Hazardous Material Technician Level Training

Sunland Park, New Mexico / Acuña, Coahuila, Mexico

June 2009

Day 2

SAFETY PLANS

THE UNDESIRABLE

Hazardous materials constitute an important part of our life. Nevertheless, when out of control, they can endanger people, the environmental and property.

GENERAL ASPECTS OF RISKS

Industrial facilities include a great variety of operations such as mining, transportation, energy, waste disposal, and they all have hazardous materials in their operations that require special handling. For example, operations that include the handling, storing and processing of potentially hazardous substances, like: reactive chemicals and hazardous wastes. As well as, the industrial facilities, that can bring potential dangers that are different from hazardous substances. These risks are generally because of substances and chemical reactions, that originate in the industries, business establishments or homes. This occurs because of the inadequate use of fuel, and faulty electrical wiring.

INDUSTRY RISKS

Due to the existence of hazards in industry, we must properly handle the following risks to minimize adverse impacts:

- conditions that can potentially lead to accidents involving spills (such as, pipes, hose, filters, valves, tanks, pumps, compressors, tanks, stacks);
- Work conditions, occupational health and safety.

CLASSIFICATION OF HAZARDOUS MATERIALS

Classify hazardous materials and waste under one or more of the following definitions:

- Flammable: are substances which are easily ignited and, therefore, represent a fire hazard under normal industrial conditions (crushed metal, liquids having a flash point of 100 º F or less),

- Corrosive: are substances that will destroy or irreversibly damage another substance with which it comes in contact. (ex., acids, acid anhydrides and alkali metals).

- Reactivity: A transformation resulting in a change of composition, constitution and/or configuration of a compound. These substances require special handling and storage. Environmental conditions (temperature, pressure) or contact with water may cause a reaction; these substances become unstable and may result in a poisonous gas, explosion or fire.

CLASSIFYING HAZARDOUS MATERIALES

- Toxic: are substances (heavy metals, pesticides, solvents, fuels derived from oil), which when handled improperly, can release sufficient amounts of toxic materials that may have a direct effect on health (chronic or acute) due to inhalation, skin absorption, and ingestion, or cause a potentially toxic accumulation in the environment and / or the food chain.

- Biological: deliberate release of germs or other biological substances. A biological agent is an infectious disease or toxin that can be used in bioterrorism or biological warfare. Because many biological agents reproduce rapidly and require minimal resources for preservation, they are a potential danger in a wide variety of occupational settings.

INDUSTRY RISKS

In addition to the previous categories of hazardous substances, there are general risks that are related to industrial facilities. These include the following categories:

❖Electric: electrocution, misuse of power tools, high transmission cables, fallen electrical wires, cables and underground work during electrical storms;

❖Structural: the potential of falling at the work place due to slippery surfaces, narrow steps, open holes, obstructions and unstable floors; the potential of getting injured with sharp objects, and the risk of being trapped (mining industry).

❖Mechanical: accidents involving heavy equipment, especially while backing up, broken cables or pulleys, and getting clothing caught in a piece of equipment;

INDUSTRY RISKS (cont.)

❖Temperature: fatigue in hot environments, or working with clothes that limits the dissipation of body heat or sweat; the effects of freezing environments or wind chill factors

❖Noise: ear damage; being subject to high levels of noise that exceed recommended standards (for example, a continuous noise level in an 8 hour period that is higher than 90 dB)

❖Radiation: burns and/or internal wounds when exposed to excessive levels radiation

❖Oxygen Deficiency: health issues due to the presence of another gas, a chemical reaction, especially, in closed in areas or low areas. If levels fall below 19.5 % of oxygen.

INDUSTRY RISKS (cont.)

Ergonomic stress can occur because of inadequate tool design or work areas. These can cause discomfort, mental stress, loss of employee efficiency or employee well-being.

While employee tension is not an ergonomic risk as explained above, it can reduce the worker's ability to respond clearly and quickly to a hazard, and should be considered during project development.

If stress is the result of human reaction to monotony or fatigue, then you increase the potential risks and accidents.

POLICY, PROCEDURES, RECOMMENDED GUIDELINES

As established guidelines, a significant risk would exist under the following circumstances: a release of a toxic substance, highly reactive, explosive or flammable. If there is a high probability, request a “Environmental Risk Analysis”

A risk analysis should be part of planning process. It’s not the same as an Environmental Assessment. The risk analysis objectives are:

- Identify the nature and extent of the use of hazardous substances at the facility;
- Specify the measures taken for the safe operation of the facility, control measures in case of an accident and the emergency procedures
- Identify the type, the probability and the consequences of major accidents; and,
- Show that the contractor has considered the potential risk due to the company’s activities and that the control measures are adequate

PROJECT RISKS

Energy projects:

- Fire hazards and release of toxic substances caused by fuel spills or gas leaks,
- Mechanical risks caused by drill towers,
- Noise due to generators,
- The physical risk due to inhalation hazards (ash, chemicals used for water treatment)
- Loss of oxygen in confined spaces; electrical shocks

PROJECT RISKS (cont.)

Chemical facilities:

- Physical danger (movement of substances),
- Work exhaustion (heat)
- Noise (running of machines)
- Dust (grinding or sawing)
- Container leaks
- Explosion of chemicals used for water treatment,
- Explosion caused by chemical reactions, and
- Toxic vapors produced by chemical spills.

PROJECT RISKS (cont.)

Mining Industry:

- Physical risk caused by the use of explosives and excavation equipment,
- Dust produced by perforation, blasting and grinding,
- Loss of oxygen,
- Toxic gases in underground mines, and
- Cave-Ins.

