

# Table of Contents

<b>Section Number</b>	<b>Title</b>
1.....	What are Hazardous Materials Emergencies?
2.....	Emergency Response Roles
3.....	You Have the Right to Know
4.....	Will It Burn, Blow Up, or React? -- Chemical Hazards
5.....	Material Safety Data Sheets (MSDSs)
6.....	Getting More Information (Using the NIOSH Pocket Guide)
7.....	DOT Placards, Labels, and Emergency Response Guidebook
8.....	NFPA, HMIS, and OSHA Labels
9.....	Emergency Response Plans
10.....	Emergency Response Actions
11.....	Spill Control Procedures
12.....	Testing the Air
13.....	Air Purifying Respirators
14.....	Self-Contained Breathing Apparatus (SCBA)
15.....	Chemical Protective Clothing
16.....	Decontamination
17.....	Hands-On Practice
18.....	Back at the Plant -- Putting Training to Work

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## UAW/University of Michigan Curriculum Project Team

Project Director: **Frank Mirer**

Grant Coordinator: **Luis Vazquez**

Grant Staff: **John Uram, Mike Lee, Sherrod Elledge, Pamela Vossen**

Desktop Publishing: **Sam Stark**, UAW Education Department; **Robin Graubarth, Anne Heybey**, University of Michigan, Department of Environmental Health Sciences

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### Curriculum Consultants

**Amy Mock**, curriculum development specialist

**Jennifer Cromley**, curriculum development specialist

**Mark Neal**, illustrator

Reviewers:

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# Section 1

## Purpose



**To understand what can happen at a hazardous materials emergency.**

**To identify hazardous materials emergencies at your workplace.**



# **If You Don't Know What It Is, Stay Away!**

**W**hy stay away? Because hazardous materials can be deadly! At any spill, you have to **assume that a material is hazardous until you know for sure it is not.** You will protect yourself by following this rule of thumb.

- Some hazardous materials have no smell. You may not be able to see or feel them until the chemical has already poisoned you.
- Carbon monoxide is a good example -- it has no odor, but it can kill you!
- You may be able to smell some solvents such as toluene or mineral spirits, but you can't tell how much is soaking through your skin.
- You can't tell the oxygen in an area is too low until your body is already suffering the effects. Then it's too late to get out.
- Some chemicals creep along the ground and in low spots until they find a flame. Then **KABOOM!**
- Chemicals in cylinders can go off like a rocket.
- Conditions can change fast! What seemed safe one minute could be fatal a few minutes later.

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## ***Fact Sheet #1, continued***

If you don't know exactly what the dangers are, you cannot select the right equipment to protect you. Besides, no equipment can protect you from explosions or fire. Only distance will.

**By law, your employer has to keep a list of all the hazardous chemicals you work around.**

You have a right to get a copy of this list. Your employer is also required to train you on each chemical you work around.



**If you don't know exactly what the dangers are, don't go near a chemical release.**

**Try to identify what it is from a safe distance, then find out more about the hazards.**

**Stay upwind from the spill.**

# **Industry Employees Hurt at Hazardous Materials Emergencies**

**T**he federal Agency for Toxic Substances and Disease Registry (ATSDR) has been collecting information on hazardous chemical emergencies since 1990. ATSDR collects and analyzes information on haz mat emergencies. It hopes to find ways to prevent future emergencies and decrease the number of injuries and deaths from haz mat incidents.

## **Interesting facts discovered by ATSDR:**

- 84% of hazardous materials (haz mat) **emergencies happen at facilities** (mostly factories), not during transportation. You might think of the train derailments and overturned trucks dumping their loads that you hear in the news. But that's only a small part of emergencies in this country. We just don't hear about most of the rest.
- **Industry employees are more likely to be hurt than emergency responders (from off-site) or the public. Employees are the ones that are in the area when an emergency happens.**
- 73% of injured employees used **no personal protective equipment**. They were just trying to help out.
- The most common injury (31%) was to the victim's respiratory system (lungs, nose, throat).
- Volatile organic compounds (solvents and gases like propane), and acids were the chemicals most often released during emergencies.

