

Hazardous Materials: Managing the Incident

CHAPTER 5 Site Management

Learning Objectives Overview

- Knowledge Objectives
- Skills Objectives

Introduction (1 of 2)

- Site management is the first step in the Eight Step Process[©].
 - Establishing control of the incident scene
 - Playing field is clearly established and identified
 - Ultimately helps the IC manage the biggest problem first—people

Introduction (2 of 2)

- The actions taken in the first 10 minutes of the incident usually dictate how well the next hour will go.
- It is easier to make a hazard control zone smaller once you have control.
- IC should not begin extended operations until the hazard control zones have been identified and the isolation perimeter is secured.

Terminology and Definitions

(1 of 4)

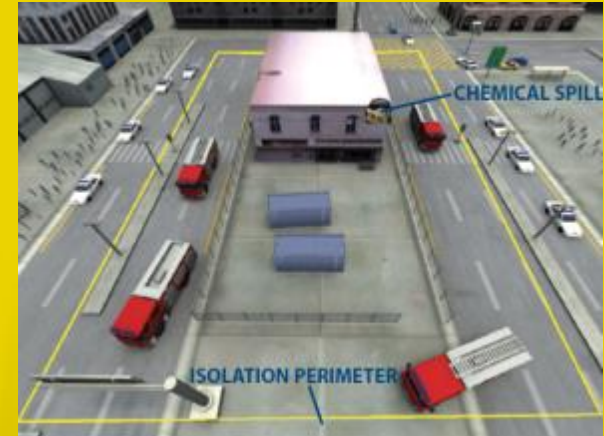
- Staging
 - The National Incident Management System (NIMS) defines staging as the location where resources can be placed while awaiting a tactical assignment.



Terminology and Definitions

(2 of 4)

- Isolation perimeter



Establishing an isolation perimeter outside of a building.

Terminology and Definitions

(3 of 4)

- Hazard control zones
 - Hot zone
 - Warm zone
 - Cold zone



Terminology and Definitions

(4 of 4)

- Area of refuge
- Public protective actions (PPAs)
- Protection-in-place
- Evacuation



Site Management Task

- Site management can be divided into six major tasks:
 - Assuming command and control
 - Ensuring safe approach and positioning
 - Establishing staging
 - Establishing an isolation perimeter
 - Establishing hazard control zones
 - Implementing initial PPAs



Command and Control (1 of 2)

- The IC should initiate the following command functions:
 - Correctly assume command
 - Confirm command
 - Who is in command
 - How to contact Command
 - Where to find the location of the incident command post (ICP)



Command and Control (2 of 2)

- Additional command functions:
 - Select a stationary location for the ICP
 - Establish a staging area
 - Request necessary assistance



Approach and Positioning (1 of 2)

- Safe approach and positioning by the initial emergency responders is critical to how the incident will be managed.
 - If the incident starts bad, it sometimes stays bad.
 - Should follow basic safe operating principles



Approach and Positioning (2 of 2)

- General guidelines include:
 - Approach from uphill and upwind.
 - Look for physical hazmat clues.
 - Questions to ask:
 - Where is the hazmat being released from now?
 - Where is it going?
 - Where am I in relation to where it is going?
 - How fast is it moving?
 - What will the hazmat do to me when it gets to where I am?



Staging Areas (1 of 2)

- Staging procedures facilitate safety and accountability.
- Close enough, yet far enough away
- Easily accessible to responding apparatuses
- Consider establishing primary and secondary staging areas.



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Staging Areas (2 of 2)

- Provides the IC with the most options
- Should be in a safe, upwind location
- Used as a resource management tool
- Location based on the nature of the emergency, available geographic locations, and prevailing wind conditions



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Isolation Perimeter

(1 of 2)

- Separates the responders from the spectators
- Immediately limit the number individuals exposed to the problem.
- May be established within a building or for outdoor scenarios



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Isolation Perimeter

(2 of 2)



Isolation perimeter priorities for an outdoor spill scenario.

