authorities
- Keep people away from the area

Again, the information in the ERG will tell you how far to stay away from the incident.

Narration script: Knowing is half the battle. Now it is time to choose what to do to so you and others stay safe, and the experts can best assist while containing the incident. Remember, if you don't know, don't go, it might blow!

## ***Identify action options***

**I** in the DECIDE process stands for *Identify*.

After determining your response objectives, you will need to identify action options.

Possible actions to take include:

- Notifying the authorities
- Evacuating areas downwind
- Securing the area
- Withdrawing immediately

Narration script: You need to be able to make a quick and appropriate decision about the actions you will take. Your first instinct is probably to get the fire out, but that instinct could get you or others hurt. Know all your options before you decide.

## ***Do the best option***

The second **D** in the DECIDE process stands for *Do*.

After you decide your available action options, you need to *do* the best option. Decide the best option by:

- Observing any effects your decision has had on the incident so far
- Following up to see that your decision is working
- Getting feedback from residents, fellow crewmembers, and the dispatch center

### ***Evaluate progress***

The E in the DECIDE process stands for *Evaluate*.

You must always *Evaluate* your progress. Because you know you are not a HazMat expert, you should always:

- Use agency policy to determine who to call
- Know your community hazardous materials authority

Narration script: Hazardous material incidents are unique, and require specialized knowledge. Because of this, follow-up on your initial action choices is critical. Make sure you contact the proper authorities to make sure the proper actions are being taken on the scene.

### ***Knowledge Check 3***

Multiple choice—check the box of the answer(s) you choose.

Identify **THREE** terms that are **NOT** part of the DECIDE process.

- Detect
- Examine
- Choose
- Investigate
- Do
- Explain

The correct answers are: examine, investigate, and explain.

### ***Topic summary***

Fires are bad enough, but fires involving HazMats are the worst. At a HazMat scene, the health of firefighters, the public, and the surrounding environment depends on your ability to make rapid and critical decisions.

This topic gave you an understanding of the resources and process for properly handling a HazMat incident, including:

- Detecting HazMats
- General response guidelines
- Emergency Response Guidebook

- **DECIDE process**

Narration script: Hazardous materials are found everywhere, and sometimes are stored in large quantities. There are too many to memorize, but knowing the resources available to you can remove some of the unknown so you can make safe and effective decisions on the scene.