*Source: "Help in Stemming Accidents," Job Safety & Health, Bureau of National Affairs, Inc., # 475, 2/13/96, p. 1*

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## Fact Sheet #3

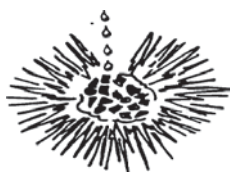
# What Are Hazardous Materials?

The EPA and OSHA emergency response regulations define hazardous materials as anything that can hurt your health or the environment. They include:

- chemicals that can burn or explode
- chemicals that cause cancer or other serious long-term damage to your health
- chemicals that are very irritating
- chemicals that can cause violent chemical reactions
- unknown chemicals
- radioactive materials
- corrosive chemicals that can burn your skin or metal
- poisons
- germs



**Poison**



**Reacts with Water**



**Burns Skin**



**Burns**



**Germs**

“Hazardous material” is a legal term. OSHA and EPA have many definitions for hazardous materials. They have lists of chemicals that they consider hazardous.

*Source: OSHA’s Standard on Hazardous Waste Operations and Emergency Response (HAZWOPER), 29 CFR 1910.120 (a)(3).*

# What can happen at a Haz Mat Emergency?

**Y**our first instinct in an emergency is probably to jump in and help. But in a hazardous materials emergency, trying to save someone's life or property could cost you your own. You could do more harm than good. Handling an emergency improperly can hurt workers, the environment and the community around your facility.

Workers who respond to haz mat emergencies need special protective equipment and training. The purpose of this course is to provide you with more information about the protective equipment needed, what hazards to expect at a haz mat emergency, and safe procedures to follow if you are part of a spill response team.

Here are a few stories of what can go wrong when hazardous materials are involved. These are all real incidents.

## **Acid spill injures workers**

On August 11, 1993 James Watson was driving a forklift for Frederick Trading Company in Frederick, MD when 40 one-gallon jugs of muriatic acid were knocked off the pallet. Twenty of the jugs broke open, and his co-worker Ryan Grimes called maintenance to have

the spill cleaned up.

The maintenance supervisor arrived with several co-workers, and tried to clean up the spill. They wore dust respirators and gloves. Three of the workers were sent to the hospital for acid burns to their lungs.



## **Bottom Line – What Happened Here:**

- **3 workers hospitalized for acid burns**
- **Company fined \$9,500 – employees not properly trained to respond to emergency chemical spills**

*Source: Washington Post and OSHA inspection report #0352450-S.*



### **Jury Awards Injured Worker \$1 Million**

On Sept. 28, 1988, Joseph Darvis reported to work as a dock employee at Conway Central Express Co. A supervisor asked Darvis to unload a truck containing four 55-gallon drums. The drums contained Gen-Glaze-550, a styrene-containing material.

#### **Punctured Drum**

Unknown to Darvis, one drum had been punctured earlier that day as a forklift loaded the barrel onto the truck at Gen-Corp.'s Pilot Plant.

When Darvis opened the truck's rear door, he noticed a paint-like odor. He started unloading the bar-

rels, but soon discovered a pool of liquid at the base of one of the barrels.

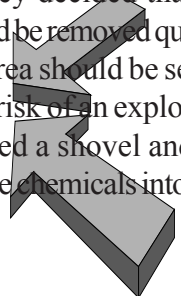
The substance, which looked like tar, was the source of the smell. Looking back at the drums, Darvis saw that each barrel was marked with a large red diamond containing the following language: "Flammable Liquid, NOS, Flash Point: 86 degrees F, UN 1993."

Darvis notified his supervisor of the spill. They decided that the material should be removed quickly and that the area should be sealed to reduce the risk of an explosion. Darvis grabbed a shovel and began loading the chemicals into four

boxes, which he threw in a dumpster.