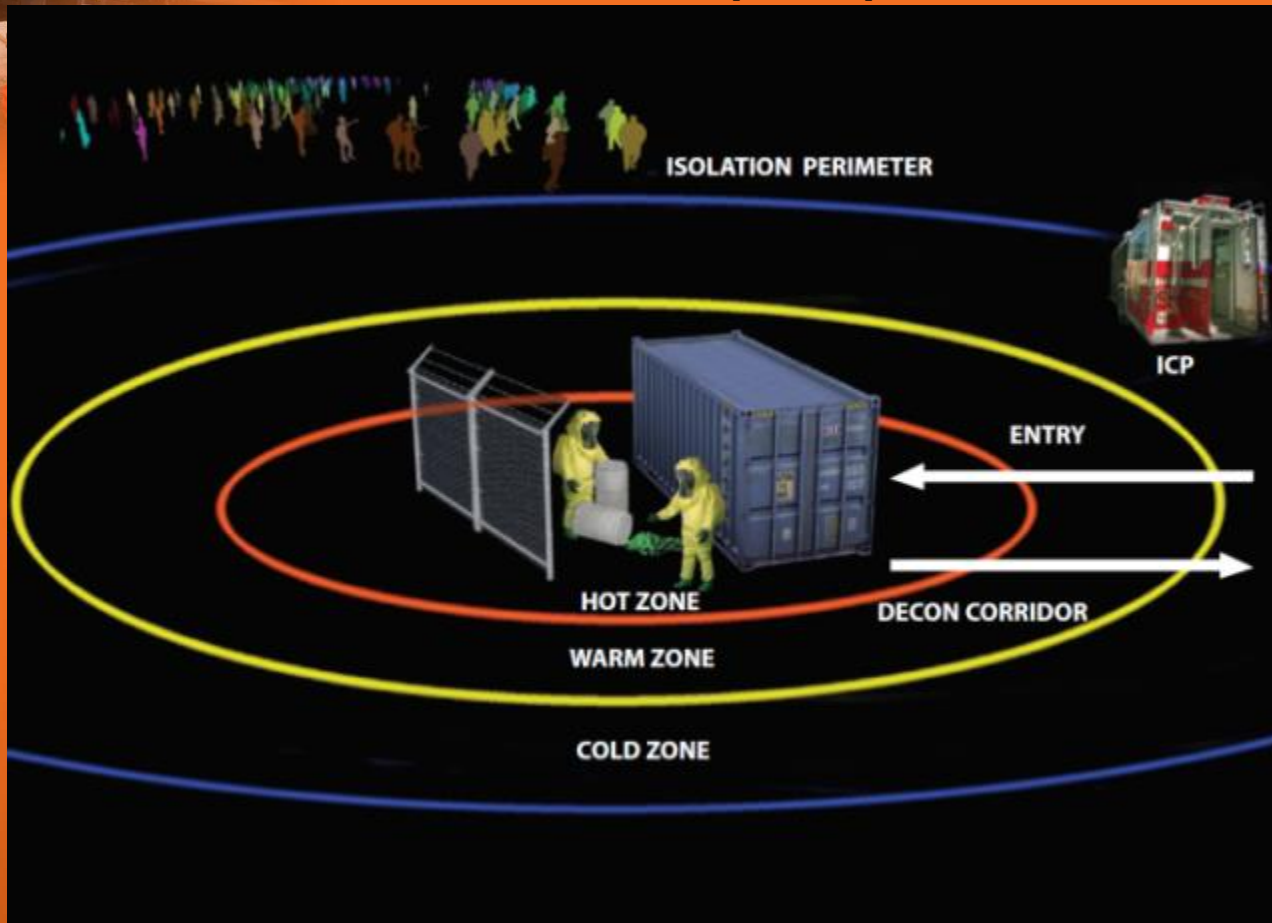
Hazard Control Zones

- Hazard control zones are designated areas at a hazardous materials incident based on safety and the degree of hazard.

Defining Hazard Control Zones (1 of 2)

- Designated restricted areas within the isolation perimeter based upon their degree of hazard.
- Designated from the most hazardous to least hazardous:
 - Hot
 - Warm
 - Cold

Defining Hazard Control Zones (2 of 2)



Establishing hazard control zones.

