

EV 09 – Critical Incidents  
 Session 27 – LERA/Decontamination  
 LD43 – Emergency Management

**Date Revised:** 12/09/19

**Event Goal:** To teach recruit officers how to respond to a critical incident.

**Session Goal:** This hands-on training module provides the law enforcement responder with the knowledge and skills to decontaminate victims after a CBRNE incident. The module examines various types of procedures for decontamination. It also provides the law enforcement responder with the knowledge and skills needed to construct a decontamination corridor and operate it safely. Survey and monitoring equipment will also be discussed during this module.

**Learning Objectives:**

- Know the purpose of decontamination
- Identify routes of exposure and the assessment of WMD exposure **[43.V.B]**
- Identify response strategies and decontamination issues **[43.V.K]**
- Identify the basic on-scene actions at a WMD incident **[43.V.M]**
- Identify the effects of toxic industrial chemicals/materials **[43.V.H]**
- Identify law enforcement First Responder roles and responsibilities associated with responding to a critical incident **[43.VI.A]**

**Session Time:** 1.5 Hours

<p><b>Resources:</b></p> <ul style="list-style-type: none"> <li>• Power Point</li> <li>• Audio/video device</li> <li>• Classroom with tables</li> </ul>	
<ul style="list-style-type: none"> <li>• <b>Session Summary:</b> The student will be able to perform decontamination procedures for ambulatory and nonambulatory victims and emergency responders.</li> </ul>	
Outline	Instructor Notes
<p>I. Decontamination <b>[43.V.M,O,K]</b> <b>[1]</b></p> <p style="padding-left: 20px;">A. Purpose of Decontamination – The three most important reasons for decontaminating exposed victims are to:</p> <ol style="list-style-type: none"> <li>1. Remove the agent from the victim’s skin and clothing</li> <li>2. Protect responders from secondary transfer exposures</li> <li>3. Provide victims with psychological comfort</li> </ol> <p style="padding-left: 20px;">B. Decontamination Corridor – Law enforcement responders who respond to CBRNE incident must be prepared to conduct emergency decontamination and to set up a decontamination corridor. Responders must select and secure a large area that is upwind,</p>	<p>Facilitated discussion (1.5 hours)</p> <p><b>[1] ASK</b> – What is the purpose of decontamination?</p> <ul style="list-style-type: none"> <li>• Answer – Remove contaminant, protect from secondary exposure, and psychological comfort.</li> </ul> <p><b>[LD43]</b> – response strategies and decontamination issues, basic on-scene actions at a WMD incident, types and levels of Personal Protective Equipment (PPE) and decontamination considerations.</p>

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uphill, upstream of the hot zone. This area will be the warm zone and contain the decontamination corridor. The area must be able to provide adequate protection for the decontamination of large numbers of victims, as well as facilities for the technical decontamination of responders and their equipment. Speed is the essential factor in the setup of an emergency operation. The sooner responders begin and complete decontamination, the better-again, time is the critical element **[LD26]**

1. Warm Zone **[43.V.K,O]**-Transitional – The warm zone is the transitional area between the hot zone and the cold zone; it is also known as the contamination reduction zone. This zone contains the decontamination area and the access control points, through which personnel and equipment enter and exit. This zone is less hazardous than the hot zone but is still contaminated; therefore, personnel may wear PPE Levels A, B or C. Setting up the warm zone for the contamination corridor will be dependent on the following **[LD41]**:
  - a. Physical and topographical condition of the site
  - b. Ease of access to the hot and cold zones
  - c. Weather conditions and wind direction
  - d. Field measurements of contaminants
  - e. Air-dispersion models of the chemical(s) involved
  - f. Physical, chemical, toxicological, and other characteristics of the chemical(s) present
  - g. Cleanup/runoff activities (done only after care for victims is completed; human life is the priority)
  - h. Potential for fire or explosion
  - i. Adequate roads, power sources, and water