The entire process took 35 - 40 minutes. Near the end of the cleanup, Darvis felt a little dizzy and noticed some eye irritation. Darvis shrugged it off and finished the disposal. He asked his supervisor whether a respirator would be necessary and was told it was not.

Darvis' symptoms worsened and he left early. He never returned to work. As a result of his injuries [Joseph] Darvis suffers from headaches, rectal bleeding, memory loss, and speech problems.



#### **Bottom Line – What Happened Here:**

- **An Ohio jury awarded over \$1 million to a worker for severe injuries he suffered when cleaning up toxic chemicals.**

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## **Fact Sheet #4, continued**

### **One dead, two hurt by toxic cloud**

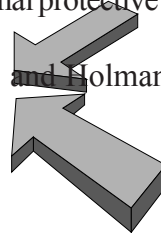
On December 7, 1993 Ernest Holman and Israel Torres reported to their regular jobs at Lowenstein and Sons in Brooklyn, NY. Lowenstein makes dyes, tanning chemicals, and other products for the cosmetics industry. Workers at Lowenstein are members of UAW Local 2321. That day they were told to mix old, unused chemicals together and add water. Then they were to dump the solution into the sewer system. Holman wore an air-purifying respirator, but Torres wore no protective equipment.

#### **Toxic cloud of gas**

Holman and Torres had mixed several of the chemicals together with some water when a reaction occurred. A toxic cloud of gas formed and surrounded them. They started choking and yelling for help. Virgil Santiago dragged Holman to the roof (outside). Several other workers helped to pull Torres out to the roof. The “rescue” workers wore no personal protective equipment.

Both Torres and Holman were

hospitalized. One month later, 45-year old Ernest Holman died from chemical pneumonitis. The toxic gas he had breathed had burned his lungs so badly that he developed pneumonia. Torres remained in the hospital for more than two months because of damage to his lungs.



### **Bottom Line - What Happened Here:**

- **1 worker dead, 1 worker disabled**
- **Company fined \$80,000 by OSHA. The company had no fact sheets for the chemicals being mixed, no emergency response plan, no training for workers, and no protective equipment for emergencies.**

*Sources: OSHA Inspection #107198434, and UAW Health and Safety Dept., fatality investigation.*

# Task 2

- Draw a simple map of a workplace.
- Use colored dots to mark sites of spills or chemical emergencies.

1. How would you define a hazardous materials emergency?

Your instructor will give you markers and a large sheet of paper. With your group members, **draw a simple map of your workplace**. If your group members come from different workplaces, **select one** to focus on. Use **colored dots** to mark the following on your map:

2. Mark the places where spills or chemical emergencies **have happened**. Use a red dot for each of these spots.
3. What chemicals were involved? Label them on your map.
4. Was anyone hurt during these emergencies? How? Label the spots where employees were injured during an emergency.
5. Now mark the places **where spills, leaks, or releases are likely to happen**. Use a **blue dot** for each of these spots.
6. What chemicals would be involved? Label them on your map.

# What is an Emergency?

**D**efinition: According to OSHA, a haz mat emergency is a spill or leak that you and the workers in your area cannot handle safely on your own.

Emergencies include spilling any amount of an unknown chemical or one that is very dangerous or irritating. Spilling a large amount of any chemical is an emergency, too.

It is an emergency, if:

- You need **special** training and equipment to protect yourself from the chemicals
- You even **think** about calling the fire department or a Haz Mat Team

## Emergency Examples

- ➔ You are unloading a semi and discover liquid leaking out of the trailer.
- ➔ You don't know what chemicals have been spilled.
- ➔ A tanker full of chocolate sauce overturns and dumps its contents into a stream. (Don't laugh, this really happened!) All the fish and plants in the stream were killed.
- ➔ A solvent degreaser overflows onto the shop floor. All of the operators nearby are pulled off the job to clean it up.
- ➔ One pound of Chlordane<sup>TM</sup> (a very poisonous pesticide) spills in the storage room.
- ➔ A waste coolant settling tank splits open and dumps machining fluid all over the floor.