PROJECT RISKS (cont.)

Contamination control projects:

- Rupture of pressurized containers (Chlorine tanks at sewer plant or drums at waste disposal facilities)
- Explosives or toxic gas release due to a combination of incompatible chemicals
- Dust and/or vapors containing pathogenic microorganisms during waste disposal operations
- Toxic gases due to waste disposal operacions

PROJECT RISKS (cont.)

Transportation projects may include means of transport used for loading, transporting and dumping of hazardous substances. As part of the environmental impact analysis, a transportation risk analysis is needed to study the probability of an accident or derailment causing a toxic spill, fire or explosion.

Agricultural projects and pest control, such as lobster farms; problems relating to handling and storage, use and disposal of pesticides.

Purpose of OSHA's Hazard Communication Standard

Who is covered?

The Hazard Communication Standard of OSHA applies to general industry, shipyard employment, marine terminals, ship builders and covers chemical manufacturers, importers, employers and employees exposed to chemical hazards.

The purpose of this section is to ensure that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees and they know how to protect themselves to reduce the incidence of disease and injury.

Employers Responsibility

- In-plant containers of hazardous chemicals must be labeled, tagged, or marked with the identity of the material and appropriate hazard warnings.
- Employers must have an MSDS for each hazardous chemical which they use. Employers may rely on the information received from their suppliers.
- All workplaces where employees are exposed to hazardous chemicals must have a written plan which describes how the standard will be implemented in that facility
- The written plan that describes the requirements for labels and other forms of warning, material safety data sheets, employee information, and training, are going to be met in your facility.

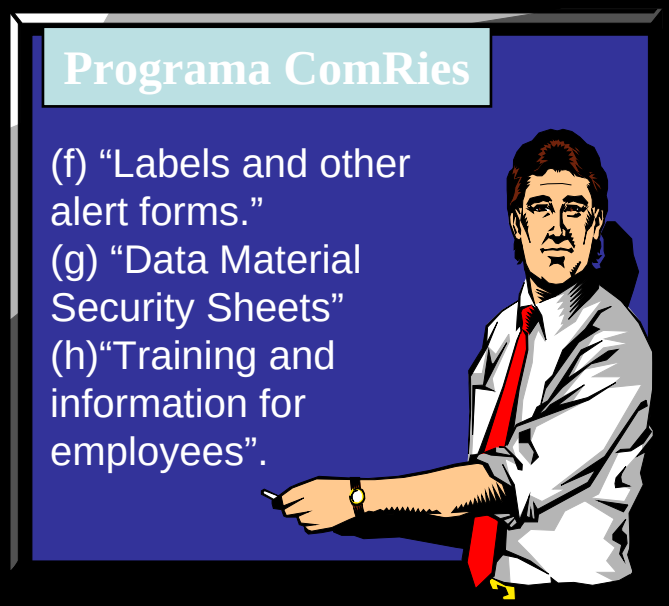
How can we minimize the risks in our work area?

- First step is a materials inventory- A list of the *hazardous materials* present in a particular work area and conducting a risk evaluation

- Employers can get information from the manufacturer's or suppliers' risk evaluations
  - This information can be found in the MSDSs and labels

Why do you need to have a written program?

- Make sure that the employers receive the information that they need, in order to inform and train their employees
- Provides the employees information about the risks



Requirements for the Hazard Communication Written Program

- Describes container labels, MSDSs and training for employees for each work area
- List of hazardous chemicals
- Information on risk and protection measures is available for other employers that operate in that area

Training

Employees are trained to identify and work safely with *hazardous materials*.

What training is needed to protect workers?

- Information on the Hazardous Communication program, including labels, MSDSs and where to obtain risk information and how to use it
- Protection measures such as engineering controls, safe labor practices and the proper use of Personal Protection Equipment
- How to detect a release of a hazardous material (use of monitoring equipment, being aware of the surroundings and by sense of smell)

What information should be given to employees?

Employees should be informed of::

- The Hazardous Communication Standard
- Operations in their work areas where there hazardous materials
- Location and availability of written risk assessment procedures, the communications program, lists of hazardous chemicals and MSDSs requirements

Summary

- OSHA's Hazard Communication Standard is based on a simple concept: employees should be apprised of all hazards to which they are exposed on the job. Employees who may be exposed to hazardous chemicals in the workplace have a right to know about the hazards and how to protect themselves.

SECURITY PLAN

MANAGING INCIDENTS

Some spills can be easily detected and identified, others may go unnoticed, so please be alert to certain signs (bad odors, vapors, etc.). And be aware of any symptoms such as eye or skin irritation and respiratory problems, among others.

Therefore, the best way to control these situations is prevention, as well as proper planning especially in the work areas where there is a risk. Each situation may require different procedures or emergency response operations, so each work area should have its own specific plan.

SECURITY PLAN

- Make sure that a Emergency Response Coordinator has been assigned.

- Annual review of emergency response plan and that any area that handles hazardous materials, has an emergency plan and that it includes the preventive control measures.

- Directors, supervisors or other assigned personal to the area need to maintain the area organized and make inspections.

- Lab investigators, technicians, supervisors, other personnel, personnel in charge of hazardous materials storage, work areas that have gas tanks or cylinders, will be responsible for the following:

SECURITY PLAN (CONT.)