Identifying Hazard Control Zones (1 of 2)

- Hazard zones should be established through air monitoring, and clearly marked.
- Determine if immediately dangerous to life and health concentrations (IDLH) are present.

Identifying Hazard Control Zones (2 of 2)

- Hazard control zones should be based on the following:
 - Flammability
 - Oxygen
 - Toxicity
 - Radioactivity
- IC should strictly control and limit the number of personnel working in the hot zone.

Roles of Security and Law Enforcement Personnel (1 of 3)

- Isolation perimeter assignments require close coordination with security or law enforcement supervisors.
- If there is a risk of exposure, proper PPE must be provided.



Roles of Security and Law Enforcement Personnel (2 of 3)

- Best used where traffic and crowd control will involve large groups of people on public property



Courtesy of Rebecca Crawford, Dragonfil Photography



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Roles of Security and Law Enforcement Personnel (3 of 3)

- Key law enforcement functions include:
 - Staffing entry control points
 - Patrolling the perimeter
 - Provide security for the ICP and emergency responders
- Police are better trained for perimeter security than firefighters.



Rescue and Initial Public Protective Actions (1 of 2)

- First responders will be the most likely personnel to be faced with the decision to “go or not go” in order to attempt a rescue and favorably change the outcome.



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Rescue and Initial Public Protective Actions (2 of 2)

- Terrorism incidents can pose significantly higher risk levels.
- Reality of most tactical hazmat response operations is that they are not well suited for rapid entry and extrication operations.
- For rescue operations to be effective, first responders must have:
 - The proper training
 - Pre-established SOP
 - Appropriate and available personal protective clothing and equipment



Initiating Public Protective Actions

- Factors evaluated when developing PPA include:
 - What has been released
 - How much has been released
 - The hazards of the material(s) involved
 - The population density
 - Time of day
 - Weather conditions
 - Type of facility
 - The availability of air-tight structures

Initial PPA Decision-Making (1 of 3)

- The IC's decision to either evacuate or protect-in-place should be based on the following factors:
 - Hazardous material(s) involved
 - The population at risk
 - Time factors involved in the release
 - Effects of the present and projected weather
 - Communication capability
 - Availability and capabilities of hazmat responders

Initial PPA Decision-Making (2 of 3)



Staying inside may be initially safer than going outdoors.



Initial PPA Decision-Making (3 of 3)

- Achieving PPA objectives translates into the following:
 - Gaining control of a specified area beyond the isolation perimeter
 - Securing and clearing that area
 - Controlling a second downwind or adjacent area
- The *Emergency Response Guidebook (ERG)* is a good resource document.

Protection-In-Place

(1 of 2)

- Research clearly indicates that staying indoors may provide a safe haven during toxic vapor releases.
- For chemical releases of limited duration, it is faster and usually safer to shelter in place than to evacuate.
- May not be the best option if incident involves a prolonged release of a toxic material



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Protection-In-Place

(2 of 2)

- Public provided with clear instructions
- Public compliant with recommendations
- Requires timely and effective warning
- Clear rationale between protect-in-place and evacuation
- Credibility of emergency response personnel with the general public
- Previous training and education



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Wally Wise Guy™

- An effective public education program, Wally Wise Guy was developed by the LEPC in Deer Park, Texas.
- Wally is a turtle that “knows it’s wise to go inside his shell whenever there’s danger.”
- Teaches children and their parents how to shelter-in-place in case of a chemical emergency

Evaluating Structures for Protection-In-Place

- Pre-incident plans should include possible shelter locations.
- Factors to consider when evaluating structures for protection-in-place include:
 - Age of the building
 - Prevailing wind direction
 - Building height



Evacuation

- Evacuation is the controlled relocation of people.
- Used at both fixed facility incidents and those involving the general public
- Evacuations can be defined in terms of limited-scale and full-scale evacuations.



Limited-Scale Evacuations

- Limited-scale evacuations
 - Implemented when the incident affects one or two buildings in the vicinity of the incident
 - Majority of the evacuations required at hazmat incidents affect a small number of people
 - A limited-scale evacuation may be the best option for the IC.

