

## Chapter 10

# PATIENT DECONTAMINATION STATION: PLANNING, SETUP, AND OPERATION

*This chapter is adapted from: US Army, Marine Corps, Navy, Air Force. Multiservice Tactics, Techniques, and Procedures for Health Service Support in a Chemical, Biological, Radiological, and Nuclear Environment. Washington, DC: Department of Defense; 2009. FM 4-02.7.*

## Overview

Patient decontamination is a labor-intensive undertaking and requires augmentation personnel, additional or specialized equipment, and training for all personnel involved. Proactive planning will minimize the impact on the affected unit and help ensure that the overall medical mission is not impaired. With training, thorough planning, and aggressive execution, an effective patient decontamination procedure can be established.

The care of contaminated casualties, although more complicated than that of conventional casualties, must not stop the ongoing medical mission. Medical officers and noncommissioned officers (NCOs) must develop realistic, battle-focused plans. They must then refine and validate these plans in challenging training exercises to ensure the success of health service support on the future battlefield.

There are three levels of patient decontamination:

1. **Immediate decontamination.** Primarily performed to protect the individual. The contaminated person removes contamination from his or her individual protective ensemble (IPE), equipment, and skin as quickly as possible after exposure. Another individual (buddy) provides immediate decontamination for casualties who are unable to do it themselves.
2. **Patient operational decontamination.** Performed to protect operators of transport vehicles. Unit members remove as much contamination as possible from the casualty's IPE, equipment, and skin without removing the IPE. This is done to prepare the individual for transport on designated "dirty" (contaminated) evacuation assets to the next role of medical care.
3. **Patient thorough decontamination.** Operators of the patient decontamination station (PDS) perform this procedure to protect medical facility staff and equipment and to reduce patient contamination. It involves removal of contaminated IPE and a thorough decontamination of any contaminated skin before a patient enters a medical treatment facility (MTF).

**NOTE:** *It is possible that patients triaged as minimal or delayed never go through patient thorough decontamination at the battalion aid station or other far forward MTF. Instead, they may be treated in the dirty treatment area and returned to their unit. Other patients with more severe conditions, once stabilized, may have their IPE decontaminated but not removed. These casualties are then taken to the next role of care (dirty evacuation) without going inside the battalion aid station. At the larger MTF, they will undergo patient thorough decontamination before admission into the facility.*

Historically, the most difficult aspect of care for contaminated casualties has been the actual decontamination effort. The material presented in this chapter is derived from recently conducted tests, doctrinal procedures, and the practical experiences of medical NCOs and those trained in CBRN response. It will provide suggestions on how to successfully conduct contaminated casualty decontamination. Each role of medical care must have an operational PDS function.

## **Key Planning Elements**

The in-depth planning required for operating the decontamination site must include the anticipated casualty load, day or night operations, weather conditions, work and rest rates for personnel, logistical support for the site, and the acceptable impact on ongoing conventional medical operations. Key elements that must be considered in the planning process include:

- the unit's mission
- wind direction
- security of decontamination site
- access control to decontamination site
- number of casualties to be treated
- equipment sets and supplies
- personnel requirements
- work/rest cycle considerations
- establishing a patient decontamination station
- disestablishing a patient decontamination station
- litter casualty decontamination procedures
- ambulatory casualty decontamination procedures
- dirty evacuation assets

## **The Battlefield**

A picture of the battlefield subjected to a chemical or biological attack (where contaminated casualties originate) is required if planning is to anticipate, with some degree of accuracy, the appropriate level of preparation required for casualty decontamination and care. Chemical agents can be introduced into the environment as a solid, liquid, or gas (or aerosol), depending on the weapon system used. Biological agents can be introduced into the environment in wet or dry form. Examples are:

- aerosols,
- slurry mix (wet),
- large, thick drops,
- dry powder,
- spores, or
- vectors.

Regardless of which form a chemical or biological agent is in when introduced, these weapons will contaminate personnel, terrain, and equipment on the ground. However, it is not enough to know that contamination occurred; it is also necessary to discuss the extent of the contamination and how long it will last. The following section covers military CBRN attacks resulting from the offensive use of CBRN weapons.

### ***Chemical Contamination***

*This section is adapted from: US Army, Marine Corps, Navy, Air Force. Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Contamination Avoidance. Washington, DC: Department of Defense; 2006. FM 3-11.3. Specifically:*

- Appendix D, *Weather Effects on Nuclear, Biological, and Chemical Agents and Meteorological Reports*, covers the method for predicting the area affected by a chemical attack;
- Appendix E, *Chemical-Contamination Avoidance Tactics, Techniques, and Procedures* describes the prediction report (NBC3 CHEM);
- Appendix F, *Biological Contamination Avoidance Tactics, Techniques, and Procedures* covers predictions for biological attacks; and
- Appendix H, *Release-Other-Than-Attack Contamination Avoidance Tactics, Techniques, and Procedures* describes hazard prediction resulting from toxic industrial chemicals.

The most common misconception people have about chemical contamination is that vast areas of the battlefield will be contaminated by liquid chemical agents. Another misconception is that everything in the contaminated area will be “dripping” with chemical agents. Instead, contamination assessments should be done according to the method described below.

The NBC3 CHEM report is a prediction of the hazard area. This prediction is safe-sided to ensure that a significant hazard will not exist outside the predicted hazard area. A chemical contamination prediction should include two important aspects

of the chemical attack: (1) the attack area, in which liquid contamination can be found, and (2) the hazard area, which is the area downwind from the attack that can be affected by chemical vapors originating in the attack area. The prediction includes a determination of whether the attack was an air-contaminating attack, which is with nonpersistent agents (type A) and has little or no liquid contamination on the ground; a ground-contaminating attack, with persistent agents (type B); or an attack of unknown origin (type C).

The dimensions of the attack area are based on the type of agent employed and weapon system used. The attack area will be larger than the actual area contaminated by a liquid chemical agent. In a liquid or aerosol attack, the type B attack area is predicted to be shaped like a cylinder. Although it can be several kilometers in length, it will be no more than 2 km wide at any point. This type of attack will contaminate the greatest area of all the attack types shown.

Contaminated casualties can cause cross-contamination, posing the greatest risk during initial medical treatment and patient decontamination because of the potential liquid contamination that may be transferred to the care provider, to the interior of evacuation vehicles, or to non-medical augmentees performing patient decontamination. These casualties can pose both liquid and vapor hazards, from liquid on their clothing and equipment, from evaporating liquid agent, and from vapors trapped in clothing fabric and hair. Because of these liquid and vapor risks, it is important to understand as much as possible about the attack and hazard areas.

Exposure to a vapor poses less of a hazard to decontamination operators than exposure to liquid agent or concentrated aerosols. Often vapor exposures, predominant in a type A attack, will quickly volatilize (evaporate) before the patient reaches the decontamination station. In these cases, removing the clothing and briskly rubbing or washing the hair (if the hair was exposed and unprotected by IPE) may be all that is needed to release the trapped vapors.

**Type A Attack.** The type A attack occurs when enemy forces believe that a large concentration of chemical agent vapors will surprise US forces and cause casualties through inhalation. This

attack usually is conducted by firing large numbers of highly volatile (nonpersistent) chemical agent munitions into a relatively small area. These nonpersistent agents are nerve (GB, GD), pulmonary (CG), vesicating (CX), and cyanide (AC, CK) agents.

A type A attack will not normally be aimed directly at a unit's position but will occur "off-target," that is, at some distance away from the unit, to maximize the development of a vapor cloud and the number of casualties. This will be particularly true of an attack that uses the G-series nerve agents, the pulmonary agent CG, or the vesicating agent CX. If a cyanide agent is used, the attack will most likely be in or extremely close to a unit's location because of the rapid expansion of cyanide vapor in the air and its ability to mix easily with the surrounding air, causing rapid dilution. Cyanide is most effective in enclosed spaces such as buildings.

Casualties in the type B attack area present potential liquid and off-gassing vapor hazards, whereas casualties in the type A hazard area pose only an off-gassing hazard. However, in most cases, any liquid chemical agent found on type A attack casualties will be minimal because of the rapid evaporation of the highly volatile liquid chemical agents from the IPE's outer material. Although the M9 Chemical Agent Detector Paper (tape) worn by casualties in the attack area will show a positive color reaction upon exposure to any liquid chemical agents, detecting and identifying the agent may be difficult using M8 Chemical Agent Detector Paper during triage at the decontamination site because of evaporation. The Improved Chemical Agent Monitor (ICAM) may be useful here.

**Type B Attack.** A type B attack occurs when enemy forces believe that terrain denial or the creation of a chemical barrier will slow US forces or cause them to maneuver around the obstacle, potentially into a preplanned killing zone. Type B attacks are likely to be placed on or near units to maximize the effect of liquid and heavy vapor contamination on personnel and equipment. The type B attack area can be several times larger than the type A area. The use of a type B attack on choke points (ie, narrow points in a valley, road junctions, or crossing points at water obstacles) can be expected, especially if US forces are in these locations.