- Keep work areas clean and organized , and areas where you have hazardous materials.
- Inventory of all hazardous materials is updated
- Have a material safety data sheet or MSDS of each hazardous material
- Inspect laboratories and warehouse areas where there are hazardous materials and check for any leaks or spills
- Identify the most dangerous hazardous materials and know its exact location.
- Have absorbent material and spill control equipment, as well as personal protection equipment.
- Make you are aware of the spill control procedures in your work area and how to use the personal protection equipment.

GENERAL TASKS

OBJECTIVE

Establish specific safety rules and guideline for the handling of hazardous materials based on the following risks:

* Fire
* Chemical splash
* Inhaling or ingesting of hazardous materials
* Burns

DIRECTED TO

All company personnel that work with hazardous materials.

VERIFY THAT THE APPROPIATE CHEMICAL SUBSTANCE IS BEING USED

* Read the substance label
* Remember that some chemicals are similar in color and may even look the same, but react in different forms.

GENERAL TASKS (cont.)

DETERMINE THE NATURE AND RISK LEVEL

- Know if it's a toxic substance, irritable, can it burn your skin, can it explode under certain conditions

- Placards indicate the types of risks associated with the use of the chemical

  - NFPA 704 (National Fire Protection Association) "**fire diamond**" used by emergency personnel to quickly and easily identify the risks posed by nearby hazardous materials

- **HMIS** (Hazardous Materials Identification System) is a numerical hazard rating that incorporates the use of labels with color-coded bars as well as training materials.

  - United Nations/North American Hazardous Materials Code

- Know how to consult the MSDSs

GENERAL TASKS (cont.)

KNOW EMERGENCY RESPONSE PROCEDURES:

- ✓ Emergency number located in the MSDS
- ✓ First aid training
- ✓ Share MSDS information with medical staff
- ✓ Know the location of emergency showers and eye wash stations (practice using them)
- ✓ Know where the fire extinguishers, blankets, first aid kits, or any other safety equipment is located
- ✓ Know where the emergency exits are located

GENERAL TASKS (cont.)

FOLLOW GENERAL SAFETY RULES

- Use safety glasses to avoid splashes
- Do not use contact lenses when handling hazardous materials, if there is a chemical splash you will injure your eye before you can get the contact lens out
- Use chemical gloves, especially when it's a corrosive or toxic substance
- Do not eat and drink when handling hazardous materials, food or drink could get contaminated
- Do not eat on or store drinks in hazardous materials containers
- Wash your hands after each task
- Do not smoke or start a fire, smoke only in designated areas

GENERAL TASKS (cont.)

- Do not inhale, taste or smell chemical products
- Close hazardous materials jars after use
- All spills of hazardous materials need to be cleaned up immediately
- Do not inhale hazardous vapors. If you are exposed use proper protection.
- Use gloves when handling hazardous materials to avoid getting it on your skin, especially toxic or corrosive substances. Wash hands frequently.
- As general rule, carefully read safety label before using.
- Avoid unnecessary transportation of hazardous materials.

GENERAL TASKS (cont.)

- Be aware of ignition sources, heat sources, or electrical equipment within your work area.
- Do not store incompatible hazardous materials together
- Minimize waste thus limiting the amount that is bought and used.

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SAFETY PLANS & INCIDENT MANAGEMENT SYSTEMS

What are hazardous materials?

The emergency response rules and regulations by OSHA/EPA define a hazardous material as:

- a chemical substances that can burn or explode
- chemical substances that cause cancer
- poisons
- germs
- radioactive materials
- chemical substances that can cause violent chemical reactions.

"Hazardous Material" is a legal term. OSHA y EPA have other definitions for hazardous materials.

What are hazardous materials? (cont.)

Some materials are considered hazardous because they are on a list. Other hazardous materials have certain chemical properties.

If you don’t know the name of the chemical that was spilled, consider it hazardous.

Consider any chemical spill as hazardous until you are sure what it is. Some hazardous materials have no odor: even though you can’t see it or feel it, the chemical substance can be poisoning you.

examples:

- carbon monoxide has no odor.
- methyl chloride can’t be seen (evaporates rapidly.)
- you can’t smell “phosphene” until there is a dangerous amount in the environment.
- you can smell BENCENO and gasoline, but can penetrate the skin without you knowing

By law, employers has to keep a list of all hazardous materials at the work place. You have the right to see this list.

What is an emergency?

By law a hazardous material emergency, is a spill or leak that you and your co-workers are not able to control.

It is an emergency if:

• you require training and personal protection equipment

• if you considered calling the fire department or response team (hazmat team).

Emergencies include hazmat spills irritant, an unknown substance or a very large spill. “Large” is defined by EPA, not by the employer.

What is an emergency? (cont.)

Examples

• after an accident drums fall out and spilled on the road. No one knows what they contain.

• 2 chemical substances are mixed in a lab, forcing everyone to leave the room.

• a tank containing a solvent spills and floods the area and everyone is called to help control the spill.

• a pound of pesticide is spilled in the warehouse.

Spills

When is it small?

Depends! Employees can control some spills, especially hazardous materials that are not very hazardous. But **you will always need someone** that has specialized training:

- very hazardous substance
- large spill (even if the material is not extremely dangerous)
- do not know the hazardous material (unknown)
- mixture of hazardous materials

Spills

Employees can clean up:

• a small gasoline or diesel spill with the exception — if its mixed with another chemical. Its on fire or there is fire.

• a small spill (a propane cylinder with the exception — if it's a deadly substance (like chlorine).

• a 55 gallon spill (drum) with the exception — that it has been mixed with another chemical. It is a deadly substance (styrene).

