

## Chapter 9 Decontamination

### Lesson Goal

After completing this lesson, the student shall be able to discuss decontamination. The student will learn the various methods and types of decontamination and will perform the types of decontamination.

### Objectives

Upon successful completion of this lesson, the student shall be able to:

1. Define decontamination. *[NFPA® 472, 5.3.4(1), 5.3.4(2)]*
2. Identify various decontamination methods. *[NFPA® 472, 5.3.4(3), 5.3.4(4)]*
3. Discuss general guidelines for decon operations.
4. Describe the different types of victims that may receive decontamination.
5. Describe emergency decontamination. *[NFPA® 472, 5.3.4(5), 5.3.4(6)]*
6. Perform emergency decontamination. *[NFPA® 472, 5.4.1(4); Skill Sheet 9-1]*
7. Describe technical decontamination. *[NFPA® 472, 6.2.3.1(3)(f), 6.4.3.2(1-6), 6.4.4.1(1-2)]*
8. Set up and implement a technical decontamination corridor and undergo decontamination. *[NFPA® 472, 6.2.4.1(4), 6.4.3.1, 6.4.4.2(1-2), 6.9.4.1.1(2); Skill Sheet 9-2]*
9. Perform technical decontamination on a non-ambulatory victim. *[NFPA® 472, 6.2.4.1(4); Skill Sheet 9-3]*
10. Discuss mass decontamination. *[NFPA® 472, 6.3.3.2(1), 6.3.3.2(2)(a-c), 6.3.3.2(3-5)]*
11. Perform mass decontamination. *[NFPA® 472, 6.3.4.2; Skill Sheet 9-4]*
12. Determine the effectiveness of decontamination operations. *[NFPA® 472, 6.3.5.1, 6.4.5.1]*
13. Explain how to implement decontamination. *[NFPA® 472, 6.3.6.1(1-4), 6.4.6.1(1-4), 6.9.4.1.1(2)]*

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**Section I: Introduction to Chapter 9***10 min.***I. INTRODUCTION TO CHAPTER 9****A. Lesson Goal**

- Chapter 9 lesson goals — After completing this lesson, the student shall be able to discuss decontamination. The student will learn the various methods and types of decontamination. Students will perform the types of decontamination.

**B. Objectives**

- Define decontamination.
- Identify various decontamination methods.
- Discuss the general guidelines for decon operations.
- Describe the different types of victims that may receive decontamination.
- Describe emergency decontamination.
- Perform emergency decontamination. [Skill Sheet 9-1]
- Describe technical decontamination.
- Set up and implement a technical decontamination corridor and undergo decontamination. [Skill Sheet 9-2]
- Perform technical decontamination on a non-ambulatory victim. [Skill Sheet 9-3]
- Discuss mass decontamination.
- Perform mass decontamination. [Skill Sheet 9-4]
- Determine the effectiveness of decontamination operations.
- Explain how to implement decontamination.

**p. 434-435****Objective 1 — Define decontamination.****A. Decontamination**

- Process of removing hazardous materials to prevent the spread of contaminants beyond a specific area and reduce contamination to levels that are no longer harmful
- Essential activity that must be considered at any hazardous materials or terrorism incident to ensure the safety of emergency responders and the public
- Basic principles of any decontamination operation

- a. Get it off
  - b. Keep it off
  - c. Contain it
4. Before initiating decontamination, one must answer the following questions:
- a. Do victims need to be decontaminated immediately or can they wait?
  - b. Is it safe to conduct decon?
  - c. What alternative decon methods are available?
  - d. Are there adequate resources to conduct the operation? If not, can additional resources be obtained in a timely fashion?
  - e. What is the time limit available to conclude decon before the victims further deteriorate?
  - f. Is the equipment you are attempting to decontaminate going to be useable again and/or is it more cost effective to simply dispose of?
  - g. Does decon save money or add value?

**Review Question:** What is decontamination?  
*See pages 434-435 of the manual for answers.*

What questions should be answered before initiating decontamination?  
*See page 435 of the manual for answers.*

## Section II: Decontamination Methods

20 min.

### II. DECONTAMINATION METHODS

**Instructor Note:** The purpose of this section is to discuss decontamination methods.

pp. 435-437

#### Objective 2 — Identify various decontamination methods.

**Instructor Note:** Decontamination methods can be divided into the four broad categories: Wet or dry methods and physical or chemical methods.