Type B attacks use persistent chemical agents, which have a low volatility, taking more than 24 hours to fully evaporate. The persistent chemical agents are nerve (thickened GD, VX)

and vesicating (L, H, HD) agents. Type B attacks represent the worst case scenario for medical support because of the long-term hazard posed by liquid chemical agents. Until deliberate chemical surveys indicate a type A attack has occurred, the response is planned according to a type B scenario.

Casualties caught in the open without overhead cover during a type B attack will have easily visible oily splashes or a large number of oily spots of varying sizes on their IPE. The mask carrier and load-bearing equipment will also have spots or smears that cannot be a result of perspiration. The M9 detection tape may also have positive indications of chemical agent drops (some as small as 100  $\mu\text{m}$ ) and a few streaks. After the actual attack has stopped, the individual will probably contact objects such as plants or equipment that have agent on them. This can smear agent on IPE and protective gloves, causing oily smears or spots of varying sizes. The M9 detection tape will have more streaks than spots, which could indicate that the casualty brushed against the liquid while moving. Casualties in the hazard area of the type B attack will pose the same hazard as a type A casualty, that is, off-gassing vapors from the IPE.

**Type C Attack.** In a type C attack, the origin of the attack is unknown. These attacks will most likely be found by a survey or reconnaissance. A 10-km radius is drawn around the center of the detection location, and the area within the circle represents the attack area and the hazard area. Casualties in this area will most likely pose the same hazard as type B attack casualties.

### ***Biological Contamination***

Unlike the extensive information available on chemical contamination, knowledge about the incubation period of biological agents is limited. US forces may not know that a biological attack has occurred, or even which biological agent was used, until several days to a week after the attack has actually occurred. Once a biological attack is suspected, the prediction method in FM 3-11.3, Appendix F, will be used to assess what terrain was potentially contaminated, which units were present

in the predicted area of contamination, and how long these units remained in the affected area. A medical response will then be planned that is appropriate for the agent used and the anticipated casualty load.

Biological attacks can be categorized into four groups, based on the means of delivery and wind speed: type P attacks, using localized exploding munitions such as bombs, shells, rockets, mines, missiles, and surface release sprays; type Q attacks, using munitions that cover a large area such as bomblets or air burst missiles; type R attacks, in which the location of the attack is known, but the type is unknown or the attack was from an air release spray or generator; and type S attacks, in which detection occurs after an unobserved attack.

Biological agent casualties can occur in a larger area than in a chemical attack. As the cloud of agent travels farther downrange, it is exposed to the environmental elements and subjected to dispersal, settling, and impaction on features of the terrain. During this process the cloud loses much of its concentration, and subsequently most of the unprotected personnel exposed will not receive an infective (pathogen) or effective (toxin) dose. As a result, dispersal will not be uniform, and casualties may occur as far as four to five times the maximum downwind hazard distance (DHD) of chemical agents when environmental conditions are optimal for dispersal.

The size of the attack area and the maximum DHD vary greatly depending on the type of biological agent attack. Knowing the type of attack will allow medical unit leaders to better allocate their resources. The maximum DHD for each type of attack must be calculated using the chemical downwind message. Information for calculating the maximum DHD is described in FM 3-11.3, Appendix F.

Depending on the type of biological attack, the total DHD may produce a hazard area of enormous proportions. Any casualty from a location within the attack or hazard area who requires medical support must be considered contaminated and handled appropriately. This standard response should continue until deliberate biological sampling has taken place and the laboratory analysis of the samples indicates that a biological threat no longer exists.



**NOTE:** *Biological casualties who arrive at the MTF with flu-like symptoms and have bathed in the last day or two have already decontaminated themselves. Most biological agents do not remain active on clothing for more than a day or two and are killed by heat or sunlight exposure. The exception is anthrax spores, which remain a hazard for months to years and can be trapped in clothing fibers and hair if clothing has not been changed or hair washed since the attack.*

## **Tactical Planning**

When a chemical or biological attack occurs on or near a unit, the supporting medical platoon must be prepared to quickly and efficiently transition from conventional casualty operations to contaminated casualty operations. To accomplish this transition, the medical platoon leader or sergeant must be alerted almost as quickly as the unit commander that an attack has occurred. For this information to be obtained as soon as possible, one of these individuals must be located in the unit tactical operations center. When an attack occurs, an NBC1 observer's report will be sent or automatically generated through the Chemical, Biological, Radiological, and Nuclear Warning and Reporting System, which will alert the unit that a chemical attack has occurred (see FM 3-11.3). Because the unit CBRN NCO or officer will lack vital chemical/biological survey information during the first hour or so after an attack has occurred, it must be assumed that, in the case of a chemical attack, a type B attack has occurred (as discussed above).

The medical response must begin with a quick evaluation of the attack, including factors that may indicate the type of casualties most likely to be seen, and the type of contamination these casualties will bring in with them—liquid versus vapor, chemical versus biological. This evaluation will be based on the following information:

- The location of all units supported by the medical platoon.
- The location of the attack (line F of the NBC1 report).
- Release information on agent attacks (line I of the NBC1 report). If line I is unknown, then assume a type B attack.

- Which units were in the attack area.
- Which units were in the hazard area.
- The readiness posture of any unit inside the predicted attack and hazard areas.
- What mission-oriented protective posture (MOPP) level the affected unit was in.
- What type of terrain the unit occupied. (Built-up, urban terrain could indicate that overhead cover was available to shield personnel against the initial liquid contamination. Wooded terrain could also indicate some overhead cover provided by the forest canopy. Desert terrain indicates very little overhead cover.)
- How long the unit had been in its position.
- If nerve agent is suspected, whether the unit took pyridostigmine pretreatment (although this will not alter treatment).
- If nerve agent is reported, how the agent was verified. (The Joint Chemical Agent Detector [JCAD], M22 Automatic Chemical Agent Detection Alarm [ACADA], and M256A1 Chemical Agent Detector Kit indicate a vapor or aerosol hazard only; M9 tape indicates an aerosol or liquid hazard; M8 detector paper indicates a liquid hazard only. Any combination of M8 detector paper, the M22 ACADA or JCAD, and M256A1 detector sampler indicates both a liquid and vapor hazard.)
- Whether the attack consisted of a chemical attack only, or also included conventional high explosive munitions used alone or along with a ground attack.
- Whether any suspicious liquid failed to cause a reaction on M9 or M8 paper.
- If aerosols were observed being disseminated, and whether a stand-off automatic chemical agent detector alarm or any other chemical detection devices failed to indicate a chemical agent.
- Whether a biological attack was suspected, and with what indicators.
- Whether any biological agent rapid detection field tests indicated a possible biological agent.

## **Establishing the Decontamination Site**

The ability of the medical platoon or, more specifically, the treatment squad to establish the decontamination site will depend greatly on unit support. Long before the medical platoon deploys, the unit leadership must understand the need for manpower and equipment support. Additionally, when possible, the commander should predesignate in the tactical standard operating procedures which sections of the headquarters unit will provide personnel or equipment to the medical decontamination site. The medical platoon leader should ensure that the sections tasked to provide personnel are trained prior to deployment and that after deployment they receive quick refresher training when possible.

When an attack occurs, the required personnel and equipment must be available almost immediately. The medical platoon leader or platoon sergeant must maintain a current status of required support equipment and a continuously updated roster (by name) to ensure personnel and equipment can be quickly assembled when a timely response is critical to patient care.

### ***Wind Direction***

Wind direction and speed are critical factors in planning because of the vapor hazard that will be present downwind from the PDS. When planning for patient decontamination, the assumption must be made that, after decontamination operations begin, chemical agents in vapor and liquid form will be present in areas of the PDS (open dirty dump, patient arrival and triage area, etc). Consideration must be given to the effect that wind-driven chemical agent vapors have on other unit operations or on other co-located units. A valid concern of unit commanders will be the uncontrolled effect vapors have. This factor may be a reason to plan for decontamination outside the unit area.

Knowing the anticipated wind direction and wind speed, and their estimated duration, will allow for a swift response to incoming chemical casualties. The decontamination site will therefore initially be set up to take advantage of the prevailing

wind, with the “clean” (uncontaminated) area operations always being placed upwind of dirty areas. If a radical wind shift is predicted during decontamination operations, the setup should be adaptable to allow for quick rearrangement.

Keeping track of the existing wind direction during the decontamination operation is the responsibility of the site noncommissioned officer-in-charge (NCOIC). One of the best means of doing this is to attach short strips of the yellow marking ribbon to mounting stakes from the M274 Contamination Sign Kit or attach white engineering tape to tent poles, tent ropes, etc. One of these wind direction devices must be visible from the hot line when looking in any direction.

Moving the PDS must be considered if the wind shifts more than 30° from the prevailing wind direction. Wind shifts often are transient, so it is advisable to wait 10 to 15 minutes to see if the wind goes back to its original direction. Coordination for the disruption of patient flow and diversion during this waiting period should be considered in the preplanning phase.