Spills

When is it large?

Depends! The government has a definition for large spills. This is called Reportable Quantity (RQ).

examples:

asbestos	1 pd
chlorine	100 pds
sodium hydroxide	1,000 pds

You can find more information about RQ in the *"Driver's Guide to Hazardous Materials."*

If any oil or gasoline is spilled in the ocean or river, the employer should notify the US Coast Guard.

Examples of HazMat Emergencies

Fires and explosions represent the most common types of emergencies in waste water treatment plants, hazmat storage facilities and waste disposal facilities (Treatment, Storage & Disposal/TSD) . TSD plant have to be prepared to respond to any other type of emergency. Some examples types of emergencies that might occur in a TSD plant:

1. Emergencies resulting from an accident

- fire
- chemical leak
- toxic vapor or radioactive material leak
- explosion
- spill
- reaction of incompatible chemicals

2. Emergencies resulting in the physical injury of an employee

- excessive contact with chemicals or radiation
- health problems (heat stroke or heart attack)
- physical wounds caused by a fall, a fallen object, or an accident in a hazardous work area

Examples of HazMat Emergencies (cont.)

3. Emergencies that result from mechanical problems at the site

- electricity shut-off
- machinery failure
- tank pressure failure
- faulty alarms and receptors

4. Emergencies caused by forces of nature

- natural disasters (earthquakes, floods, hurricanes or tornados)
- changes in weather (rain, lightning, extreme temperatures, hot/cold)

Establishing priorities: Life first!

If you must respond to an emergency is very important to determine in advance the most important steps. The following are the most important priorities:

1. **Life and the employee's safety**

   The first priority during an emergency is to protect the employee's life and rescue

DO not try to rescue a co-worker without you having the appropriate personal protection equipment. If necessary, wait until the response team arrives

Establishing priorities: life first!

2. The environment

Sometimes a response to an emergency (spill or fire) can damage the environment. **It is very important to avoid damaging the environment.**

It is important to stop a gas release or a stop a chemical spill from going into a water supply than to save a burning fire.

3. Equipment and property

After taking measures to protect the employees' life and the environment, try and protect equipment and buildings. It's important that personal protective equipment not become contaminated.

Do not risk your life or the life of others to save equipment or property!

Seven steps to follow in an emergency:

Employees might be the first to notice an emergency situation. It's important that all employees follow the same steps during an emergency:

Step 1: Alert all employees that there is a problem. Ask for help.

Step 2: Evaluate the situation. Think about it and decide what measures to take.

Step 3: Rescue anyone that may be wounded. Make sure there is someone that can help and that you have the personal protective equipment.

Step 4: Try to control or shut off the spill or leak. A specialized response team usually handles this.

Step 5: Decontaminate wounded employees with water

Step 6: Evacuate (take out) the contaminated area

Step 7: Notify government agencies: (OSHA, DOT, EPA, TCEQ)
— The order of these steps will depend on the type of emergency

Emergency Response

The person that sees a emergency in the facility should alert other employees in the immediate area. Then sound an alarm or place a call to notify the ER Supervisor (This person name should be included in the Emergency Plan). The alarm should also be an alert to stop all work activities, and respond to the emergency.

When you contact the emergency response team, let them know the following information:

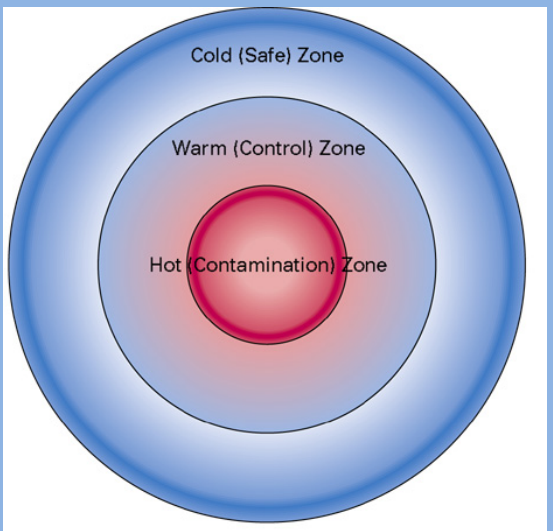
- What happened?
- Who was affected by it?
- How did it happen?
- Where did it happen?
- When did it happen?
- How much damage did it cause?
- What kind of help is needed?

Control Zones

When there is a spill, it is very important to control the spill **immediately.** Avoid the chemical spill from spreading into other areas through a system called **work zones.**

Generally, there are three work zones:

1. Hot (Contaminated) Zone
2. Warm (Control) Zone
3. Cold (Safe) Zone



Hot (Contamination) Zone

- Contamination is actually present.
- Personnel must wear appropriate protective gear.
- Number of rescuers limited to those absolutely necessary.
- Bystanders never allowed.

Warm (Control) Zone

- Area surrounding the contamination zone.
- Vital to preventing spread of contamination.
- Personnel must wear appropriate protective gear.
- Life-saving emergency care is performed.

Cold (Safe) Zone

- Normal triage, stabilization, and treatment are performed.
- Rescuers must shed contaminated gear before entering the cold zone.