**Your employer must decide ahead of time which spills you can handle and which ones are emergencies.** This information goes in the written Emergency Response Plan for your facility. The Health and Safety Committee should review the plan and make sure that it protects workers. In an emergency, only workers with special equipment and training may respond to a spill.

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## **Fact Sheet #6**

### **It depends -**

Workers can handle some spills, especially small spills of less dangerous materials.

**However,** you always need specially trained workers with special protective equipment

### **if:**

- The material is very dangerous.
- The spill is large (even if the material is not extremely dangerous).
- You don't know what the chemical is.
- There is a chance of different chemicals mixing or being heated up.
- The spill is in a confined space.



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**Fact Sheet #6, continued**

**Workers can usually clean up:**

A small spill of gasoline or diesel fuel  
(less than 10 gallons)



**UNLESS**

- It has mixed with another chemical.
- It is on fire, or near an ignition source or flame.
- It is in a confined space.

A small leak (like a propane cylinder)

**UNLESS**



- It is a deadly chemical (like chlorine or ammonia).

A spill of less than 55 gallons (one drum)

**UNLESS**



- It has mixed with another chemical.
- It is deadly.
- It is in a confined space.

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## **Fact Sheet #7**

# **Put It in Writing: Emergency Response Plans**

**H**ere is a page from one employer's actual Emergency Response Plan. They looked at each area of the plant, listed what hazardous materials were present, and decided how much of the material would create an emergency. This company said they would have an emergency whenever enough chemical was spilled to reach the "IDLH" level for that specific substance.

**MagicLine Refrigerator Company  
Chemical Emergency Response  
Operations and Management Plan**

### **Location: Paint Departments**

<b>Material Stored</b>	<b>Location</b>	<b>Amount if spilled could create an IDLH atmosphere</b>
<b>Amlac 422</b>	<b>Paint Mix Room</b>	<b>2 gallons</b>
<b>Hi Solids Paints*</b>	<b>Paint Mix Room</b>	<b>10 gallons</b>
<b>Isopropyl Alcohol</b>	<b>Paint Mix Room</b>	<b>11 gallons</b>
<b>Lacquer Thinner</b>	<b>Paint Mix Room</b>	<b>3 gallons</b>
<b>* no IDLH, rule of thumb = 10 gallons</b>		

**“IDLH” is immediately dangerous to life or health. This level of chemical in the air will either kill you, cause irreversible damage to your health, or effect you so you cannot escape.**

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## **Fact Sheet #7, continued**