Often wind speed will be less than 5 mph for long periods. During these calm atmospheric conditions, chemical agent vapors will drift in almost any direction, so planners must consider moving the decontamination site well outside the base cluster or support areas so that it will not adversely affect other units or the ongoing conventional medical mission of the MTF.

### ***Protection and Monitoring During Setup***

Outside a 1-km stand-off distance from the edge of the predicted downwind hazard area, all personnel can remain in MOPP 2 during the setup of the decontamination site. In this area, the site should be free from both liquid and vapor contamination. It is recommended that one soldier in MOPP 4 conduct continuous monitoring during site setup at a location at least 1 km away. This soldier should use the JCAD or M22 ACADA regardless of which agent has been reported (initial NBC1 observer's reports received at the tactical operations center during testing scenarios and field training exercises often contain incorrect information about which agent was actually encountered). As long as the monitor continues to

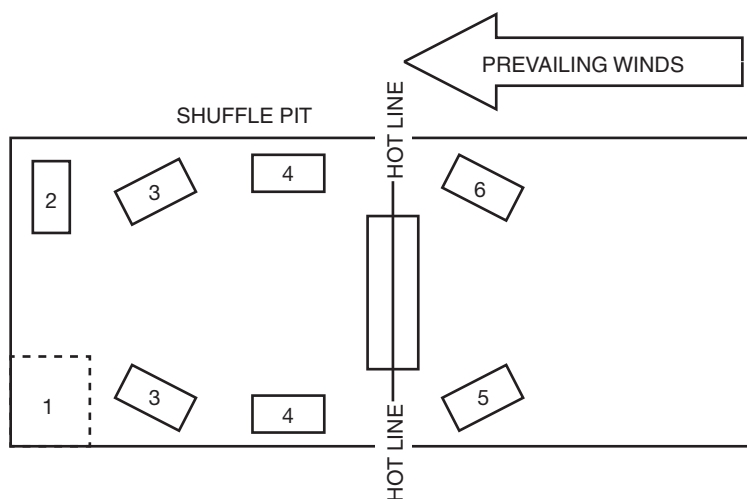
report no contact with chemical agent vapors, all personnel can remain in MOPP 2 until the first casualties are 5 to 10 minutes away.

If the selected site is within the 1-km stand-off distance or within the predicted downwind vapor hazard area, all personnel must be in MOPP 3 or 4 during site setup. Modification of the MOPP level based on temperature and expected workload during setup can be accomplished as described in FM 3-11.4, *Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection*, Chapter 4, Mission-Oriented Protective Posture Analysis. If the site must be set up in the vapor hazard area, it is critical that the selected site be free of liquid contamination. As long as the team sent to the selected site remains completely outside the predicted liquid hazard area, and optimally outside the stand-off distance, a point chemical survey should take no longer than a few minutes using M8 chemical detector paper.

### ***Site Preparation Phase***

Site preparation will require time for shuffle pit preparation, dirty dump preparation, and removal of any ground obstacles (see discussions below). If the medical platoon has the time to accomplish any of this labor-intensive work prior to activating a PDS, the decontamination mission will be much more efficient. If no time for this preparation is available, a ground reconnaissance must take place prior to site activation. A simplified PDS diagram is shown in Figure 10-1 (see Appendix D for a detailed foldout). All vehicle movement routes must be marked, points along the route requiring direction indicators identified, and any ground obstacles identified for removal. The arrival or triage area must be surveyed to ensure it can handle the evacuation vehicles moving into and out of the area, plus the activities of the triage officer and the litter teams.

Both the litter and ambulatory decontamination areas must be surveyed to ensure ease of movement by medical personnel, augmentees, and ambulatory patients. The ambulatory decontamination area must be evaluated for the best location of direction indicators to facilitate patient movement through the



**Figure 10-1.** Decontamination site diagram. Numbered areas are for:

1. triage
2. emergency treatment
3. clothing removal
4. skin decontamination
5. clean treatment
6. patient hold

various steps, as well as for any obstacle that might impede foot traffic. Ideally, tentage should be set up over the decontamination and decontamination check areas of the decontamination line to shield unclothed patients against the elements. The site must also be evaluated for night operations. Also, a site for supplies should be made near the treatment area for rapid replacement. The supplies should be covered to prevent contamination and allow for reprocessing.

When preparing the site, two or three shuffle pits need to be prepared, each requiring at least two 50-lb drums of super tropical bleach (STB). These pits, depending on the amount of use they get, must be refreshed with STB once every hour or after 10 people have shuffled through them. To refresh a shuffle pit, mix half the original ratio of two shovels of STB and three

shovels of dirt back into the pit (eg, if a shuffle pit originally took 30 shovels of STB and 45 shovels of earth to construct, 15 shovels of STB and 22 [rounded down for safety] shovels of earth would be needed to refresh the pit).

**NOTE:** *If Reactive Skin Decontamination Lotion (RSDL) is used for patient decontamination, it must **NOT** be stored near the STB powder because RSDL will cause STB powder, which is highly reactive, to ignite. RSDL can be applied to a casualty on a litter stand that is above the shuffle pit.*

The preparation of the dirty dump is the most labor-intensive effort in the preparation phase. If engineering support is not available, dedicated engineering tools must be available to assist in digging the dirty dump, including saws, axes, pry bars, and long-handled shovels. These dedicated tools must be obtained prior to deployment and used exclusively by the medical treatment squad for site preparation. This will ensure that tools are available at the critical time. Pick axes and long-handled shovels are more appropriate than individual entrenching tools. The use of heavy equipment, if available, will expedite the setup. When setting up in a forest location, it may become necessary to clear low hanging branches, brush, or other ground obstacles. After site preparation is complete, all tools must be kept on the clean side of the hot line.

## **Security of Decontamination Site**

The same security considerations apply when choosing a PDS as with any other medical operation. A decontamination site has the same potential attack risks as the MTF. To evaluate security risks, the officer-in-charge (OIC) or NCOIC should answer the following questions:

- What is the commander's estimate of possible enemy contact?
- What information does the S2 (intelligence officer) have on enemy weapons and tactics?
- Can the site be defended?
- What available terrain or structures can enhance the defense of the decontamination site?

- Is the site overly accessible (eg, is it sitting on a hill or directly adjacent to a busy road where access is not controlled, can the site be seen from a distance)?
- Can the site be quickly evacuated if necessary?
- Can key locations be sandbagged for added protection?
- Will the site be located in an area under light discipline?
- Will the decontamination operation be functional in complete darkness?
- Are communication means available for medical or operational emergencies?
- Can the primary supported unit protect the PDS with augmentation as needed?
- Will dirty evacuation assets (ambulance or rotor wing aircraft) be available to take some patients to the next role of care for decontamination?

## **Access and Movement Control**

An entry control point (ECP) must be established to control movement into the MTF or the PDS. Engineering controls such as concertina wire or other sturdy fencing material should be used when available to restrict travel across the hot line to the clean area, allowing access only through a guarded ECP. The ECP should be located at a distance far enough from the MTF to minimize any vapor hazard that may occur from contaminated vehicles stopping at this point. Without extensive chemical agent monitoring ability, rapid decisions must be made about which vehicles and vehicle contents are contaminated and must proceed to the decontamination site, and which are clean and may proceed directly to the MTF. To facilitate identification of evacuation vehicles carrying clean or contaminated casualties, prior direct coordination between the MTF and supporting evacuation units, both air and ground, following a standardized identification method, must occur. This coordination should happen prior to deployment. Alternatively, all transport vehicles may be considered to be contaminated, despite actual risk, to allow for increased flow of passengers through the ambulatory decontamination line and possibly prevent accidental clean side exposure.



One option for identifying vehicles is to use fabricated metal triangles with NATO standard dimensions (28 cm x 20 cm x 20 cm). The triangles can be camouflaged by painting them with flat green chemical agent resistant coating (CARC) paint. On the three separate triangles, paint the words "ATOM," "BIO," or "GAS" in flat black CARC paint. This will give the evacuation vehicle crew the ability to designate the casualty type as nuclear, biological or chemical. Attach the triangles to the front end of the evacuation vehicle so that the ECP personnel can observe it at a distance. In night operations, use "chem-lights": yellow for chemical casualties, blue for biological casualties, and red for radiation casualties. Attach the light to the front end of the vehicle, below the level of the hood, to reduce its interference with the driver's night vision.

The soldiers staffing the ECP should be in MOPP 4 and equipped with binoculars and night vision goggles for standoff inspection (from a safe distance) of the approaching evacuation vehicle. Once the vehicle halts at the ECP, the soldiers should cautiously approach the vehicle, noting the vehicle crew's MOPP level and, regardless of MOPP level, question the crew about any patient signs or symptoms related to agent exposure and about the vehicle's contamination status. ECP staff should then do the following:

1. Visually inspect the vehicle at the ECP and test any suspicious liquids with M8 or M9 detector paper to make a rapid determination of whether or not a liquid chemical agent is present on or in a vehicle.
2. Use the ICAM to detect vapor coming from any liquid contamination on or in a vehicle. Areas likely to have liquid contamination are the vehicle's rear portion, wheel well areas, and tires.