#### A. Wet Decontamination

1. Involves washing contaminated surface or flushing with a hose stream or safety shower
2. May necessitate collection of runoff water
3. May require that collected water be analyzed for treatment and disposal
4. Requires that runoff water and residue be properly disposed of
5. Must include notification of proper authorities
6. May be difficult to use due to environmental or weather conditions

#### B. Dry Decontamination

1. May include removing contaminated clothing and putting it into suitable container or allowing contaminant to evaporate

2. Other methods
  - a. Vacuuming
  - b. Brushing a surface
  - c. Scraping material off
  - d. Using sticky tape to clean or wipe off contamination
3. Has advantage of not creating large amounts of runoff
4. May be accomplished through the systematic removal of disposable PPE while avoiding contact with any contaminants
5. Can be used during cold weather operations when wet methods are difficult to use
6. Can also use dry materials to remove liquid chemicals by absorption
  - a. Clay
  - b. Sawdust
  - c. Flour
  - d. Dirt
  - e. Fuller's earth
  - f. Tissue paper
  - g. Charcoal
  - h. Silica gel
  - i. Paper towels
  - j. Sponges

**C. Physical Decontamination**

1. Removes contaminant without changing the material chemically
2. Contains contaminant for disposal
3. Examples
  - a. Absorption
  - b. Adsorption
  - c. Brushing and scraping
  - d. Dilution
  - e. Evaporation
  - f. Isolation and disposal
  - g. Washing and vacuuming

**D. Chemical Decontamination**

1. Makes the contaminant less harmful by changing it through some kind of chemical process
2. Example
  - a. Bleach to sanitize tools
  - b. Degradation
  - c. Sanitization

- d. Disinfection
- e. Sterilization
- f. Neutralization
- g. Solidification

**Review Question:** What are the different methods of decontamination?  
*See pages 435-437 of the manual for answers.*

### **Section III:** General Guidelines for Decon Operations

*15 min.*

#### **III. GENERAL GUIDELINES FOR DECON OPERATIONS**

**pp. 437-440**

**Objective 3 — Discuss general guidelines for decon operations.**

##### **A. General Guidelines for Decon Operations**

1. Ensure technical decon setup is operational before entry personnel enter the hot zone
2. Begin emergency/mass decon operations quickly; the speed necessary will be determined by the material and type of incident involved
3. Always wear appropriate PPE
4. Avoid contacting hazardous materials, including contaminated victims
5. Decon operations may be coupled with an initial separation of victims into ambulatory/non-ambulatory and male/female

6. Assess all victims believed to have been in the hot zone to determine the need for decontamination before moving them to the cold zone
7. Establish clearly designated decon entry points so that victims and responders both know where to go
8. When conducting decon of victims, the more clothing removed the better; unless a victim is soaked in something that would have penetrated outer clothing and into their underwear, there is no real need to have people disrobe completely
9. Decontaminate all emergency response personnel who have been in the hot zone before moving to the cold zone
10. Decon emergency responders separately from victims
11. Establish a medical triage and treatment area just outside the decon zone so that persons exiting the decon area can be evaluated for injuries and exposure related medical symptoms
12. Communicate with victims by using hand signals, signs with pictures, apparatus public address systems, megaphones or other methods to direct them to decon gathering areas as well as through the decon process itself; it is very important to provide clear and easily understood directions since people may be traumatized and/or suffering from exposures
13. Provide privacy whenever possible
14. Provide warm water for washing, if possible
15. Preserve and record belongings of victims decontaminated for future identification of victims and forensic examination
16. Provide the victims and responders with clean/alternative clothing to maintain their privacy and protect them from the weather

**Section IV: Recipients of Decontamination Operations***15 min.***IV. RECIPIENTS OF DECONTAMINATION OPERATIONS****pp. 440-443****Objective 4 — Describe the different types of victims that may receive decontamination.****A. Triage**

1. Procedures should be predetermined within the local emergency response plan
2. Conducted in the cold zone after decontamination
3. May be conducted in the hot zone prior to decon
4. START (Simple Triage and Rapid Treatment/Transport) may be used for nonambulatory patients