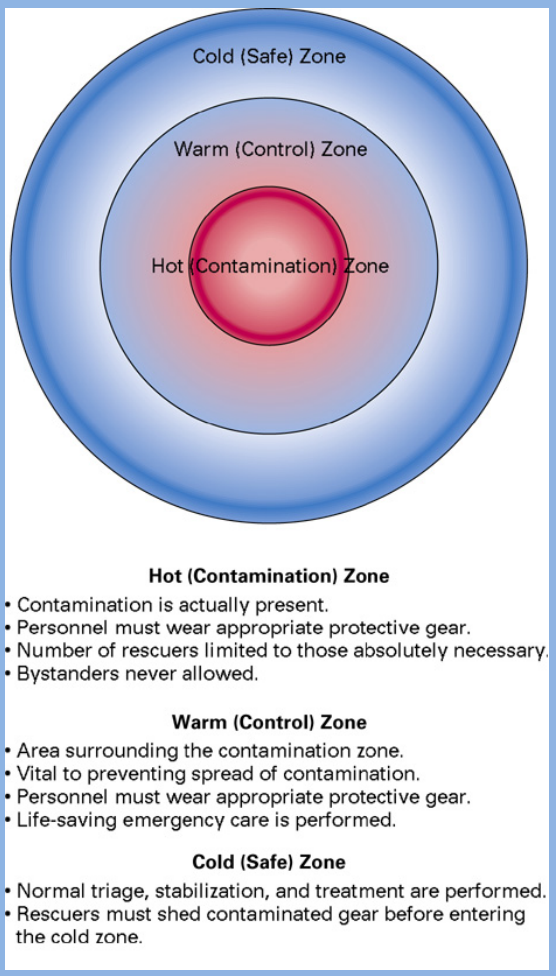
Control Zones

Zone 1: Hot Zone –

The **hot zone** is the contaminated area. It is important that a minimum number of people are in the hot zone.

The hot line represents the boundary between the hot zone and warm zone.

Anyone that enters the hot zone has to wear personal protective equipment.



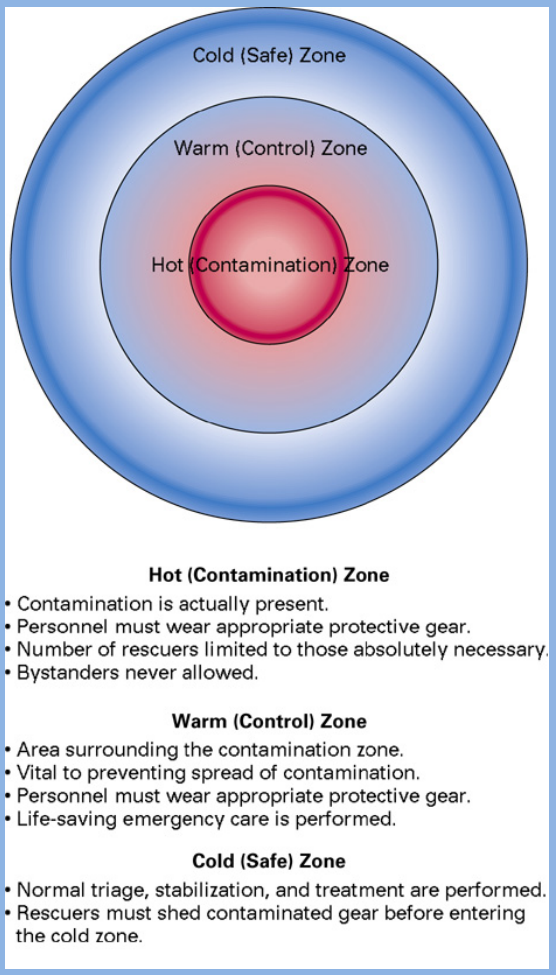
Control Zones

Zone 2: Warm zone –

The **warm zone** is the area between the contaminated zone (the hot zone) and the cold zone.

The decontamination area is within the warm zone. All protective clothing is removed in this area and should not leave this area until it's decontaminated.

The warm zone is the area between the unsafe area (hot zone) and the safe area (cold zone).



Control Zones

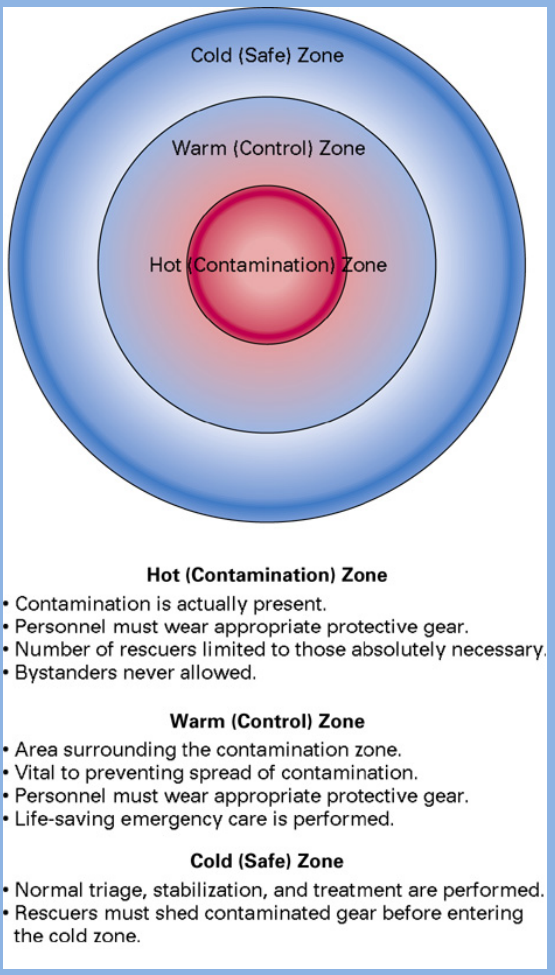
Zone 3: Cold Zone –

The **cold zone** is the **clean** zone. It is not necessary to wear protective clothing in this area.