If the outside of the vehicle is contaminated and the patient must be transported to the next role of care, plans must be in place to transfer the casualty from the contaminated vehicle to another without outside contamination. Nonstandard evacuation platforms can be used if adequate ambulance assets are not available. The dirty vehicle will then return to the battlefield to pick up more contaminated patients. The commander may want

to restrict vehicles with exterior contamination from moving through the unit area. Litter teams may also be utilized to transfer casualties. As a last resort, the contaminated evacuation vehicle may be routed into the PDS along a route that has minimal impact on vehicle movement into the MTF.

Control of vehicle movement to specific routes and areas within the PDS is a critical safety issue, even during combat operations. It can involve routing vehicles along a clearly marked, one-way path from the ECP to the chemical casualty decontamination site. Ideally, return to the ECP should be along the same route. If vehicles are not kept on the proper path, clean areas are likely to become contaminated, and both patients and personnel are at risk of being hit by vehicles during night operations. Planning for vehicle movement must always include night operations and operations in low visibility conditions.

Control of personnel movement is necessary to ensure that casualties and site personnel do not accidentally cross the hot line without first being decontaminated and to secure the PDS and MTF sites from enemy infiltrators. Concertina wire works well to keep personnel in the desired areas, and a clearly marked, one-way route helps to ensure that correct entry and exit points are used. To reinforce the physical barriers in place, night operations must also use visual control measures that conform to light discipline guidelines.

## **Supplies and Equipment**

Only the minimum amount of equipment needed to support patient decontamination should be set up on the designated dirty side of the hot line, as well as the minimum amount of medical supplies needed to support the contaminated emergency treatment point. Having an advance knowledge of the numbers of casualties and types of injuries expected is very helpful in logistical planning, but not always possible. Practicing procedures for the resupply of the PDS from the clean side of the hot line is important. Some supplies should be positioned in the decontamination area, but a majority should be covered and prepositioned in kits on the clean side of the hot line (open these prior to the arrival of the first casualty). These supplies are handed to personnel working on the dirty side, as needed, to replace used supplies as the numbers

of patients increase. This may prevent unnecessary disposal of large numbers of medical supplies that might be considered contaminated if they were positioned in the contaminated PDS area and never used. Also, by keeping equipment and supplies to the minimum required, fewer items must be dealt with during disestablishment of the decontamination site.

Typical Role 1 Army medical platoons are equipped with three different medical equipment sets, for (1) tactical combat medical care, (2) chemical agent patient treatment, and (3) chemical agent patient decontamination. These sets provide a planning factor (for how long supplies will last) of 2 days, or 48 hours, of class VIII supplies. Chemical agent sets include supplies for decontaminating 60 and treating 30 patients. Units are fielded equipment based on their modified table of organization and equipment (MTOE). Larger units will have higher quantities of equipment items. Note: the tactical combat medical care set can easily be depleted during a single mass casualty incident. The sets will service specific numbers of soldiers based upon the facility's role of care. Below are lists of supplies to position at various stations in the PDS. Item quantities should be based on projected throughput.

### ***Entry Control Point***

- field medical card (carried by triage officer)
- RSDL (carried by triage officer)
- litters (decontaminable or canvas litters with sacrificial coverings)
- tactile (7 or 14 mm) chemical protective gloves (one pair worn and one carried by the triage officer)
- M8 Chemical Agent Detector Paper (one booklet carried by one member of each litter team and one carried by the triage officer)

If ambulances organic to the unit are used to transport casualties from collection points inside the attack or hazard area to the PDS, it is highly unlikely that these same ambulances, which may require decontamination, would be used to evacuate clean casualties to the next role of health service support. In this situation, remove the four patient protective wraps authorized

per vehicle from each ambulance and hold them on the clean side of the hot line for use in transporting undressed decontaminated casualties in designated dirty evacuation assets, or through possible areas of contamination, to the next role of care.

### ***Emergency Treatment Areas (Clean and Dirty)***

- RSDL
- Antidote Treatment Nerve Agent Autoinjectors (ATNAAs)
- atropine autoinjectors
- Convulsant Antidote, Nerve Agent (CANA)
- 50-mL syringes
- adult stethoscope
- flashlight
- field intravenous (IV) poles
- IV bags
- IV sets
- catheter/needle units
- povidone iodine pads
- constricting bands (use with one patient only because it is impossible to ensure decontamination between patients)
- adhesive tape (to secure the IV)
- field dressings
- 11 ¾" first-aid dressing
- 7 ¼" angled bandage scissors
- cricothyroidotomy cannula kits
- large and small airway pharyngeals
- hand-operated resuscitator

The Resuscitation Device, Individual Chemical (RDIC) is the best hand-operated resuscitator for use on the dirty side of the hot line. RDICs are included in ground ambulance equipment and the chemical agent patient treatment set.

### ***Litter and Ambulatory Patient Decontamination Lines***

- large trash bags for contaminated waste
- bucket of 5% hypochlorite decontamination solution
- bucket of soap and water decontamination solution, RSDL (preferably) or 0.5% hypochlorite solution

- bandage scissors or long-handled seatbelt cutter with blade replacements
- self-sealing plastic bags for field medical cards and personal effects found in outer and inner garments
- sponges
- toxicological agent protective (TAP) decontamination apron
- decontaminable litter for patient exchange (one per patient expected)
- RSDL (one to three applicators per patient)
- M295 Individual Equipment Decontamination Kit (one per patient)
- liquid soap
- litter stands (a pair) to steady patients
- replacement bandages, tourniquets, and splints (as necessary)

Listed below are optional items that are not found in the patient decontamination list but may be useful:

- trash can to hold large garbage bags (if space is available)
- bucket of rinse water
- additional canteens of water for decontamination team members
- 3" x 5" card and pen (to list personal effects per patient) or permanent markers (to mark outside of personal effects self-sealing plastic bags)
- chairs to steady standing patients

**NOTE:** *Prepare additional quantities of soap and bleach decontamination solutions and store in sealed containers to refill buckets.*

## **Personnel Requirements**

Provided below is a minimum suggested list of personnel to staff the PDS. The total number is 30 to 39 soldiers. Although a fully effective litter decontamination procedure can be performed by just two augmentees and triage can be handled with minimal staff, planning must include staffing for both the operational and support staff.

### ***Command and Control Cell***

- one officer
- one NCOIC safety officer

**NOTE:** *The individual appointed as the safety officer must be able to move freely throughout the dirty area of the PDS to check with personnel and ensure that they are not showing symptoms of heat stress and are following safe patient handling procedures.*

### ***Entry Control Point***

- two (optional) security personnel
- eight augmentees to unload litter patients (two teams of four)
- two additional (optional) security guards at arrival point to perform pat-down search
- three (optional) road guides and lookouts (night operations)

### ***Triage and Emergency Medical Treatment Area (Dirty Side)***

- one senior healthcare NCO or other primary triage officer (physician assistant or nurse)
- one medical personnel to administer treatment
- eight augmentees to serve as litter bearers (two teams of four personnel)

### ***Litter Decontamination Area (Per Litter Lane)***

- four augmentees (wearing TAP aprons) to decontaminate the casualties and perform patient lifts
- one medical personnel
- one (optional) augmentee to clean litters

### ***Ambulatory Decontamination Area (Per Lane)***

- one (optional) augmentee to assist patients
- one medical personnel

### ***Contamination Check Area***

- one augmentee trained to use various contamination detection tools

### ***Hot Line Patient Reception (Clean Side)***

- two augmentees to move litter patient across hot line
- one healthcare specialist

## **Work/Rest Considerations**

Work/rest cycles have a direct impact on personnel efficiency and replacement requirements. A complete understanding of the available information on this subject, coupled with common sense and experience, will enhance the planning process and address workforce needs. Establishing a work/rest cycle is dependent on several factors:

- How rested are the soldiers at the outset of operations?
- Have the soldiers been acclimated?
- Has a command drinking policy been in effect regardless of MOPP level (affecting how well hydrated the soldiers are)?
- What is the anticipated relative humidity?
- What is the anticipated temperature?
- Will overhead cover (shade) be available?
- How many heat casualties will the commander accept?

Further information can be found in FM 3-11.4.

## **Operations and Patient Flow**

### ***Dirty Side Triage Area***

Once casualties are inbound, personnel working in the triage area are at MOPP 4. Field ambulances approach the triage point from a downwind direction (see discussion of ECP, above). After the arrival of casualties, the entire decontamination site on the downwind side of the hot line must be considered a liquid/vapor hazard area. Patients are off-loaded from the ambulances and taken to the triage point. The patients are triaged and visibly marked with prepared tags or adhesive tapes using the following colors to denote triage casualties:

- immediate: red
- delayed: yellow
- minimal: green
- expectant: black

These colors can also be used for triage with chem-lights in night operations, with the exception that the expectant casualty would be marked with a blue chem-light. Unless the casualty is in respiratory distress, requiring intubation on the dirty side, or has wounds that prohibit masking, unmasked patients must be masked immediately at this point.

