

**Fundamentals of Fire Fighter Skills** Chapter 30

**Objectives (1 of 2)**

- Describe how to contact the proper authorities.
- Describe how to plan an initial response.
- Describe how to estimate the size and scope of the incident.
- Describe how to identify a resource for determining the size of an endangered area.

**NFPA** 2 **IAFC**

## Objectives (2 of 2)

- Describe resources available for determining the concentrations of a released hazardous material.
- Initiate an incident management system (IMS) for hazardous materials incidents.
- Identify considerations for determining the location of the command post.

## Who to Contact

- Identify resources that can assist you in the process of reporting the hazardous materials incident.
  - Follow local SOP.
- Who to Contact
  - First call should be for additional resources.

## Additional Resources

- Support personnel
- Trained technicians
- Technical specialists
- Will help identify the hazardous material
- Control the incident
- Decontamination personnel and equipment

## Other Notifications

- CHEMTREC
- National Response Center
- Local and state environmental agencies
- Local emergency planning commission
- A list of contact names and numbers should be at the dispatch center

## Identification (1 of 3)

- No offensive action should take place until the identity of the hazardous material is confirmed.
- Identity should be confirmed in a minimum of three references:
  - Placard
  - NAERG
  - MSDS
  - NIOSH and CHEMTREC

## Identification (2 of 3)

- Variety of information sources should be compared for consistency.
  - If there is a variation, follow the information that reflects a more conservative course of action.
- Protection and safety of fire fighters is the first priority.
- On-scene research should continue throughout the incident.

## Identification (3 of 3)

- After identification, operations-level responder should perform only actions that do not involve contact with the material.
  - Maintain full protective equipment during any activity.
  - Complete decontamination procedures prior to leaving any area where hazardous materials are present.

## What to Report (1 of 5)

- Report the information clearly, concisely, and accurately.
- An error in spelling, an incorrect measurement, a mispronunciation of a chemical name, or incorrect identification of a hazardous material can be disastrous.
  - The change or omission of just one letter in a chemical name could lead to incorrect identification.

## What to Report (2 of 5)

- Keep information as simple as possible.
- Spell names that are complex or potentially confusing.
- Have the receiver of the information repeat back what was heard.

## What to Report (3 of 5)

- Information to report includes:
  - Exact address and location of spill or leak
  - Identification of indicators and markers of hazardous materials
  - All color and class information obtained from placards

## What to Report (4 of 5)

- Four-digit UN/NA numbers
- Hazardous material identification obtained from shipping papers or MSDS and the potential quantity of hazardous material involved
- Description of container, including size, capacity, type, and shape
- Amount of chemical that could leak and amount that has leaked

## What to Report (5 of 5)

- Exposures of people and the presence of special populations
- Environment of the immediate area
- Current weather conditions, including wind direction and speed
- A contact or callback telephone number and two-way radio frequency or channel

## Plan an Initial Response (1 of 9)

- The first priority is the safety of responding personnel.
  - Responders are there to isolate the problem, not to become part of it.
- Proper incident planning will:
  - Keep responders safe
  - Provide a means to control the incident effectively, preventing further harm to persons or property

## Plan an Initial Response (2 of 9)

- Planning begins with the initial call for help.
- Information is used to determine the safest and fastest route to the scene.

## Plan an Initial Response (3 of 9)

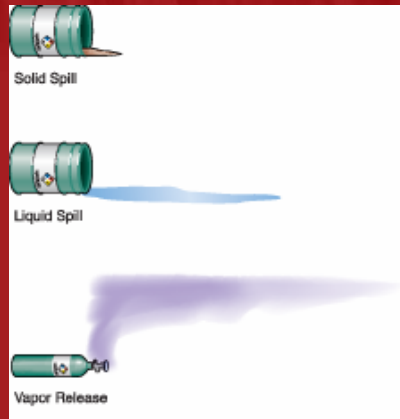
- Choose a route that approaches the scene from an upwind and upgrade direction.
  - Natural wind currents will blow the hazardous material vapors away.
- Choose a route that places the responders uphill of the site.
  - A liquid hazardous material will flow away from responders.