Contaminated equipment or contaminated protective clothing should not enter the cold zone!

The location of the cold zone depends on the following:

- available space
- wind direction
- distance of the hot zone
- availability of resources (phones/water)



TRAINING

OSHA: Regulation 1910.120

All employees working on site (such as but not limited to equipment operators, general laborers and others) exposed to hazardous substances, health hazards, or safety hazards and their supervisors and management responsible for the site shall receive training meeting the requirements of this paragraph before they are permitted to engage in hazardous waste operations that could expose them to hazardous substances, safety, or health hazards, and they shall receive review training as specified in this paragraph.

Do not try to control an emergency situation if you have not been trained.

TRAINING (cont.)

RCRA rules: Classroom instruction or on-the-job training

The program must ensure that employees are able to respond to emergencies and must include training on emergency procedures, equipment and systems.

RCRA training requirements for Part 265 facility personnel will include:

- Elements of the RCRA Contingency Plan
- Communications or alarm systems
- Standard operating procedures for using, inspecting, repairing and replacing facility emergency and monitoring equipment
- Key parameters for automatic waste feed cut-off systems
- Use and limitations of personal protective equipment
- Response to fires, explosions, groundwater contamination incidents and shutdown of operations.
- The EPA small quantity generator (SQG) regulations do not specify or give additional guidance

When should you receive emergency response training?

Initial Training

A new employee, or an employee who changes job functions, may perform hazmat job functions before completing training, provided:
the employee does so under the direct supervision of a properly trained and knowledgeable hazmat employee; and the hazmat training is completed within 90 days of employment or change in job function.

Recurrent Training

Is required at least once every three years. The three year period begins on the actual date of training.

5 Levels of HazMat Training

- Level I: First Responder—Personnel must possess the ability to identify and report all hazardous materials accidents.

- Level II: Responder—Personnel must be proficient at Level I and complete 8 hours or more of advanced training.

- Level III: Technician—Personnel must complete at least 24 hours of training beyond Level II.
- Level IV: Incident Coordinator—Personnel must complete at least 40 hours of training beyond Level III.

- Level V: Incident Commander—Personnel must have 10 hours beyond Level IV.

The written safety and health program

Employers shall develop and implement a written safety and health program for their employees involved in hazardous waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards, and provide for emergency response for hazardous waste operations

- ✓ written plan should be available to employees and OSHA inspectors
- ✓ specific training for the emergency response team
- ✓ general training for workers NOT directly responsible for emergency response
- ✓ practice/exercise of the Emergency Plan
- ✓ specific steps to explain the employer's during an emergency

What should be included in the Emergency Plan?

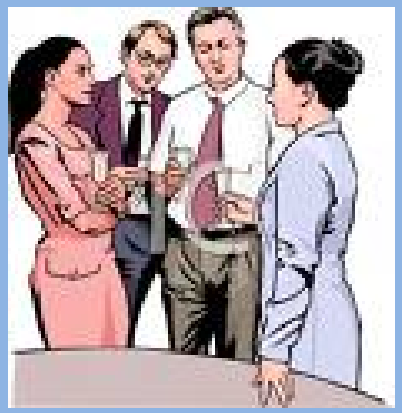
The emergency plan should be in place before an emergency.

The plan should include the following information:

- definition of an emergency
- what chemicals are used and the hazards
- how to prevent spills
- when there is a spill, who should be notified

What should be included in the Emergency Plan?

- how to contact emergency responders
- what level of training is required for the types of emergencies
- how the company works with firefighters, response teams and other contractors
- who is in charge of emergency and who do they report to
- how to clean up a spill



What should be included in the Emergency Plan?

- if someone needs to be evacuated, who is in charge and how will it be done
- safe places to go in case of emergency
- how to account for all employees during an emergency
- how to keep people out of the area (security)

What should be included in the Emergency Plan?

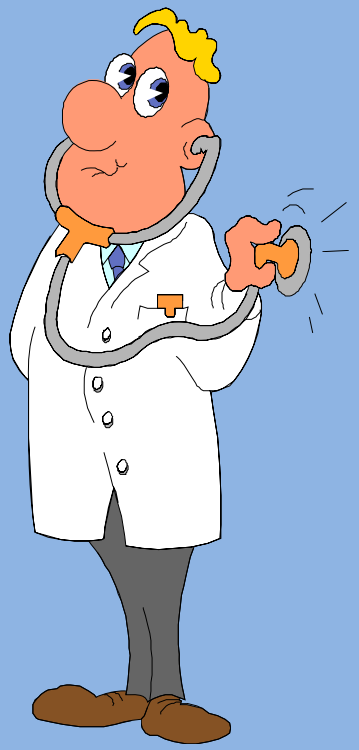
- decontamination procedures
- emergency care provider
- evaluation of response plan
- a coordination plan with contractors (firefighters)
- a description of the responsibilities of emergency response personnel

What should be included in the Emergency Plan?

- steps on how to alert and evacuate all employees during an emergency

- a medical care plan and first aid

- description of personal protection equipment and equipment needed to respond to an emergency



REMEMBER! In an Emergency:

ALERT! all employees

THINK! What should I do in this situation and then

ACT! According to your training level

Summary: Responding to an Emergency

1. priorities during an emergency:

   A. Human Life

   B. Environmental conservation

   C. Preservation of equipment and property

2. Management is responsible for developing the Emergency Plan and defining the roles and responsibilities for each employee. ALL employees must be trained and the plan needs to be exercised.