At the triage area, all military gear (protective mask carrier, Kevlar [DuPont, Wilmington, DE] vest and helmet, load-bearing equipment, weapon, and all types of armament) must be removed from both litter and ambulatory casualties. A pat-down search of the casualty's body, especially the chest and all pockets, is important to locate any ordinance carried by soldiers or explosive devices carried by disguised terrorists. After triage, the casualty will be directed to the ambulatory decontamination line, litter casualty decontamination line, or the dirty side emergency medical treatment (EMT) station. The mask is kept on the patient unless removal is clinically indicated.

### ***Dirty Side Emergency Treatment Area***

The EMT station should be established upwind from the triage point and to the side of the decontamination site perpendicular to the prevailing wind direction. It should be positioned as far to the side of the decontamination site as is practical. This setup will allow the EMT station to be away from the heaviest concentration of vapor resulting from the evaporation of liquid chemical agents concentrated at the triage point. It should also be an area that is expandable, depending on the influx of patients that need to be treated and stabilized. All personnel rendering EMT assistance will be at MOPP 4.

Treatment at the EMT station is limited to administering ATNAAs and diazepam, applying pressure dressings, establishing a patent airway, and starting an IV infusion. If



immediate clearing of the airway must be done at this point to save the patient's life, the airway is cleared and the mask replaced, or the patient is intubated. After this lifesaving procedure, it may or may not be necessary to change the triage category of the patient to reflect the increased burden of the exposure or the improved condition of the casualty.

### ***Casualty Decontamination***

Personnel working in the casualty decontamination areas will be at MOPP 4. Only the soldiers performing litter patient decontamination should wear the TAP apron over their IPE to keep it dry. Any additional gear (helmets and body armor, load-bearing equipment, protective mask carrier, and weapons) should be kept on the clean side of the hot line. Each soldier should carry three ATNAAs, one diazepam auto-injector (CANA), one package of RSDL, and one booklet of M8 detection paper in the cargo pockets of their overgarment trousers.

**NOTE:** *Two people (not including litter team) will work with each patient, tracking the patient from the first decontamination step to hand-over at the hot line.*

Two different concentrations of bleach solution are used in the patient decontamination procedure. A 5% bleach solution is used to decontaminate scissors and other cutting devices, TAP aprons, litters, and the gloves of personnel working in patient decontamination. The bleach solution is placed in the 3-quart plastic buckets issued with the patient decontamination medical equipment set. The buckets should be distinctly marked to distinguish the 5% solution from either the 0.5% bleach solution or soap and water. Preparation of these solutions is covered in Appendix B, Preparation of Patient Decontamination Solutions. Bleach evaporates quickly at high temperatures and loses its oxidation ability over time, so the solutions should be prepared shortly before they are needed. See the attachment to this chapter for step-by-step decontamination instructions.

### ***Dirty Zone Rest and Rehydration Point***

An area should be established 50 m perpendicular to the litter casualty decontamination line and approximately 5 m from the hot line for workers to use as a rest and rehydration point. If possible, this rest point should have overhead cover for shade. Before using this area, workers must decontaminate their TAP aprons using a 5% bleach solution and doff the apron near the decontamination line. Before removing the apron, gloves must be decontaminated with the M295 kit, RSDL, or 5% bleach solution. The aprons should be hung up so they can air out and be worn again. Next, workers must decontaminate their chemical protective boots by using an M295 kit or moving through a shuffle pit dug for this area. After completing this decontamination process, the soldiers move to the rest and rehydration point and begin rehydration using their mask's drinking system. Soldiers should not group together in this area, but should stay 3 m apart.

### ***Clean Side Resupply Point***

Of equal importance to the casualty decontamination effort is the logistical support of the ongoing operation. A logistics support point is established upwind within 30 to 50 m of the hot line. At this point, the soapy water and hypochlorite (bleach) solutions are prepared. All the soldiers staffing the site also stockpile 1- or 2-quart canteens for use by decontamination team members. These canteens must be fitted with caps that support the mask drinking system. The logistics support point should have one 400-gallon water buffalo or, initially, twenty 5-gallon water cans. Medical supply, chemical casualty treatment, and decontamination medical equipment sets can be located in this area along with additional supplies.

### ***Contaminated Waste Dump Area***

The dirty dump is located a minimum of 75 m downwind from the triage and emergency medical treatment areas. Prepare the dump ahead of time; it is a manual, labor-intensive job if no engineering support is available (see site prep section, above). Initially the dirty dump is a hole 4 ft wide on each side and 5 ft

deep. All personnel working in and around the dirty dump must be at MOPP 4 once casualties begin to arrive at the site. When the PDS is closed and the dirty dump is backfilled, its location must be reported (using an NBC5 report) to higher headquarters as a contaminated site with an 8- or 10-digit grid coordinate.

## **Disestablishing the Patient Decontamination Station**

The closure of the patient decontamination site will pose as difficult a mission as the actual decontamination effort itself, due in large part to the physical condition of the medical personnel and non-medical augmentees. Fatigue will cause site personnel to move slower and make mistakes. Regardless of the number of times command drinking was done, most of the site personnel will be dehydrated. Dehydration will lower performance and stamina while increasing the likelihood of heat injuries. Disestablishing the site must be done carefully to prevent heat casualties among the personnel.

Prolonged encapsulation in the MOPP gear may distort tempers, attitudes, and motivation. Any plans made to disestablish the PDS must be simple and quick; personnel will not be able to sustain an involved and detailed process.

The three areas of concern during closure are equipment recovery, site closure, and personnel recovery. Efforts must be prioritized to optimize the recovery of essential equipment versus expendable equipment, to deny threat forces tactical intelligence, and to ensure that site personnel complete required work and emerge from total encapsulation as quickly and safely as possible.

### ***Equipment and Personnel Recovery and Site Closure***

Decontamination and monitoring of the equipment can take place adjacent to the hot line and 50 m to the left or right of the litter and ambulatory decontamination areas. Recommended equipment for recovery is as follows:

- large trash bags for contaminated waste
- a slurry mixture of STB or 5% hypochlorite (full-strength household liquid bleach) solution (in buckets)

- buckets for STB slurry or hypochlorite solution
- buckets for rinse water
- sponges or rags
- TAP aprons
- entrenching tools

To prepare the STB slurry mix, use two parts STB mixed into three parts water (by weight). For example, 6 gallons of water weighs 42 lb (1 gallon = 7 lb), which is mixed with 28 pounds of STB. The slurry mixture or 5% bleach solution must be scrubbed onto the items requiring decontamination and allowed to remain on the surface for 30 minutes. After this contact time, the items must be flushed with clean water.

If the mission permits, the following items can be decontaminated for reuse:

- decontaminable litters
- litter support stands
- 12-quart steel utility pails
- TAP aprons
- field IV poles
- flashlights
- RDICs
- ICAMs

While waiting for the 30-minute contact time to elapse, all other items on the dirty side of the hot line can be placed in a plastic garbage bag and put in the dirty dump. Several personnel must conduct a police call of the arrival/triage area and litter and ambulatory decontamination areas.

After the 30-minute contact time has elapsed and all items have been flushed with clean water, each item must be monitored before it is passed over the hot line. Ensure that cracks, joints or seams, bolts, porous materials, and any openings are monitored in addition to surface areas of the equipment items.

Upon completion of equipment recovery, all personnel except for two will conduct MOPP gear exchange at a site selected by the site NCOIC or OIC adjacent to the hot line and 50 m opposite the side used to decontaminate equipment. MOPP gear

will be exchanged with the unit supplying required support. After completing MOPP gear exchange, the two remaining personnel will put all discarded MOPP gear into plastic bags and place them in the dirty dump. Then they will backfill the dirty dump, covering it with earth, mark it with hazard signs, and mark its location on a map with coordinates relayed to higher headquarters. These two personnel will then move back to the hot line and perform their own MOPP gear exchange. The remaining two sets of discarded MOPP gear are left in place and camouflaged.

Once all tasks have been completed, the area can be closed.

**NOTE:** *Two personnel from the clean side of the hot line should complete these actions because dirty side personnel will be fatigued.*

## **ATTACHMENT: STEP-BY-STEP GUIDES TO LITTER AND AMBULATORY PATIENT DECONTAMINATION**

Decontamination of litter and ambulatory casualties closely follows the methods described in FM 4-02.7, *Multiservice Tactics, Techniques, and Procedures for Health Service Support in a Chemical, Biological, Radiological, and Nuclear Environment*, and FM 3-11.5, *Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Decontamination*. The step-by-step procedures outlined below are the prescribed doctrine for decontaminating litter and ambulatory patients, but they are by no means the only methods. Knowing these methods, however, ensures that correct and essential steps are not omitted; if the steps cannot be followed (eg, if responders are a mix of military and civilian personnel), other measures discussed here can be taken to preclude a hazardous outcome.