## Plan an Initial Response (4 of 9)

- Responders need to know the type of material involved.
  - Is the material a solid, liquid, or gas?
  - Is it contained in a drum, barrel, or pressurized tanker?

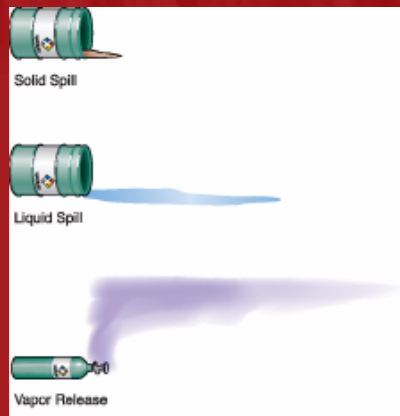
## Plan an Initial Response (5 of 9)

- Response to a spill of a solid hazardous material will differ from response to a liquid-release incident or vapor-release incident.



## Plan an Initial Response (6 of 9)

- A solid can be widespread and constantly moving.
- Depending on the gas characteristics and weather conditions



## Plan an Initial Response (7 of 9)

- Characteristics of the affected area near the location of the spill or leak are important factors.
- If an area is heavily populated:
  - Evacuation procedures and a decontamination process is established very early

## Plan an Initial Response (8 of 9)

- If the area is sparsely populated and rural:
  - Isolating the area from anyone trying to enter the location is the top priority
- A high-traffic area such as a major highway would necessitate immediate rerouting of traffic.

## Plan an Initial Response (9 of 9)

- When responding to an incident, the more information that can be obtained the better.
- If information is unknown or is unconfirmed, then plan for the worst-case scenario.
- When planning for hazardous materials incidents, always plan for the largest margin of safety possible.

## Response Objectives (1 of 2)

- At operations-level, all response objectives are primarily defensive.
- Personnel are not actually in contact with the hazardous material.
- Some effective defense actions can be taken safely at a distance.
  - Defensive actions are ones that do not involve stopping the leak or release of a hazardous material.

## Response Objectives (2 of 2)

- Defensive objectives are as follows:
  - Isolate the area affected by the leak or spill.
  - Evacuate victims who could become exposed.
  - Control where the spill or release is spreading.
  - Contain the spill to a specific area.

## Defensive Actions

- Some of the defensive actions that can be taken include:
  - Diking and damming
  - Absorbing or adsorbing material
  - Stopping the flow remotely from a valve or shutoff
  - Dilution or diverting material
  - Suppressing or dispersing vapor

## Proper Personal Protective Equipment

- PPE is needed based on the hazardous material involved.
- At a minimum, fire fighters should wear full protective gear with no skin exposed and use SCBA.
- Standard structural firefighting PPE offers limited hazardous material protection.

## Identify Emergency Decontamination Procedures (1 of 2)

- Needs to be a procedure or a plan in place to decontaminate any responder who accidentally becomes contaminated
- Victims removed from a contaminated zone must be decontaminated.

## Identify Emergency Decontamination Procedures (2 of 2)

- The methods decontamination depend on:
  - The hazardous material
  - The physical state of the material
  - The hazards involved
- Decontamination can be:
  - Simple as removing clothing and flushing material away with water
  - Complex as using drug therapy

## Gauging the Potential Harm or Severity of the Incident (1 of 2)

- During elevation, responders need to consider factors such as:
  - Size of the container
  - Nature of the hazardous material involved
  - Amount released
  - Area exposed

## Gauging the Potential Harm or Severity of the Incident (2 of 2)

- Based on the toxicity and the concentration of the hazardous material, how the incident might progress can be gauged.