3. The Health and Safety Committee should review and evaluate the Emergency Plan for the facility.

Summary: Responding to an Emergency

4. Emergency response team receives specialized training

5. Respond to emergencies only if you have the adequate training

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SIZE-UP, STRATEGY AND TACTICS

Innovative Decision Making Process, appropriately named **DECIDE**

As responders to an incident involving hazardous materials, there is an obligation to protect the public, the environment, and the Response Team.

In a HazMat emergency, the decision-maker is faced with a series of "decision events." To affect or influence the emergency events sequence, decisions must focus on modification of the sequence that would otherwise occur naturally. There are six steps that can provide a framework for decision making in a given HM emergency. These six steps are:

* Benner Ludwig. DECIDE, in Hazardous Material Emergencies. Fire Journal. National Fire Protection Association, Quincy, Ma. 1998

Innovative Decision Making Process, appropriately named **DECIDE**

Detect HM Presence.
Estimate Likely Harm Without Intervention.
Choose Response Objectives.
Identify Action Options.
Do Best Option.
Evaluate Progress.

EVALUATION

An estimation or an evaluation of the condition from which an opinion or judgment can be formed

Size-up is never completed until the situation is mitigated and completely under control.

Size-up and evaluation is the job of all personnel. What one person can see another may not.

INCIDENT PHASE

If the situation has been stabilized, the response team only needs to on alert, until the clean-up team arrives and disposes of the spilled product.

If the material is still leaking, the response team has to act bringing with them specialized response equipment to control de emergency.

To determine the stage of the emergency some key questions are decisive for the assessment of the emergency.

INCIDENT STAGE

1. What caused the incident?
2. How much time has passed by since the incident?
3. What has happened at the site since then?, What is happening now?, How much time will it last?
4. Has the situation stabilized?, Will the situation change because of the wind, the time of day or another circumstance?, Will it get worse or better?
5. Are any materials leaking?, What materials?, Where are they going?
6. Are toxic vapors or smokes involved?, Is an explosion possible?

TYPES OF CONTAINERS

Some hazardous materials are transported in specialized containers. The shape and size of these containers can be clues to the identity of the contents. For example:

Cylinders and drums are often used to transport hazardous materials.

Tank trucks and cylindrical or elliptical containers: generally, flat or nearly flat ends indicate liquids at atmospheric pressure (e.g., gasoline); rounded ends indicate pressurized contents (e.g., liquified natural gas).

Rail tank cars with dome fittings enclosed with a tight cap contain liquid under very high pressure, such as liquified petroleum gas.

DETECTING THE PRESENCE OF HAZARDOUS MATERIALS

The very first unit on the scene must start the work of recognizing, identifying, and verifying the hazardous materials involved.

If the material cannot be immediately identified, there are ways to determine the general hazard class or chemical family of the material.

Clues to identifying the material include occupancy where it is found, container type and markings, placards/labels, information on shipping/facility documents, and results of air monitoring. Although responders can use their senses to identify a hazardous material, be warned: If you can see, hear, feel, or smell the release, then you are probably too close!

DETECTING THE PRESENCE OF HAZARDOUS MATERIALS

Safety must be the number one priority at all emergency operations. Risks should not be taken without a thorough understanding of the hazards involved.

Upon approach to the scene, the responders should be looking for further clues. The presences of facilities or containers, where hazardous materials might be found, or the more obvious presence of actual spills, are all clues. It should be kept in mind that hazardous materials could be in gaseous or particulate form and may not be visible.

The objective is to minimize the level of risk to emergency response personnel, the community, and the environment.

If there are no solid clues, identify an unknown chemical take notes about the substance's physical appearance, such as odor, color and state. Another option for pinpointing unknown chemicals is to report medical symptoms displayed by victims.

DETECTING THE PRESENCE OF HAZARDOUS MATERIALS

First Responders Emergency Action Checklist

a.Type of container or containers.
b.How much of hazardous material is in each container.
c.Name and/or identification number
d.Source of spill.
e.Take note of any visible damage.
f.Verify all information.

DETECTING THE PRESENCE OF HAZARDOUS MATERIALS

Approach Cautiously

The 2004 Emergency Response Guidebook (2004 ERG) states – “Resist the urge to rush in: others cannot be helped until the situation has been fully assessed”.

Determine the hazardous materials present and survey from a distance.

If you are first on scene, find out as much information as possible, such as Where is the driver of the truck (transportation accident), the train crew (train accident), or key personnel of the company (accident at a facility)?

Some people may provide documentation or other key information about the physical location and identity of the hazardous materials.

MODIFYING FACTORS

No two situations are the same, and is these subtle differences one incident and another, when ignored, can have serious consequences for the population, the environment , facilities, etc.

Table 1 (next slide) states some factors that response teams should keep in mind during an incident.

The site is an important factor when you are dealing with an emergency with a hazardous material, for example, country road vs. city road; spill on the ground vs. spill in the water; spill on highway vs. deserted road. These differences change the form and type of response, making it more or less safe and / or efficient.