**B. Ambulatory**

1. Victims who are able to understand directions, talk, and walk unassisted
2. Should be directed to an area of safe refuge within the isolation perimeter
3. Factors that may influence the priority for ambulatory patients:
  - a. Victims with serious medical symptoms
  - b. Victims closest to the point of release
  - c. Victims reporting exposure to the hazardous material

- d. Victims with evidence of contamination on their clothing or skin
- e. Victims with conventional injuries

**C. Nonambulatory**

- 1. Victims or responders who are unconscious, unresponsive, or unable to move unassisted
- 2. May be more seriously injured than ambulatory patients
- 3. May have to remain in place if sufficient personnel are not available to remove them from the hot zone

**D. Deceased**

- 1. Delayed removal until all viable victims have been removed
- 2. May create ethical issues when removing
- 3. Must be handled with utmost level of respect and dignity
- 4. Must include decon operations prior to the transfer to the medical examiner
- 5. Should remain untouched
- 6. Personnel should be mindful of the need to preserve the incident scene
- 7. Operations should be conducted with minimal disturbance and in consultation with those tasked with forensic evidence collection
- 8. Law enforcement agency having jurisdiction will make a determination as to how victim remains will be managed
- 9. Handling large numbers of deceased victims may be beyond the capabilities of local emergency response personnel
- 10. May require specialty response teams
- 11. May include establishment of an on-scene morgue facility if the incident involves large numbers of deceased victims

**Review Question:** What are the general guidelines for decontamination operations?

*See pages 437-438 of the manual for answers.*

Describe the different types of recipients of decontamination.

*See page 440 of the manual for answers.*

**Section V: Emergency Decon**

*15 min.*

**V. EMERGENCY DECON**

**pp. 444-445**

**Objective 5 — Describe emergency decontamination.**

**A. Emergency Decontamination**

- 1. Goal - Remove threatening contaminant from victim as quickly as possible
- 2. No regard for environment or property protection
- 3. May be necessary for both victims and rescuers
- 4. If contaminated, individuals are stripped of their clothing and washed quickly
- 5. Victims that need medical attention cannot wait for formal decontamination corridor

6. Examples of instances where needed:
  - a. Failure of protective clothing
  - b. Accidental contamination of emergency responders
  - c. Heat illness or other injury suffered by emergency workers in the hot zone
  - d. Immediate medical attention is required
7. Limitations
  - a. Removal of all contaminants may not occur
  - b. May require more thorough decontamination later
  - c. Can harm the environment
8. If responders become contaminated before they realize what the situation is — Responders should:
  - a. Withdraw immediately
  - b. Remain isolated until someone with proper expertise and monitoring equipment ensures decontamination

**Ask Students:** What are the advantages and limitations of emergency decon?

Briefly discuss answers with students.

Advantages:

Fast to implement

Requires minimal equipment

Reduces contamination quickly

Does not require a formal contamination reduction corridor or decon process

Limitations:

Does not always totally decontaminate the victim

Can create contaminated runoff that can harm the environment and other exposures

**Review Question:** What is emergency decontamination? When might it be used?

*See page 444 of the manual for answers.*

## Section VI: Skill Sheet 9-1

30 min.

### VI. SKILL SHEET 9-1

#### Objective 6 — Perform emergency decontamination.

##### A. Skill Sheet 9-1

1. For this skill sheet, students will perform emergency decontamination.
2. This skill sheet can be found on p. 127 of the Student Workbook.
3. A skills evaluation checklist for this skill can be found within this curriculum. These step-by-step instructions include a checklist for the instructor to use when evaluating the student.



**B. Directions**

1. Specific instructions for completing this skill sheet are included in the skills evaluation checklist.

**C. Necessary equipment**

1. Two first responders in full protective clothing
2. A victim wearing personal protective clothing
3. A charged hoseline
4. A scrub brush

**Section VII: Technical Decon***30 min.***VII. TECHNICAL DECON****pp. 445-451****Objective 7 — Describe technical decontamination.****A. Technical Decontamination**