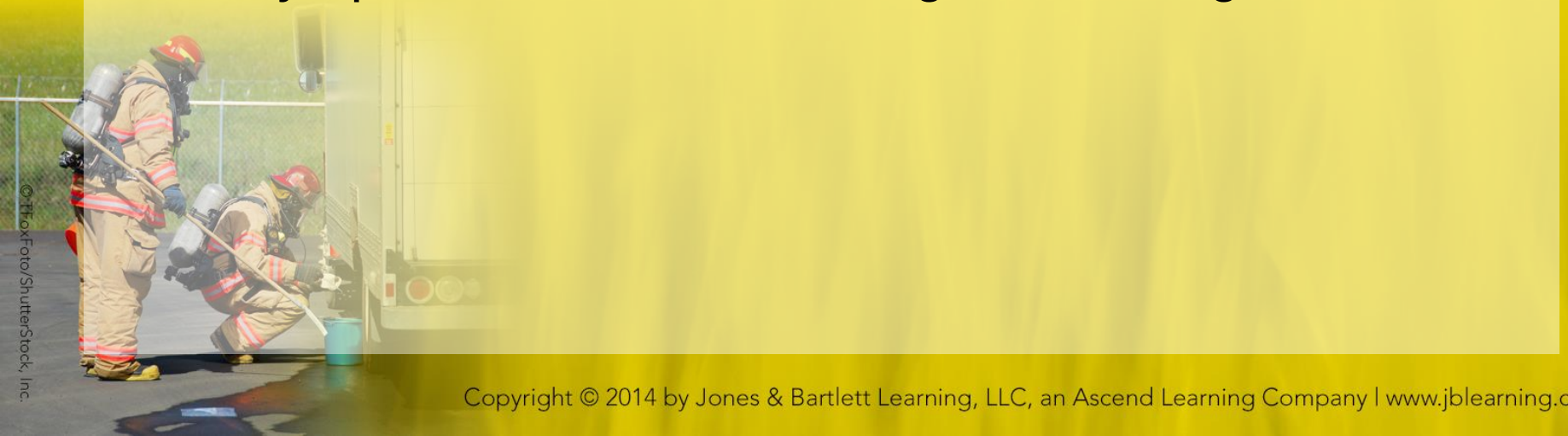
Sick Building Syndrome (1 of 2)

- Occurs when occupants of a building experience acute health effects that seem to be linked to time spent in a building
- May be localized or widespread



Sick Building Syndrome (2 of 2)

- Indicators of a sick building may include:
 - There are none of the usual indicators that there is a hazardous materials release inside the building.
 - The structure is a “tight building.”
 - Most of the complainants report relief of their symptoms soon after leaving the building.



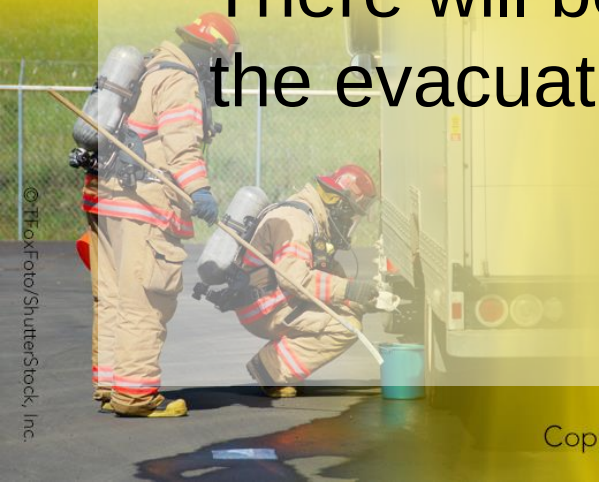
Evacuation of Fixed Industrial Facilities

- Industrial emergency response teams know exactly what types of hazardous materials are in their facilities.
- OSHA requires fixed facilities to have written evacuation procedures.
- Many facilities have developed a tiered approach to implementing PPAs.



Full-Scale Evacuations (1 of 3)

- Full-scale evacuations involve the relocation of large populations.
- Present two major problems:
 - Life safety
 - Expense
- There will be no shortage of critics the day after the evacuation.