RSDL or a soap solution and water are used for chemical contamination on the skin. The least desired alternative for skin decontamination is bleach (hypochlorite solution). A 0.5% hypochlorite solution with water rinse is useful if water is limited and RSDL is not available. Only use a 0.5% hypochlorite solution for skin decontamination; higher concentrations will irritate and burn the skin, allowing agents to enter the skin more rapidly.

The M295 Individual Equipment Decontamination Kit is used to remove obvious contamination from the patient and help to control the spread of contamination on IPE (MOPP ensemble) and other equipment. If it is not available, then either soap solution or a field-expedient adsorbent material, such as clean, dry earth or flour, can be substituted.

### **Litter Casualty Decontamination**

#### ***Step 1. Clothing removal***

1. Decontaminate mask and hood.
  - a. Wipe or sponge down the voicemitter, eyelets, and outserts with RSDL or 5% bleach solution. While wiping around the filter, momentarily cover the filter's inlet with your hand to keep liquid out of the inside of the filter, where it could wet the charcoal, reduce filter efficiency, and clog the filter.
  - b. Hoods are of two types: those that are part of the overgarment and those attached to the mask.
    - i. For integral hoods that are part of the overgarment, such as the Joint Service Lightweight Integrated Suit Technology (JSLIST) type II, no decontamination is necessary.
    - ii. For hoods attached to the mask, first wipe down the hood using 5% bleach solution, starting at the top of the head and wiping down toward the shoulders.

**NOTE:** *When the M295 kit or RSDL are not available or are in limited supply, use a 5% bleach solution on equipment.*

2. Remove hood.
  - a. Start with a cutting device soaking in a bucket of 5% bleach solution (or decontaminate the cutting tool with the M295 kit or RSDL).
  - b. Cut the hood starting at the front center and continue cutting across the top of the head toward the litter (Figure 10-2).
  - c. Fold the left and right sides of the hood away from the head on the litter.

**NOTE:** *To cut the hood and JSLIST, use scissors or a combat strap cutter. After every complete segmental cut (eg, cutting the sleeve from the cuff to the jacket collar), the cutting tools and the gloved hands of the soldier doing the cutting must be decontaminated. Put the cutting device in a bucket of 5% hypochlorite solution after each complete line of cut and get another cutting tool from the hypochlorite solution bucket for the next cut. If a bucket of 5% hypochlorite solution is not available, the cutting tools must be scrubbed using the M295 kit between each cut or rinsed thoroughly in running soapy water. Cutting tools must be replaced*



**Figure 10-2.** Cutting the hood.

Cut line: — — —

*once they no longer make a smooth cut. Use soap and water, RSDL, or 0.5% bleach solution on skin or equipment items that will contact skin.*

3. Decontaminate head.
  - a. Use soap and water, RSDL, or 0.5% bleach solution.
  - b. Leaving the mask on the patient, cover the inlet port of its filter to keep it from getting wet or congested.
  - c. Wipe any exposed areas of patient's face that were not protected by the hood, including chin, neck, and back of ears.
4. Remove the field medical card (FMC).
  - a. The care provider at the litter patient decontamination station should view the FMC prior to removal.
  - b. Cut the FMC tie wire.
  - c. Allow the FMC to fall into a self-sealing plastic bag.
  - d. Seal the plastic bag and decontaminate the outside of the bag.



- e. Place the plastic bag under the back of the patient's mask head harness straps.
5. Remove personal articles from the pockets of the JSLIST.
  - a. Place the articles in self-sealing bags.
  - b. Label the bags with the patient's name and assigned identification number. Other items, from inside pockets, will be added to the bags later in the process.
  - c. Decontaminate gloves before and after handling the bags.

**NOTE:** *The patient's identification tags stay around the patient's neck throughout the decontamination process. They are decontaminated with soap and water, RSDL, or 0.5% bleach.*

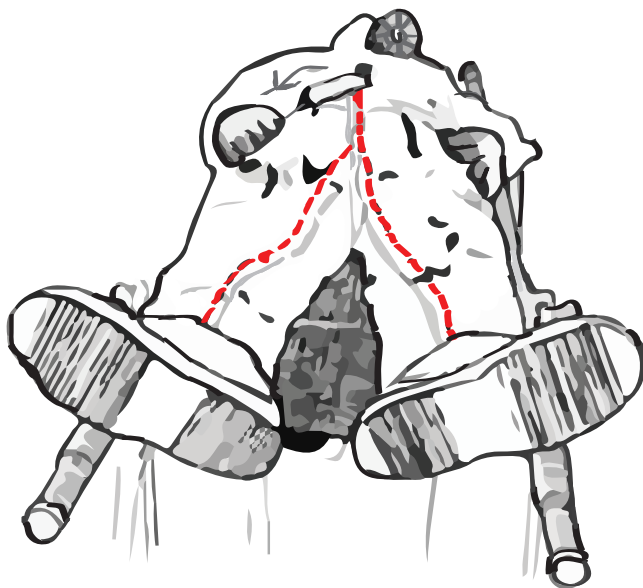
6. Cut patient's JSLIST.
  - a. Cut overgarment around tourniquets, bandages, and splints (two people will be cutting the overgarment at the same time).
  - b. Remove the JSLIST jacket by cutting it off.
    - i. Unfasten or cut hook-and-pile wrist closure at the wrist.
    - ii. Make two cuts, one up each sleeve from the wrist to the shoulder, and then to the collar. Keep the cuts close to the inside of the arms so that most of the sleeve material is folded outward (Figure 10-3).
    - iii. Cut the jacket drawstring at the bottom of the jacket and unfasten hook-and-pile closures, moving from waist to neck, and then unzip the jacket.
    - iv. If the casualty is able, instruct them to hold their arms up and away from their body, and drape the left and right chest sections of the jacket over the outside of the litter.
    - v. Then instruct the casualty to keep their hands to their sides, away from the areas where the JSLIST has been removed.
    - vi. If the casualty is unable to lift their arms, one augmentee will hold the casualty's gloved hand and perform this action. Another augmentee folds the chest sections over the outside of the litter. The patient's arms are then lowered to the sides, keeping the gloves away from the area where the jacket has been removed.



**Figure 10-3.** Cut lines for removing the Joint Service Lightweight Integrated Suit Technology jacket.

Cut line: - - -

- c. Remove the JSLIST trousers.
  - i. Cut the suspenders.
  - ii. Unfasten the hook-and-pile closure at the ankle cuff.
  - iii. Cut from the ankle along the inseam of the left trouser leg until the crotch area is reached, then cut across into the zipper (Figure 10-4).
  - iv. Cut along the inseam of the right trouser leg until the crotch area is reached, then go sideways into the first cut.
    - v. Allow trouser halves to drape over the side of the litter.
    - vi. Tuck the remaining cloth between the legs by rolling it, while ensuring that only the black lining is showing.
7. Remove the outer gloves. Do not remove the inner gloves.
  - a. Decontaminate your own gloves with the M295 kit, RSDL,



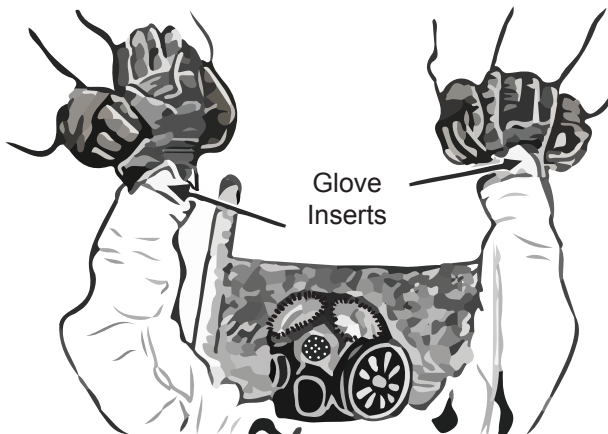
**Figure 10-4.** Cut lines for removing the Joint Service Lightweight Integrated Suit Technology trousers.

Cut line: - - -

- or 5% bleach solution.
- b. Decontaminate the casualty's gloves with the M295 kit, RSDL, or 5% bleach solution.
- c. Instruct the casualty to hold their arms away from the litter and upper body or, if they cannot comply, hold their gloves by the fingers.

**NOTE:** *Always remove the gloves over the sides of the litter.*

- d. Grasp the cuff of the glove, turning the glove inside out, and remove it (Figure 10-5).
- e. Carefully lower the patient's arm across their chest as each glove is removed. Avoid touching the patient's cloth glove liner or arm with your rubber glove.