**[LD26]** – Establishing a perimeter/protecting the incident location

**[LD43]** – Response strategies and decontamination issues, types and levels of PPE and decontamination considerations

**[LD41]** – Types of control zones at a hazardous materials incident

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<p>2. Modesty Issues – Innovative coverings (Tyvek, Hospital gowns, large black trash bags, etc.). Shield from prying eyes (Media, Photographers)</p> <p>3. Preservation of Property – Use a large trash bag over a gloved hand to gather and pick up clothing. As in triage, be sure to properly tag and bag all valuables for identification. To prepackage emergency modesty cover/belongings kits, include the following:</p> <ul style="list-style-type: none"><li>a. 35-gallon, 0.04 ml thick polyurethane bag</li><li>b. Large zippered plastic bag for personal effects</li><li>c. Disposable Tyvek suits for temporary clothing</li><li>d. Information card indicating what was collected from the victim, their names and addresses</li><li>e. Valuables should go through decontamination and then be returned to the rightful owners. Local protocols will establish chain of custody</li></ul> <p>C. Types of Decontamination – There are four different types of decontamination discussed in this section; mass, emergency, technical, secondary <b>[43.V.K]</b></p> <p>1. Mass Decontamination – Mass Decontamination is the physical process of reducing or removing surface contaminants from large numbers of victims in potentially life-threatening situations in the fastest time possible. The mass decontamination procedure must be performed as quickly as possible. The Occupational Safety and Health Administration (OSHA) recommend low-pressure, high volume water system as the default standard for mass decontamination. The use of proper surveying and monitoring equipment may identify people requiring further</p>	<p><b>[LD43]</b> – Response strategies and decontamination issues</p>
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decontamination. For large numbers of contaminated victims, responders can use hose lines and master streams. One of the most effective methods for providing mass decontamination is the use of elevated master stems, using fog nozzles with low pressure to shower the victims with water.

2. Emergency Decontamination – Emergency Decontamination is the physical process of immediately reducing contamination of individuals in potentially life-threatening situations with or without the formal establishment of a decontamination corridor. As with mass decontamination, emergency decontamination commonly refers to procedures taken for the rapid reduction of agent from the victim.
3. Technical Decontamination – Technical Decontamination is the planned and systematic process of reducing contamination to a level that is As Low as Reasonably Achievable (ALARA). Technical decontamination should be conducted in a location separated visually from victim decontamination, for psychological reasons. Responders should be carefully and thoroughly cleaned. Speed is not the goal of technical decontamination. Technical decontamination concentrates more on completely removing the agent from the PPE. The incident commander or decontamination officer will establish the distances between stations based on:
  - a. Weather conditions (wind, rain, etc.)
  - b. Number of responders
  - c. Space available
  - d. Type of agent
  - e. Time constraints
  - f. Terrain
4. Secondary Decontamination – Secondary Decontamination is performed following

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mass decontamination, and after a victim has been removed from the hot zone. It is performed on an as needed basis. Secondary decontamination may be limited to one area of the body; it will be, however, more thoroughly than the mass decontamination.

5. Ambulatory Victims
    - a. Walk and assist in decontamination
    - b. Have minor injuries and minimum exposure
    - c. Processed by triage status
  6. Nonambulatory Victim – Decontamination requires more time, since the nonambulatory victim cannot assist in the process. Special considerations must be given when decontaminating a nonambulatory victim. Responders should:
    - a. Wear appropriate PPE
    - b. Limit the number of responders in contact with the victim
    - c. Keep clothing away from the victim's face during removal to prevent victim from inhaling or ingesting contaminants
    - d. Remove clothing from head to toe. Front to back, while keeping clothing away from the victim's face
    - e. Any bandages or medical apparatus must be removed from the victim for decontamination and, if practical, reapplied in the treatment area after decontamination is complete
- D. Types of Decontaminants
1. Commercial, Natural, and Military
    - a. Commercial – Available stockpiles of these decontaminants may be quickly expended and not readily replaceable. Therefore, it is important that responders understand other decontaminants, their sources, and their uses.

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- b. Natural – Available naturally occurring decontaminants such as weather (temperature, wind rain, and humidity).
    - 1) Temperature – The higher the temperature, the faster the rate of decontamination.
    - 2) Wind – Aeration aids in decontamination; agents are dispersed by the wind, thus reducing the concentration.
    - 3) Humidity and rain – Moisture tends to slowly break down chemical agents. Heavy rain physically removes contaminants, but contaminated runoff may collect in drainage areas. Biological agents dehydrate in low humidity. Rain may prevent the absorption of aerosols and leach contamination into the soil.
    - 4) Sunlight/ultraviolet light
  - c. Military – Available military decontaminants (such as the M291, M258, or M295 Personal Decontamination Kits, Supertropical Bleach [STB], Decontamination Solution 2 [DS2]).
- 2. Soap and Water – Soap and water is an inexpensive option for decontamination. Common problems with other form of personal decontamination are irritation of the skin, toxicity, ineffectiveness, and high cost. These problems are of little concern when considering soap and water for decontamination.
  - 3. Absorbents – Contamination transferred to the absorbent material must be treated as contaminated waste and disposed of accordingly. Since there is no preparation time for absorbent material application, implement the use of the material as soon as

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it arrives at the incident scene.