Full-Scale Evacuations (2 of 3)

The March 11, 2011 9.0 earthquake and tsunami severely damaged nuclear power plants located in Fukushima, Japan.



© Kyodo/AP Photos

It is estimated that between 300,000 and 1 million people evacuated Manhattan Island on 9/11.



© Daniel Shanken/AP Photos



Full-Scale Evacuations (3 of 3)



60 tons of chlorine were released from this rail car, requiring an evacuation of 5,400 people within a 1-mile radius.

© Aiken County Sheriff's Dept/AP Photos

Alerting and Notification (1 of 4)

- Methods of notification will vary depending on:
 - The location of the emergency
 - The type of plan and hardware in place
 - The time of day



Alerting and Notification (2 of 4)

- Alerting methods include:
 - Door-to-door
 - Loudspeakers/public address systems
 - Tone-alert radios
 - Emergency Alerting System
 - Personalized Localized Alerting Network
 - Weather radios
 - Commercial television and radio



Alerting and Notification (3 of 4)

- Alerting methods include:
 - Smart phone applications
 - Social networking
 - Sirens and alarms
 - Aircraft
 - Electronic billboards
 - Computerized telephone notification systems
 - Low-power AM radio systems



Alerting and Notification (4 of 4)

Table 2 Average 24 Hour Population Location

Population Locations		
Location/ Activity	Hours Per Day	Percent of Time
Home	16.6	69.2
School or work	4.7	19.6
Commuting	1.2	5.0
Outdoors	1.5	6.2



Alerting Systems in Fixed Facilities (1 of 2)

- Normally occurs by activation of sirens or by use of an on-site public address system
- Evacuation alarms should be unique and distinctly different from any other type of alarm.



Alerting Systems in Fixed Facilities (2 of 2)

- Supervisors are usually responsible for coordinating all personnel accountability activities.



Transportation (1 of 2)

- In any major city, there will be a large number of people with critical transportation needs (CTN).
 - Cannot self-evacuate
 - Too young or old to drive
 - Medical issues or disabilities
 - Do not own an automobile
- Commercial motor coaches are the only practical and cost-effective way of moving large numbers of people with CTN.

Transportation (2 of 2)



People with critical transportation needs sometimes require assistance in loading and unloading a motor coach for large scale evacuations.

Courtesy of Steve Danzig



Special Emergency Extraction

- Special emergency extraction may be required to transport people from areas close to the hazardous materials release.
- Emergency escape packs, also known as emergency breathing apparatus (EBA), may be used to evacuate those within the hazard zone.

Relocation Facilities

(1 of 2)

- Relocation facilities, or shelters, are used to temporarily house evacuees.
- Typically located at:
 - Schools
 - Sports complexes
 - Other similar structures with large, open floor areas



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Relocation Facilities

(2 of 2)



- Effective shelters elements include:
 - Safe building
 - Shelter manager
 - Shelter support staff

Information

- Failure to keep people informed often creates political and public affairs issues.
- Relocation facility shelter managers should receive regular situation briefings.
- The news media can be a powerful tool in confirming the initial evacuation was well handled and is still necessary for public safety.
- The IC and PIO should hold regularly scheduled joint press briefings.



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Summary (1 of 4)

- Site management is the first step in the Eight Step Process[©].
- Site management and control provide the foundation for the response.
- Safe approach and positioning by the initial emergency responders is critical to how the incident will be managed.

Summary (2 of 4)

- Staging procedures facilitate safety and accountability by allowing for the orderly, systematic, and deliberate deployment of responders.
- The isolation perimeter is the designated crowd control line surrounding the incident scene to maintain the safety and security of the spectators and the responders.

Summary (3 of 4)

- Hazard control zones are designated restricted areas within the isolation perimeter based upon their degree of hazard.
- Safe operating procedures should strictly control and limit the number of personnel working in the hot zone.

Summary (4 of 4)

- PPAs are the strategy used by the IC to protect the general population from the hazardous material by implementing either (1) protection-in-place, (2) evacuation, or (3) a combination of protection-in-place and evacuation.