**Figure 10-5.** Removing the outer gloves.

**CAUTION:** Do not allow the arms to contact the exterior (camouflage) side of the overgarment.

- f. Dispose of the contaminated gloves by placing them in a trash bag.
- g. Decontaminate your own gloves with the M295 kit, RSDL, or 5% bleach solution.
8. Remove the overboots.
  - a. Unfasten the overboots.
  - b. Gently pull the overboot by the heel until it is removed.
  - c. If the overboot will not come off, cut the boot from top to bottom along the centerline of the boot or along the inside of the boot. Fold the overboot down and gently pull the heel until it is removed. Place the overboots in the contaminated trash.
9. Remove personal effects from the JSLIST.

**NOTE:** Remember to decontaminate your gloves first.

- a. Place personal effects in a self-sealing plastic bag.
- b. Remove the bag to the contaminated holding area.

10. Remove combat boots without touching body surfaces.
  - a. Cut the boot laces along the tongue.
  - b. Pull the boots downward and toward you until they are removed.
  - c. Place the boots in the plastic bag containing the chemical overboots and gloves.
11. Remove inner clothing.
  - a. Cut or unbuckle the belt.
  - b. Cut the duty uniform pants following the same procedures as for the overgarment trousers.
  - c. Cut the duty uniform jacket following the same procedures as for the overgarment jacket.
12. Remove undergarments.
  - a. Remove the patient's T-shirt.
    - i. Decontaminate gloves and scissors with the M295 kit or RSDL, or immerse cutting devices in a bucket of 5% bleach solution between each complete cut.
    - ii. Cut up the front of the patient's T-shirt from the waist up to the collar.
    - iii. Cut both sleeves from the inside, starting at the elbow, up to the shoulder, and then to the collar.
    - iv. Cut around bandages or splints, leaving them in place.
    - v. Next, gently peel the T-shirt away from the body to avoid spreading any contamination.
  - b. Remove the patient's brassiere.
    - i. Decontaminate gloves and scissors.
    - ii. Cut brassiere between the cups.
    - iii. Cut both shoulder straps where they attach to the cups and remove the brassiere.
  - c. Remove the patient's undershorts or panties.
    - i. Decontaminate gloves and scissors.
    - ii. Cut from the lower side of the hip to the waist on both sides.
    - iii. Place the undergarments into the plastic garbage bag containing the other contaminated items.
13. Remove socks. Place them in the plastic garbage bag.
14. Remove inner gloves. Place them in the plastic garbage bag.

**NOTE:** *It is recommended that workers decontaminate each other's TAP aprons, gloves, and lower portion of the protective hood with RSDL or 5% solution between each patient and before any litter transfers. Team members should wash each other, with each person being decontaminated standing with their arms spread out to the sides, allowing the team member performing the decontamination to get into all the folds of the TAP apron front and sleeves.*

## **Step 2. Litter transfer and decontamination**

1. After decontaminating one another's TAP aprons, team members will now use a patient-lift to move the unclothed patient to a clean litter, where skin decontamination will occur. Before and during the lift, the leader explains to the casualty exactly what is going to happen.
2. Decontamination team members position themselves with one person on one side of the litter and three on the other.
3. The single person on one side rolls the patient toward himself or herself.
4. The three on the other side slide their clean arms under the patient (in a forklift fashion), supporting the casualty's neck, torso/lower back, and distal legs. A medic, if present, provides supervision and can assist in neck stabilization.
5. The single person on the first side then rolls the patient back onto the forearms of the other three team members.
6. The medical provider, or an individual at the patient's head, gives the command, "prepare to lift." If ready to lift, the other members reply, "ready." The medic then commands, "lift."
7. To ensure safety during the lift, team members keep their backs as straight as possible and perpendicular to the ground, and lift using their legs and arms.
8. The patient is lifted up and rolled slightly inward against the lifters' chests to reduce the effort and better support the patient.
9. The dirty litter and its contaminated clothing are removed from the litter stands, and a clean, decontaminable litter is placed under the patient by the lone augmentee.
10. The medic then gives the command, "prepare to lower." If ready, the other team members respond, "ready." The command to "lower" is then given, and the patient is slowly lowered onto the clean litter.

11. The cut overgarment and undergarments from under the patient are now placed in the plastic garbage bag with the other waste from the casualty.

**NOTE:** *Contaminated material from two litter patients can be placed into one 35-gallon trash bag. The remaining 5% bleach solution and soapy water (if used) can be poured into the bags. The bag must be tied shut and transported to the dirty dump.*

12. The dirty litter is decontaminated with an M295 kit or a 5% bleach solution with a water rinse. It remains on the dirty side to be reused for transferring other casualties from the triage area to the litter patient decontamination point.

### ***Step 3. Skin and wound decontamination***

1. The casualty is now decontaminated with soap and water, RSDL (for spot decontamination), or 0.5% bleach solution.
2. If the patient was wearing a chemical protective overgarment, decontaminate only those skin areas where there was a break in the garment (eg, around wounds, areas where the underlying uniform is wet with agent, or where there is a tear in the overgarment).
3. If the patient was not wearing IPE or had significant uniform tears or a damaged underlying uniform, decontaminate the entire skin surface by wiping the skin with a sponge and soapy water or 0.5% bleach solution with a water rinse.
  - a. Wash the casualty from the midline outward, constantly washing from clean to dirty. Do not place a dirty sponge back on a clean area without first rinsing the sponge. Wash the complete topside of the casualty in this manner, paying particular attention to hairy areas of the body (groin and axillary regions) and sweaty areas (belt-line, just above the boots, the crease of the buttocks, and wrists).
  - b. Log-roll the patient onto their side, and wash their backside. Then wash the casualty's back from the shoulders to over halfway down the backside, taking care not to miss any areas.
  - c. Decontaminate the upper side of the litter with soap and water, 0.5% bleach, or RSDL prior to rolling the patient onto their back again. Log-roll and wash the opposite

side of the casualty in exactly the same manner and decontaminate the litter before rolling the patient onto their back again.

4. After the casualty is decontaminated, the medic removes dressings and replaces them only if needed.
  - a. Superficial wounds (with no involvement of body cavities, eyes, or nervous tissue) are decontaminated with RSDL, flushed with soapy water, or 0.5% bleach solution, and new dressings are applied if needed.
  - b. Larger wounds are irrigated, if contaminated, with sterile water or IV saline to remove contaminants. Then cover the wounds with a large dressing and plastic if additional contamination may get into the wound.
  - c. Tourniquets that are contaminated are replaced by a qualified medical provider. The new tourniquets are placed 0.5 to 1 inch proximal to the original tourniquet. The old, contaminated tourniquet is removed and put in the waste bag.
  - d. Hemostatic dressing should be evaluated by a qualified medical provider and only removed or replaced if potential bleeding can be controlled.
  - e. Splints are not removed by augmentees, but are decontaminated with RSDL or saturated to the skin with 0.5% hypochlorite solution and rinsed thoroughly with soapy water. If the splint cannot be saturated (air splint or canvas splint), it must be moved sufficiently or replaced by the care provider to enable everything under it to be decontaminated.

#### ***Step 4. Monitor for completeness of decontamination***

1. Establish an area between the decontamination area and the hot line to check for thoroughness of patient decontamination before the patient crosses the hot line.
2. Use the ICAM or M8 paper in this area to check for chemical agent contamination and a radiac meter or other appropriate monitoring instruments to check radiological contamination.
3. If contamination is detected, use appropriate decontaminants (RSDL, soap and water, or 0.5% bleach) to spot decontaminate suspected areas.



4. Once the casualty is confirmed clean of any CBRN contamination, the decontamination team again helps one another to ensure that their TAP aprons and gloves are decontaminated and then takes the litter patient to the hot line.

**NOTE:** *As the dirty team prepares to bring the casualty to the hot line, the team on the clean side opens a blanket or other covering appropriate for the environmental conditions.*

### ***Step 5. The hot line and clean side actions for litter patient***

Straddling the hot line is the casualty pass-over point, which is in a shuffle pit.

1. The dirty team brings the decontaminated casualty to the hot line on the litter and places the litter on the stands.
2. In the shuffle pit, the patient's FMC is transcribed by the medic on a new, clean FMC, and the dirty one is taken back to the dirty side by the dirty team.
3. Three dirty team members log-roll the casualty up and off the litter. A fourth dirty team member removes the litter. The clean team replaces the litter with a clean one. The dirty team lowers the casualty onto the clean litter and moves away.
4. After the dirty team moves away, clean team members fold the blanket over the casualty and move the casualty to a holding area 30 to 50 meters upwind.
5. In the clean treatment area, the patient can now be retriaged, treated, and evacuated. In a hot climate, the patient will probably be significantly dehydrated. The rehydration process must begin immediately. Overhead cover should be provided for casualties in the holding area. The mask may now be removed unless circumstances dictate that the casualty remain closer to the hot line.