1. Uses chemical or physical methods to remove contaminants from PPE and equipment
2. May be used on victims in non-life-threatening situations
3. Must be performed under guidance of a haz mat technician, SOPs, or allied professional
4. Operations-Level responders will:
  - a. Protect themselves by dressing in appropriate PPE
  - b. Establish a water supply
  - c. Set up the decon corridor
  - d. Establish perimeters
  - e. Perform physical decontamination activities
  - f. Assist in the undressing/removal of PPE or clothing of individuals going through the decon line
  - g. Assist individuals going through the decon process
  - h. Perform other duties per SOPs and training
5. Usually conducted within formal decon line or corridor
6. Type and scope determined by contaminants involved
7. Resources for determining procedures
  - a. NIOSH pocket guide
  - b. Safety data sheets (SDSs)
  - c. Emergency response centers
  - d. Pre-incident plans
  - e. Technical experts
  - f. *ERG*
  - g. Other books, reference sources, computer programs, data bases
  - h. Poison Control Centers

## **B. Technical Decontamination Techniques**

1. Absorption
  - a. Picking up liquid contaminants with absorbents
  - b. Examples
    - i. Diatomaceous earth
    - ii. Baking powder
    - iii. Ashes
    - iv. Activated carbon
    - v. Vermiculite
    - vi. Soil
2. Adsorption
  - a. Hazardous liquid interacts with the surface of a sorbent material
  - b. Adsorbent used must be compatible with the hazardous material in order to avoid potentially dangerous reactions
3. Brushing and scraping
  - a. Removing large particles of contaminant or contaminated materials
  - b. Alone is not sufficient decontamination
4. Chemical degradation
  - a. Using another material to change the chemical structure of a hazardous material
  - b. Several materials are commonly used to chemically degrade a hazardous material, typically not used on living tissue:
    - i. Household bleach
    - ii. Isopropyl alcohol
    - iii. Hydrated lime
    - iv. Household drain cleaner
    - v. Baking soda
    - vi. Liquid detergents
5. Dilution
  - a. Using water to flush contaminants from contaminated victims or objects and diluting water-soluble hazardous materials to safe levels
  - b. An advantage because of the accessibility, speed, and economy of using water
6. Evaporation
  - a. Some hazardous materials evaporate quickly and completely
  - b. Not generally a technique used during emergency operations
7. Isolation and disposal
  - a. Isolates the contaminated items
  - b. Equipment that cannot be decontaminated properly must be disposed of correctly
8. Neutralization

- a. Changing the pH of a corrosive, raising or lowering it towards 7 (neutral) on the pH scale
  - b. Should not be performed on living tissue
- 9. Sanitization, disinfection, or sterilization
  - a. Sanitization — Reduces the number of microorganisms to a safe level
  - b. Disinfection — Kills most of the microorganisms present
  - c. Sterilization — Kills all microorganisms present
- 10. Solidification - Takes a hazardous liquid and treats it chemically so that it turns into a solid

**11. Vacuuming**

- a. Using high efficiency particulate air (HEPA) filter vacuum cleaners to vacuum solid materials
- b. Regular vacuums are not used for this purpose because their filters are not fine enough to catch all of the material

**12. Washing**

- a. Involves using prepared solutions
- b. An advantageous method of decontamination because of the accessibility, speed, and economy of using water and soap

**Review Question:** What techniques might be used for technical decontamination?

*See pages 446-451 of the manual for answers.*

**C. Technical Decontamination Corridors**

1. Know what to do when assigned to decontamination corridor or line
2. Should be briefed before assigned
3. May vary in number of stations, depending on needs
4. May use wet or dry methods
5. Monitoring should be conducted to determine effectiveness

**Section VIII: Skill Sheets 9-2 – 9-3***60 min.***VIII. SKILL SHEETS 9-2 – 9-3**

**Objective 8 — Set up and implement a technical decontamination corridor and undergo decontamination.**

**A. Skill Sheet 9-2**

1. For this skill sheet, students will set up and implement a technical decontamination corridor and undergo decontamination.
2. This skill sheet can be found on p. 128-129 of the Student Workbook.
3. A skills evaluation checklist for this skill can be found within this curriculum. These step-by-step instructions include a checklist for the instructor to use when evaluating the student.