4. Nonaqueous Methods – Although nonaqueous (without water) methods provide a means for contaminant removal, they have advantages and limitations. If their use is expedient, the use of dry, gelled, or powdered decontaminating material for absorbing the chemical agent is appropriate. Commonly available absorbents include dirt, flour, Fuller’s earth, baking powder, saw dust, charcoal, ashes, activated carbon, alumina, silica gels, and clay materials. Although these absorbents may be expedient means of decontamination, their effectiveness has not been determined.
5. Sodium Hypochlorite (Household Bleach) – Sodium hypochlorite, often referred to as household bleach, continues as a decontaminant of choice for disinfecting tools, equipment, and structures; however, recently responders have discontinued the use of bleach for decontamination due to the skin irritation. This is attributed to corrosive properties that can burn the skin and cause eye damage, particularly in concentrated forms. Responders are strongly encouraged to abide by jurisdictional guidelines and consult with trained medical personnel to determine the appropriateness of employing bleach in decontamination operations.
6. Reactive Skin Decontamination Lotion (RSDL) – Reactive Skin Decontamination Lotion (RSDL) is a liquid Chemical Warfare Agent (CWA) decontaminant designed to destroy chemical agents on contact. Developed specifically to eradicate nerve and mustard agents in the military arena, RSDL is finding its way into America’s emergency responder community due to ease of operation and its practicality in a chemical event
7. Ultraviolet Light – The use of natural

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degradation and ultraviolet light requires neither responder preparation nor application time. Ultraviolet light kills most biological agents quickly, but not encapsulated spores, i.e., anthrax. The extremely slow process requires extensive exposure to sunlight.

8. E. Decontamination Corridor – Before responders learn how to set up a mass decontamination area, there are several factors to consider about the site and the equipment:
  - a. Agents to be decontaminated-was the agent used chemical, biological, or radiological?
  - b. Availability and/or existing resources-what decontaminants and facilities (pools, showers, etc.) are available?
  - c. Terrain – are responders located upwind uphill, upstream, and is the land stable to accommodate the lanes?
  - d. Animals – are animals contained until after the victims are decontaminated?
  - e. Visibility – is the one zone visible to the next and can all activity within the warm zone be observed?
  - f. Run-off of decontamination/waste management-can runoff containment measures be put into place without jeopardizing care for victims?
9. Guidelines to Construct a Mass Decontamination Corridor – Construct a decontamination corridor upwind and uphill from the incident site. Ingenuity and current technologies can be used to handle large numbers of contaminated casualties. Examples of these include mobile trailers designed for mass decontamination, portable showers, and collection or children’s wading pools. Hoses can be set up overhead (in corridors) to provide a fine



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spray for victims to walk through.

- E. Operations within Decontamination Corridor  
**[43.VI.A] [2]** – Process ambulatory victims through the corridor. Perform a nonambulatory cutout and decontamination of victim. Conduct technical decontamination. Process all victims and responders to the cold zone **[LD26]**
1. Ambulatory Victim Decontamination
    - a. Provide an area for victims to disrobe and an area to secure and identify materials and their personal property. During decontamination, have victims remove clothing down to their undergarments to increase the thoroughness of the decontamination process. Removal of clothing may remove 80-90% of the contamination.
    - b. Once victims have disrobed, they enter the shower area, where they are rinsed down with copious amounts of water. Victims should hold their arms and legs stretched out to enable full decontamination.
    - c. If available, the next stage in the decontamination corridor should be a soapy water wash area, followed by a warm, total-body rinse.
    - d. Once victims have been through the shower process, they need to be surveyed to ensure contaminants have been removed. If contamination persists, the soapy wash/warm rinse shower process needs to be repeated.
    - e. After the survey has been completed, victims without evidence of contamination need to be provided with a dressing area and suitable covering/garments.
    - f. Victims then need to be triaged for possible medical treatment and debriefed about the incident. They

**[LD43]** – Law enforcement First Responder roles and responsibilities associated with responding to a critical incident

**[2] ASK** –What are some considerations when doing decontamination?

- Answer – Victims ambulatory, non-ambulatory, space, modesty issues, triage area, etc.