### **Sample Emergency Response Plan**

#### **Location Department 247**

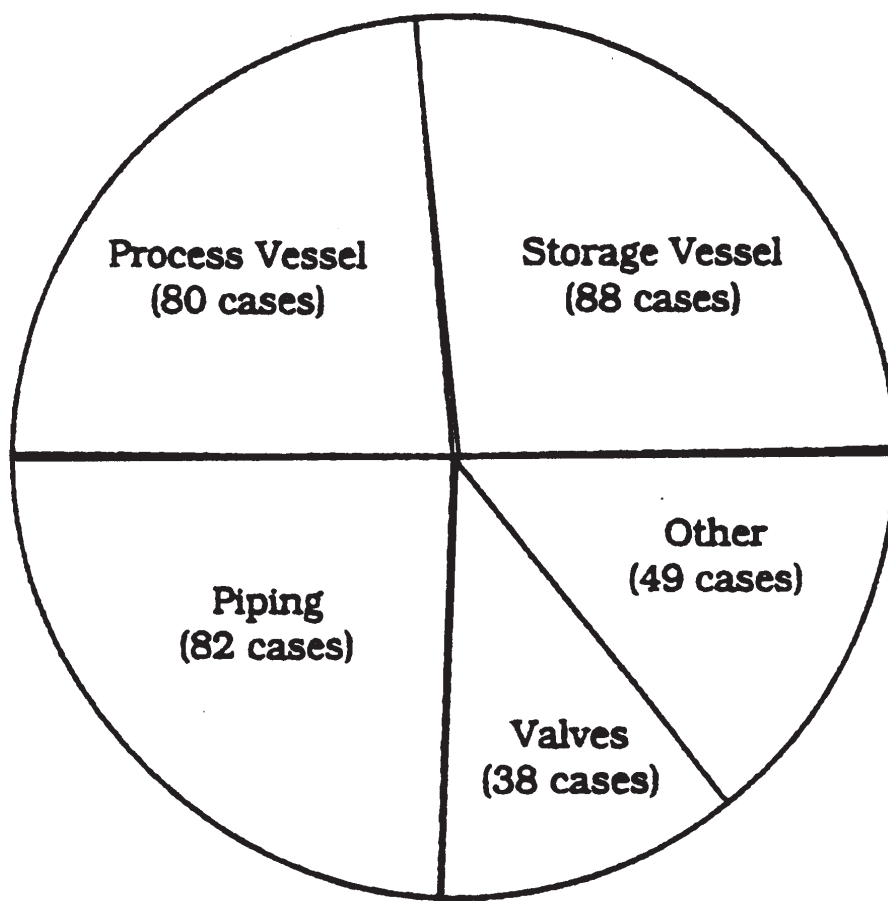
<b>Material Stored</b>	<b>Location</b>	<b>Amount if Spilled Could Create an IDLH Atmosphere</b>
<b>Amlac 422</b>	<b>Mullion Booth</b>	<b>&lt; 1 gallon</b>
	<b>Line leak in work area **</b>	<b>34 gallons</b>
	<b>Cabinet booth</b>	<b>3 gallons</b>
<b>Hi Solids Paints*</b>	<b>Mullion booth</b>	<b>10 gallons</b>
	<b>Line leak in work area **</b>	<b>10 gallons</b>
	<b>Cabinet booth</b>	<b>10 gallons</b>
<b>Hydrochloric Acid</b>	<b>Washer</b>	<b>&lt; 1 gallon</b>
	<b>Open in area</b>	<b>&lt; 1 gallon</b>
<p>* No IDLH, Rule of Thumb = 10 gallons ** Materials being delivered via pipe -- estimate is based on release as a result of a line break in an open area.</p>		



# Where Do Emergencies Happen?

The Environmental Protection Agency also collects information on chemical accidents in industry across the United States. The EPA is trying to investigate the causes of chemical accidents in order to help prevent these accidents in the future. The agency looked at 337 different accidents. This chart shows where those spills and releases occurred in 337 different accidents.

## **In-Plant Location of Chemical Spills and Releases**



*Source: Why Accidents Occur: Insights from the Accidental Release Information Program, Chemical Accident Prevention Bulletin, EPA, 7/89, PB93-205953*

## Summary

# What are Hazardous Materials Emergencies?

1 If you don't know what chemical has spilled, assume it is hazardous.

2 If you don't know exactly what the dangers are, don't go near the spill or emergency situation.

3 Industry employees often get seriously hurt, even killed, at hazardous materials emergencies.

Hazardous materials include:

- 4
- chemicals that can burn or explode
  - chemicals that cause cancer or other permanent damage
  - poisons
  - germs
  - radioactive materials
  - chemicals that can cause violent chemical reactions.

5 A haz mat emergency is a spill or leak that you and your co-workers **cannot handle on your own**. If you need special protective equipment to handle a spill, it's a haz mat emergency.

6 Your employer must decide ahead of time which spills you can handle and which ones are emergencies. Descriptions must be written into the Emergency Response Plan required by OSHA.

7 OSHA requires that workers who respond to hazardous material emergencies get special protective equipment and training.