**B. Directions**

1. Specific instructions for completing this skill sheet are included in the skills evaluation checklist.

**C. Necessary equipment**

1. Tarps, salvage covers, or plastic sheeting
2. Traffic cones, other means of marking corridor entrance
3. Catch bins or wading pools
4. Buckets, drums, or plastic containers for each drop station
5. Brushes

6. Large, heavy-duty trash bags
7. Portable sprayers
8. Pumps
9. Scrubbing utensils
10. Soap
11. Hoses/water supply, hoseline attachments
12. Appropriate monitoring/detection devices
13. Tents
14. Portable showers
15. Bags and tags for personal property or evidence

**Objective 9 — Perform technical decontamination on a non-ambulatory victim.**

**A. Skill Sheet 9-3**

1. For this skill sheet, students will perform technical decontamination on a non-ambulatory victim.
2. This skill sheet can be found on p. 130-131 of the Student Workbook.
3. A skills evaluation checklist for this skill can be found within this curriculum. These step-by-step instructions include a checklist for the instructor to use when evaluating the student.

**B. Directions**

1. Specific instructions for completing this skill sheet are included in the skills evaluation checklist.

**C. Necessary equipment**

1. Tarps, salvage covers, or plastic sheeting
2. Traffic cones, other means of marking corridor entrance
3. Catch bins or wading pools
4. Buckets, drums, or plastic containers for each drop station
5. Brushes
6. Large, heavy-duty trash bags
7. Portable sprayers
8. Pumps
9. Scrubbing utensils
10. Soap
11. Hoses/water supply, hoseline attachments
12. Appropriate monitoring/detection devices
13. Tents
14. Portable showers
15. Bags and tags for personal property or evidence
16. Carts or skids

## 17. Backboard/Stokes basket

**Section IX: Mass Decon***20 min.***IX. MASS DECON****pp. 451-457****Objective 10 — Discuss mass decontamination.****A. Mass Decontamination**

1. Physical process of rapidly reducing or removing contaminants from multiple persons in potentially life-threatening situations
2. Initiated when the number of victims and time do not allow establishment of in-depth decontamination process
3. Should be planned for by all agencies
4. Must be performed under guidance of haz mat technician, SOPs, or an allied professional
5. To combat chaos of incident, responders should:
  - a. Communicate with victims by using hand signals, signs with pictures, apparatus public address systems, megaphones or other methods to direct them to decon gathering areas as well as through the decon process itself
  - b. Provide clear, easily understood, short, specific directions since people may be traumatized and/or suffering from exposures
  - c. Use barrier tape, traffic cones, or other highly visible means to mark decon corridors
6. Methods
  - a. Dilution
  - b. Isolation
  - c. Washing
7. Most readily and effectively accomplished with a simple water shower system that merely dilutes the hazardous product and physically washes it away
  - a. Uses large volumes of low-pressure water to quickly reduce the level of contamination
  - b. Should use a high volume, low pressure of water delivered in a fog pattern
  - c. Time varies; may be as long as 2-3 minutes per individual
  - d. In large numbers, time can be shortened
8. Consider existing facilities as means for rapid decon methods
  - a. Overhead fire sprinklers
  - b. Wading in public water sources such as fountains
9. Clothing removal is recommended

**WARNING:** Never delay decon while waiting for additional resources to arrive unless an assessment has been made that further injury or exposure will not occur.

- a. Remove as much clothing as possible
  - b. Clothing should be placed in isolated drums or other container for disposal
10. Innovations and products
- a. Trailers and portable tents
  - b. Portable water heaters
  - c. Disposable coveralls
  - d. Tagging and bagging systems
11. To determine victim priority, consider factors related both to medical needs and decontamination
- a. Groups
    - i. Ambulatory
    - ii. Nonambulatory
  - b. May require separate decon areas for each group to avoid slowing down the progression
  - c. Large number of incapacitated victims may require additional resources
12. A separate decon line for emergency response personnel should be provided
13. If time allows, separate victims by gender for privacy reasons

**Ask Students:** What are the advantages and limitations of mass decon?

Briefly discuss answers with students.

Advantages:

Accommodate large numbers of people

Can be implemented quickly using limited amount of personnel and equipment

Reduces contamination quickly

Limitations:

Does not always totally decontaminate the victim

Relies on the cooperation of the victim

Can create contaminated runoff that can harm the environment and other exposures

## Section X: Skill Sheet 9-4

30 min.

### X. SKILL SHEET 9-4

#### Objective 11 — Perform mass decontamination.

##### A. Skill Sheet 9-4

- 1. For this skill sheet, students will perform mass decontamination.
- 2. This skill sheet can be found on p. 132 of the Student Workbook.