## Resources for Determining the Size of the Incident (1 of 2)

- NAERG
  - Identifies and outlines predetermined evacuation distances and basic action plans, based on spill estimates, for thousands of chemicals.
- Computerized or hard-copy preincident plan
  - Includes reports submitted to the fire department and topographical mapping information.

## Resources for Determining the Size of the Incident (2 of 2)

- Monitoring devices such as wind direction and weather forecasting equipment are critical resources.
- Computer modeling programs can predict movements of vapor clouds and plumes.
- Monitoring and portable detection devices allow IC to:
  - Determine the hot, warm, and cold zones
  - The evacuation distances required

## Reporting the Size and Scope of the Incident (1 of 3)

- Reporting the estimated incident size is done by using information available at the scene.
- If a vehicle is transporting a known amount of material, an estimate of the size of the release can be made.
  - Subtract the amount remaining in the container.

## Reporting the Size and Scope of the Incident (2 of 3)

- A gasoline tanker containing 9,000-gal overturns and 4,500-gal remains in the tanker.
- An estimated 4,500-gal of gasoline has thus spilled.
- The actual spill area can then be estimated in square feet.

## Reporting the Size and Scope of the Incident (3 of 3)

- Units can be as small as square feet or as large as square miles.
- If unsafe to approach vehicle or MSDS are not available, other methods must be used.
- The safety of responders comes first.

## Determine the Concentration of a Released Hazardous Material (1 of 2)

- Information obtained from the MSDS
- Usually states the concentration of the hazardous material
- Litmus paper (pH strips) can be used to determine hazardous material's pH.
- Monitors are used to analyze the atmosphere from a safe distance.

## Determine the Concentration of a Released Hazardous Material (2 of 2)

- Once the concentration is known, the IC can evaluate the incident response plan.
  - A high concentration of an acid would call for a higher level of PPE.
  - May also require the evacuation of civilians

## Incident Management System (1 of 4)

- IMS can be expanded to handle an incident of any size and complexity.
- Hazardous materials incidents can be complex.
- Local, state, and federal responders and agencies will be involved in many cases of long duration.

## Incident Management System (2 of 4)

- Basic IMS system consists of five functions:
  - Command
  - Operations
  - Logistics
  - Planning
  - Finance and administration

## Incident Management System (3 of 4)

- During a hazardous materials incident, a special technical group develops under the Operations section.
- This special branch consists of some or all of the following positions:
  - A second safety officer
    - Reports directly to the hazardous materials team officer
    - Responsible for the hazardous materials team's safety only

## Incident Management System (4 of 4)

- A hot zone entry team
- A decontamination team
- A backup team
- A hazardous materials information research team

## The Command Post (1 of 3)

- The main hub of the IMS
- Collection point for all information and resources
- Must be located in the cold zone upwind and updrift from the spill or leak to keep it from becoming contaminated

## The Command Post (2 of 3)

- If the command post and personnel became contaminated, the personnel would no longer be able to control the operation.
- All operations would have to be re-established elsewhere.
  - Would have to use a completely different pool of personnel, equipment, and supplies.

## The Command Post (3 of 3)

- The overall efficiency of command would be negatively affected.
- The command post could be as close as one block away or as far as miles away from the hot zone.

## Summary (1 of 3)

- An important early notification to make is the request for additional response personnel, such as support personnel, trained technicians, and technical specialists.
- The approach to the incident should be from upwind, and from a direction that ensures that released liquids or vapors flow away from responders.

**Summary** (2 of 3)

- Possible defensive actions include stopping the release with a valve or shutoff; absorbing, adsorbing, diking, damming, diverting, or diluting escaped material; and suppressing or dispersing vapor.
- The type of personal protective equipment required depends on the material involved and the nature of the incident; structural firefighting PPE provides no protection against hazardous materials.

**Summary** (3 of 3)

- In a hazardous materials incident, a hazardous materials branch develops under the Operations sector in the incident management system. This branch includes a second safety officer and a number of specialized operational teams.