**[LD26]** – Isolating the hazard, maintaining ingress and egress control.

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- should also be provided any information available about a follow-up treatment.
2. Nonambulatory Victim Decontamination – Responders must be able to perform cutout procedures efficiently to accommodate the numerous victims needing immediate decontamination and medical attention. Additionally, take precautions to prevent the spread of contamination to other responders, victims, and uncontaminated ground. When handling victims, consider these techniques to provide protection for them:
    - a. Use supports to hold stretchers and backboards off the ground (e.g., milk crates or sawhorses).
    - b. Keep clothing away from victim’s face during removal.
    - c. Remove/cut clothing from waist to face, then toes to waist.
    - d. When removing clothing from victims, do not cut through holes or tears; these may be of evidentiary value and prove useful during the investigation and prosecution.
  3. Site Set-up – establish a cutout area in the warm zone (within the boundaries of the decontamination corridor). Equipment required will include:
    - a. A rolled tarp (or other improvised solution) for control of runoff and contaminants of waste
    - b. Buckets containing decontaminant solution and extra buckets with rinse water
    - c. Shears to cut through the victim’s clothing and personal items; one shear in each bucket
    - d. Extrication devices are on hand or improvised to transport the victims
    - e. Large plastic bags and ties to contain

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<p>personal items</p> <ul style="list-style-type: none"><li>f. Water to rinse contamination from the victim</li><li>g. Triage tags</li></ul> <p>F. Chemical Survey and Monitoring – No single system will detect all hazardous materials or chemical agents. Responders must use several items, each serving a specific role during a response. There are many different types of systems, from very simple chemical-reactive papers (that work in seconds) to very sophisticated laboratory instruments (that can take from minutes to hours to give results); simple systems provide broad information while complex systems provide detailed information</p> <p><b>[LD41]</b></p> <ol style="list-style-type: none"><li>1. M8/C8 Paper – M8/C8 chemical agent detector paper provides the means to perform a quick identification of liquid nerve and blister agents; one booklet contains 25 perforated sheets. The paper changes to specific colors for the presence of G-series nerve agents, H-series blister agents, and V-series nerve agents. Color codes are located inside the front cover of the booklet.</li><li>2. Utilization of M8/C8 Paper<ol style="list-style-type: none"><li>a. Tear a sheet of the M8/C8 paper from the booklet (although the paper is perforated, ensure that an entire sheet is used).</li><li>b. Locate the liquid contamination, such as puddles and/or small or barely visible droplets, in a suspected area.</li><li>c. With a gloved hand, blot the M8/C8 detector paper on the suspected liquid agent without touching the liquid.</li><li>d. Observe the paper for a color change.</li><li>e. Identify the contaminant by comparing any color change on the paper to the color chart on the inside front cover on the booklet.</li></ol></li></ol>	<p><b>[LD41]</b> – Procedures to be followed before leaving the scene as a first responder</p>
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- f. Close the booklet and report the results.
  - g. Dispose of the sheet as a hazardous waste.
3. Chemical Agent Monitor (CAM) – The CAM is a portable, handheld instrument designed to indicate the presence of G-series nerve agent vapors or H-series blister agent vapors, identifying even the lowest hazard that could affect people over a short period.
4. Startup and Operating Procedures
- a. Ensure the nozzle protective cap assembly is in position on the CAM.
  - b. Press ON/OFF switch to ON and observe the display to ensure H-mode, markers, three vertical dots, BL, WAIT, and all eight bars are shown.
  - c. Display will clear from self-test after 30 seconds (H-mode, WAIT, and A and B markers remain). WAIT clears from display within two minutes.
  - d. Place a filtered nozzle standoff filter onto the nozzle as follows:
    - 1) Peel the back covering from the top of the filtered nozzle package until one filtered nozzle standoff is exposed.
    - 2) Quickly insert the CAM nozzle assembly into the exposed filtered nozzle standoff and remove. Do not touch the filter with your hands.
    - 3) Lay covering back in place across the top of the filtered nozzle package assembly.
    - 4) Ensure that the nozzle of the CAM is positioned one-half inch to one inch from source.
    - 5) To avoid saturation, ensure that the instrument is withdrawn from source proximity immediately upon receipt of alarm.

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