TABLA 1

Tabla 1°. La Detección de la Presencia de Factores Modificativos (Exploración de Sitios)		
LUGAR	HORARIO	CLIMA
DESÉRTICO	DEL AÑO	TEMPERATURA
POBLADO	DE LA SEMANA	DIRECCIÓN DEL VIENTO
TERRENO DIFÍCIL	DEL DÍA	VELOCIDAD DEL VIENTO
ACCESO LIMITADO	DEL PRIMER AVISO	INVERSIÓN DEL AIRE
DERRAME TERRESTRE	DE LA RESPUESTA	PRECIPITACIÓN: LLUVIA NIEVE GRANIZO OTROS
DERRAME ACUÁTICO: AGUA DULCE AGUA SALADA	DE INICIO DEL INCIDENTE	PRONÓSTICO DEL TIEMPO
UBICACIÓN DEL PRODUCTO	********** ****	********** **

MODIFYING FACTORS

The time of day is another factor in a HazMat emergency. Is there is a big difference if the incident occurs during the day or at night?

The weather is always a factor in a HazMat emergency, especially when you are dealing with hazardous materials?

Cold temperature can facilitate working with certain hazardous materials, but it may be difficult for the emergency responders.

Warm or hot weather usually increases the hazards when working with hazardous materials. Humidity is also a factor; in some cases it can affect the hazardous material and make things worse.

CANTIDAD Y NATURALEZA DE LOS MATERIALES PELIGROSOS

The quantity of a hazardous material involved usually does not change the initial danger of an incident, unless it is very small. However, the quantity can change the way in which the response team has to act, for example:

A container of 200 liters of acid has spilled, it represents a lesser risk as compared if this happens from 19,000 liter tank.

The danger is certainly greater, but in both cases the risk to the response team is the same. The nature and quantity of the hazardous materials material, changes the degree of danger.

QUANTITY AND NATURE OF HAZARDOUS MATERIALS

Information provided by the driver of the truck, train crew, or personnel from the facility, the response team should observe some basic information:

* Containers
* Trademarks
* Signs or labels on the containers
* Shipping papers
* Name (s) of products on containers
* Name (s) vendor on the containers
* Senses (mainly vision and hearing, but never depend on the smell, as it would be part of the problem).

QUANTITY AND NATURE OF HAZARDOUS MATERIALS

When using your senses to identify possible situations with hazardous materials, pay attention to certain details such as:

- Eyewitness information, certain odors like rotten fruit, sulfur, gun powder, rotten fish, chloride, fingernail polish or paint
- Vapor clouds
- Dead animals or fish
- Fire or smoke
- Victim's information, irritated skin or eyes
- Sound produced a gas leak
- Sound produced by an explosion

GENERAL RECOMMENDATIONS
RESPONSE TEAMS

The evaluation of the site is not complete, if the response team does not have all the information. They have to determine the presence of hazardous materials and the danger they represent, for the safety of their personnel as well as the facilities and the environment.

The task is to obtain, compile and interpret this information. All this can be rigorous and time consuming. This investigative work depends upon different sources of information that can be the key to a successful investigation of the incident.

RESOURCES

The response team has to visualize the probable behavior, the results and the probable damage that will result from a hazmat incident. To do this, we should answer the following questions:

- Is the container damaged or will it be damaged?, How can it break or is it broken?, What type of spill will occur as a result?
- Where will the hazardous material go and/or the container when it leaks or is spilled?, What direction will it take?, Where will it stop?
- Why is it probable that the material will take that direction?
- How will the hazardous material or container follow that direction?
- When will the hazmat or container follow this direction?
- What damage will the hazmat or container produce in that direction?

RESOURCES

The site analysis is a critical preliminary step in the development of risks and danger.

If the response team does not have the necessary equipment or personnel, they should ask the manufacturer, supplier, fire department, specialized teams, or other agencies (local, state or federal) for help.

An exact and complete site analysis allows the response teams to understand the specific damages that want to be prevented and defines strategic priorities for their preventive efforts. The prevention of damages constitutes the global goal of the group. These strategic priorities with its objectives are:

- Protection the response team
- Public protection
- Environmental protection
- Property protection

IDENTIFY YOUR OPTIONS

The response team has to consider available resources.

The incident may turn for the worst if the response team wastes time if they have an action plan without the necessary resources. Then we should ask ourselves these questions:

How many responders are available?, What is their training level? Until what point will their protective clothing work in this situation?, Is there enough PPE in stock for this operation? If required, what external resources are available?

Response teams should consider all options. These may include:

* Evacuation
* Containment
* Barrier
* Fire control
* Putting out fire

DEFENSIVE ACTIONS

These are taken from a safe distance from the site of incident. They are reactions to what happened or is happening. These defensive actions are made before the situation is stabilized. The defensive options may include evacuation, ditches, watching, decontamination of personnel, etc.

DEVELOP THE BEST OPTION

The response team has to choose any or all options that support their objectives. It means selecting the ones represent success with low risk, for security reasons and to terminate the incident.

Remember, the “best” option (or best options) depends on the specific situation and the response capabilities. Sometimes, the best decision will be to do nothing. If your best option is “to do nothing”, take it.

EVALUATE THE PROGRESS

Every time an action is taken, including not doing anything, the situation will change. You have to take continuous action steps so that the situation can be stay under control and to take alternative measures if the previous actions did not give the desired results.

Before continuing or taking another action step, stop and evaluate the results up that point in time. Did the action fulfill its purpose?, Was it in reality, the best option? Is it therefore necessary to analyze the situation, in order to be able to take the best decision by updating the information.

Strategy and Tactics

Incident Objectives

Contain

Mitigate

Recover

Confine

Contractors/

Clean

Philosophy written by Mr. Benner lets us see clearly that we should never go into a site before we, stop,

think and then act.

Remember that the purpose of an emergency response is:

“NOT TO BE PART OF THE PROBLEM”.