3. A skills evaluation checklist for this skill can be found within this curriculum. These step-by-step instructions include a checklist for the instructor to use when evaluating the student.

**B. Directions**

1. Specific instructions for completing this skill sheet are included in the skills evaluation checklist.

**C. Necessary equipment**

1. Firefighter outfitted in proper PPE
2. Fire apparatus
3. A charged hoseline with fog pattern nozzle
4. A scrub brush
5. A secure container with lid

**Section XI: Evaluating Effectiveness of Decon Operations**

*15 min.*

**XI. EVALUATING EFFECTIVENESS OF DECON OPERATIONS**

**pp. 457-458**

**Objective 12 — Determine the effectiveness of decontamination operations.**

**A. Effectiveness of Decon Operations**

1. Must be evaluated
2. May be done through use of monitoring and detection devices or other equipment as well as visually
3. If large numbers of people are involved, individuals should be briefly checked after they have gone through the decon process, otherwise check each individual more carefully
4. Should be done as they exit the decon corridor
5. If contamination is detected, individuals must be redirected through the decon process
6. Victims still complaining of symptoms or effects should be checked for contaminants

**Ask Students:** What should be done if the effectiveness of decon is called into question?

Briefly discuss answers with students. Victims should go through decon again prior to transport.

7. Tools and equipment
  - a. Will normally need to be stored in the decon area until the emergency phase of the operation is completed
  - b. Will need to be checked to ensure all contamination has been removed
  - c. Should include apparatus
  - d. Will include same monitoring and detection equipment as used on victims



**Section XII: Decon Implementation***45 min.***XII. DECON IMPLEMENTATION****pp. 458-464****Objective 13 — Explain how to implement decontamination.****A. Decon Implementation Must Include:**

1. Appropriate site
2. Number of stations and setup of the decon corridor or line
3. Method for collecting evidence
4. Appropriate termination procedures

**Review Question:** What factors should be considered when choosing a decontamination site?

*See pages 458-460 of manual for the answer.*

**B. Site Selection Factors**

1. Wind direction
  - a. Site needs to be upwind of the hot zone to help prevent the spread of airborne contaminants into clean areas
  - b. Local weather service can provide assistance in predicting changes in the wind direction and weather
2. Weather
  - a. During cold weather, the site should be protected from blowing winds, especially near the end of the corridor
  - b. Victims should be shielded from cold winds when they are removing protective clothing
3. Accessibility
  - a. Must be away from the hazards, but adjacent to the hot zone so that people exiting the hot zone can step directly into the decontamination corridor
  - b. Time considerations — The less time it takes personnel to get to and from the hot zone, the longer personnel can work
4. Terrain and surface material
  - a. Site ideally is flat or slopes toward the hot zone
  - b. Diking around the site prevents accidental contamination escaping
  - c. It is best if the site has a hard, nonporous surface to prevent ground contamination
  - d. When a hard-surfaced driveway, parking lot, or street is not accessible, some type of impervious covering may be used to cover the ground
  - e. Salvage covers or plastic sheeting will prevent contaminated water from soaking into the earth
  - f. Covers or sheeting should be used to form the technical decontamination corridor regardless of whether the surface is porous
5. Lighting/electricity

- a. Help reduce the potential for injury to personnel in the area
  - b. Site will ideally have a ready source of electricity for portable lighting
- 6. Drains and waterways
  - a. Site should not be near storm and sewer drains, creeks, ponds, ditches, and other waterways
  - b. Protect all environmentally sensitive areas
- 7. Water supply — Water must be available at the decontamination site if wet decon is used

**C. Decon Corridor Layout**

1. Established before performing any work in hot zone
2. Types vary as to the numbers of sections or steps used in the decontamination process
3. Can be straightforward or complex
4. Factors to consider
  - a. Ensure privacy
    - i. Decon tents or decon trailers allow more privacy for individuals going through the decon corridor
    - ii. Use female responders to assist whenever possible when decontaminating women
  - b. Bag and tag contaminated clothing/effects
    - i. Place clothing and/or personal items in bags and label the bags with the person's name
    - ii. Items may need to be decontaminated before being returned
    - iii. All bags that contain contaminated clothing should remain in the warm zone on the dirty side of the decon line

**Ask Students:** How can you ensure privacy at a decon corridor?

Briefly discuss answers with students then refer to the bulleted listed paragraph over decon corridor layout. Decon tents or decon trailers allow more privacy.

5. Identified with barrier tape, safety cones, or other items that are visually recognizable
6. May require:
  - a. Containment basins constructed of salvage covers and fire hose or ladders
  - b. Wading pools or portable drafting tanks used as containment basins
7. Recovery drums or other types of containers and plastic bags for stowing contaminated tools and PPE

**D. Other Implementation Considerations**

1. Decon operations on law enforcement and military personnel:
  - a. Can create a challenge at a terrorist incident
  - b. Personnel may be carrying weapons and will not release them to civilians during decon
  - c. May require haz mat trained law enforcement officer for decontaminating weapons
  - d. May require haz mat recovery bin for personnel to place weapons
2. Decontaminating animals
3. Criminal suspects

**E. Cold Weather Decon**

1. Wet decon in freezing weather can be difficult to execute

2. Individuals with pre-existing conditions can suffer cold shock if pre-warmed water is not available
3. Considerations if temperature is 64°F (18°C) degrees or lower:
  - a. Are wet methods necessary, or can disrobing and dry methods accomplish effective decon?
  - b. Is wind chill a factor?
  - c. Is shelter available for victims during and after decon?
  - d. Is it possible to conduct decon indoors (sprinkler systems, indoor swimming pools, locker room showers, etc.)?
  - e. If decon will be conducted indoors (at preplanned facilities, for example), how will victims be transported?
  - f. If decon must be conducted outside in freezing temperatures, how will icy conditions be managed (ie. sand, sawdust, kitty litter, salt)?

**WARNING:** Individuals who have been exposed to deadly levels of chemical agents should undergo emergency decon immediately, regardless of ambient temperatures.

4. Dry clothing and warm shelter should be provided as soon as possible after showering

**Review Question:** How does cold weather decontamination differ from normal weather decon?  
*See pages 462-463 of the manual for answers.*

## **F. Evidence Collection and Decontamination**

1. Performed under direction of law enforcement
2. Decontamination issues will also be determined in conjunction with law enforcement
3. Evidence collected on the scene by law enforcement personnel must be appropriately packaged
4. Only the exterior of the packaging will be decontaminated as it passes from the hot zone to the cold zone

## **G. Termination**

1. Debriefing held for those involved in the incident
2. May include return of personal items
3. Should provide exposed persons with as much information as possible about the delayed health effects of the hazardous materials involved in the incident
4. May require additional reports and supporting technical documentation
5. May include exposure records — Information might include:
  - a. Activities performed
  - b. Product involved
  - c. Reason for being there
  - d. Equipment failures or malfunction of PPE
  - e. Hazards associated with the product

- f. Symptoms experienced
- g. Monitoring levels in use
- h. Circumstances of exposure
- i. Other pertinent information

**Ask Students:** Who needs copies of exposure records for future reference?

Briefly discuss answers with students. The individual, their personal physician, and their employer need to keep copies of these exposure records for future reference.

- 6. Activity log
  - a. Must be maintained during the incident or put together afterwards
  - b. Must document the chronology of the events and activities that occurred during the incident and decon procedure

### Section XIII: Summary and Review

10 min.

#### XIII. SUMMARY AND REVIEW

##### A. Chapter Summary

- 1. Contamination is a concern at hazardous materials incidents.
- 2. Exposure can occur and cause harm.
- 3. Decontamination is conducted to prevent the spread of contaminants.

##### B. Review Questions

- 1. What is decontamination? (434-435)
- 2. What questions should be answered before initiating decontamination? (435)
- 3. What are the different methods of decontamination? (435-437)
- 4. What are the general guidelines for decontamination operations? (437-438)
- 5. Describe the different types of recipients of decontamination. (440)
- 6. What is emergency decontamination? When might it be used? (444)
- 7. What techniques might be used for technical decontamination? (446-451)
- 8. What are the advantages and disadvantages of mass decontamination? (457)
- 9. What factors should be considered when choosing a decontamination site? (458-460)
- 10. How does cold weather decontamination differ from normal decontamination? (462-463)