## **Ambulatory Casualty Decontamination**

**NOTE:** *Refer to the images in the previous section.*

### ***Step 1. Clothing removal***

1. Decontaminate the mask and hood.
  - a. Wipe or sponge down the voicemitter, eyelets, and outserts with RSDL or a 5% bleach solution. While wiping around the filter, cover the inlet of the filter with your hand momentarily to keep liquid out of the inside of the canister where it could wet the charcoal, reduce filter efficiency, and clog the filter.
  - b. Hoods are of two types: those that are part of the overgarment and those attached to the mask.
    - i. For integral hoods that are part of the overgarment, such as the JSLIST type II, no decontamination is necessary.
    - ii. For hoods attached to the mask, wipe down the hood using 5% bleach, wiping the mask and then the hood (starting at the top of the head wiping down toward the shoulders).

**NOTE:** *When the M295 kit or RSDL are not available or are in limited supply, use a 5% bleach solution on equipment.*

2. Remove hood.
  - a. Start with the cutting device in a bucket of 5% bleach solution or decontaminate it with the M295 kit or RSDL.
  - b. Cut the hood starting at the front center and continue cutting across the top of the head toward the back (see Figure 10-2).
  - c. Fold the left and right sides of the hood away from the head and place on the shoulders.

**NOTE:** *After every complete segmental cut, decontaminate the scissors or combat strap cutter along with the gloved hands of the soldier doing the cutting. This is done by dipping gloved hands and exchanging cutting tools in a bucket of 5% bleach. If ample supplies are available and water is limited, the M295 kit or RSDL can be used.*

3. Decontaminate head.
  - a. Use soap and water, RSDL, or 0.5% bleach solution.
  - b. Cover inlet port of filter to prevent wetting or congesting it. The patient continues to wear a mask until crossing the vapor control line (vapor may extend past the hot line).

- c. Wipe any exposed areas of patient's face that were not protected by the hood, including the chin, neck, and back of ears.

**NOTE:** *After completing the hood removal, instruct the casualty to move to the next station for the following steps. This station should be 10 to 20 m upwind from the hood removal station.*

4. Remove the FMC.
  - a. A medic at the litter patient decontamination station should view the FMC prior to removal.
  - b. Cut the FMC tie wire.
  - c. Allow the FMC to fall into a self-sealing plastic bag.
  - d. Seal the plastic bag and decontaminate the outside of the bag.
  - e. Place the plastic bag under the back of the patient's mask head harness straps.
5. Remove personal articles from pockets of JSLIST.
  - a. Have the casualty remove all items from the JSLIST jacket and trousers and place them in a self-sealing plastic bag.
  - b. Label the bag with the casualty's name and identification number and then move the bag with the patient to the next step in the ambulatory decontamination line.
  - c. The patient must decontaminate their gloves before and after handling the bag.

**NOTE:** *The patients' identification tags stay around their neck throughout the decontamination process. The tags are decontaminated with soap and water, RSDL, M295, or 0.5% bleach.*

6. Remove the casualty's JSLIST.

**NOTE:** *If there are not enough augmentees to do this job, one augmentee can instruct patients to cut off one another's overgarments. The augmentee must supervise the procedures.*

- a. Cut overgarment around tourniquets, bandages, and splints.
- b. Remove the JSLIST jacket by cutting it off.
  - i. The casualty should be standing and can hold onto a support, such as a chair or litter stand.

- ii. The individual with a cutting tool (scissors or combat strap cutter) stands in front of the casualty and cuts the patient's IPE.
- iii. First, cut around all bandages and tourniquets.
- iv. Cut the hook-and-pile wrist closures.
- v. Cut the JSLIST draw cord at the jacket bottom.
- vi. Cut the JSLIST jacket starting at the waist and cutting toward the collar in a line parallel to the zipper (or unfasten the hook and pile and unzip the zipper). Continue the cut from the hood down the back center of the jacket. This is best done using a seatbelt cutter.
- vii. Instruct the casualty to clench their fists and stand with feet shoulder-width apart and arms held down and extended backward at about a 30° angle if the jacket was unzipped or cut in the front. If the jacket was cut along the rear, have the patient extend the arms forward at about a 30° angle.
- viii. Grasp the jacket collar at the sides of the neck.
  - ix. Peel jacket off the shoulders in a down-and-away motion, smoothly pulling the jacket inside out over the casualty's fists.
  - x. Place the jacket in a plastic trash bag.

**NOTE:** *The jacket may need to be cut along the sleeve if bandages are in the way and sleeves cannot be rolled over the bandaged area.*

- c. Remove the JSLIST trousers.

**NOTE:** *Do not cut the trouser suspenders until the end of the process so that the trousers do not fall during cutting and get in the way of the cutter.*

- i. One augmentee should stand behind the casualty and another, if available, at the front of the casualty. The casualty should hold onto a chair or litter stand.
- ii. The easiest way to cut the trousers is from the front. Keep the pants zipped. Unfasten ankle fasteners and begin cutting at the ankle. Cut along the inseam, moving up toward the waist of the trousers (see Figure 10-4).

- After cutting both trouser legs from ankle to waist, cut each suspender and allow the trousers to fall to the ground. Take the trousers and lay them on the ground, black side up, next to the patient. Later the patient will step onto them as the overboots are removed.
- iii. Another method is to cut the trousers from the rear. In this case, first unfasten the waist tabs. Start the cut at the ankle and move to the waist. Once the cuts on both legs are complete from ankle to waist, cut the suspenders below the suspender cross points and then above the cross points, allowing the trousers to fall to the ground. Lay the trousers on the ground, black side up, next to the patient.
7. Remove the overboots.
    - a. Unfasten all boot closures.
    - b. Step on the heel of the boot and have the patient step out of the overboot and onto the black side of the cut trousers that are lying on the ground. Repeat this process for both boots. The overboots can be decontaminated and issued to other individuals.
    - c. If the overboot will not come off, cut the boot from top to bottom along the centerline of the boot until the boot is loose enough to step out of.
  8. Remove the casualty's outer gloves. Do not remove the inner glove liners.
    - a. Decontaminate your own gloves with the M295 kit, RSDL, or 5% bleach solution.
    - b. Decontaminate the casualty's gloves with the M295 kit, RSDL, or 5% bleach solution.
    - c. Instruct the casualty to hold their arms up, if possible, and away from their upper body. If the patient cannot do this, hold their gloves at the fingers.
    - d. Grasp the cuff of the glove.
    - e. Pull the cuff over the fingers, turning the glove inside out (see Figure 10-5).
    - f. Dispose of the contaminated gloves by placing them in a trash bag.
    - g. Decontaminate your own gloves again with the M295, RSDL, or 5% bleach solution.

9. Remove inner gloves.
  - a. The patient should remove their own inner gloves to reduce the possibility of spreading contamination. The augmentee instructs the casualty to remove the inner glove using the following guidance:
    - i. Grasp heel of glove liner without touching exposed skin.
    - ii. Peel liner downward and off.
    - iii. Drop it into the plastic trash bag.
    - iv. Remove the other liner in the same manner and drop it into the plastic trash bag.
    - v. The patient then moves to the monitoring station.

**NOTE:** *Waste material from two ambulatory patients, including the cut trousers, are placed into one 35-gallon trash bag along with the used 5% bleach and soapy water used on the two patients. Tie the bag shut and transport it to the dirty dump.*

### ***Step 2. Monitor duty uniform***

1. Monitor the casualty with an ICAM or M8 detection paper.
2. Check all areas of the casualty's clothing and combat boots. Pay particular attention to:
  - boots
  - protective mask
  - hair and neck area
  - discolored areas
  - damp spots
  - wrist closure area
  - areas under tears in the overgarment
  - areas around dressings and splints
3. If clean, send the casualty to the hot line.
4. If contaminated areas are found, decontaminate the areas using RSDL, the M295 kit, or soap and water. If the duty uniform is contaminated, it must be removed (see below). After decontamination, recheck the area again with the ICAM or the M8 detection paper.

**Step 3. Remove the duty uniform**

1. Remove personal effects from the duty uniform.
  - a. Have the casualty remove all items from the duty uniform and deposit them into a self-sealing plastic bag.
  - b. Check the personal items for contamination. If not contaminated, they remain with the patient. If contaminated, they are moved to a contaminated item holding area.
2. Remove inner clothing (if contaminated).
  - a. Cut or unbuckle belt.
  - b. Cut the pants following the same procedures as for the overgarment trousers.
  - c. Cut the jacket following the same procedures as for the overgarment jacket.
3. Remove undergarments (if contaminated).
  - a. Remove the patient's T-shirt.
    - i. Dip cutting devices in 5% bleach solution or scrub them with the M295 kit or the RSDL between each cut.
    - ii. Cut around bandages or splints, leaving them in place.
    - iii. Cut up the front of the patient's T-shirt from the waist up to the collar.
    - iv. Cut both sleeves from the elbow to the shoulder and then to the collar.
    - v. Next, peel the T-shirt away from the body to avoid spreading contamination.
  - b. Remove the patient's brassiere.
    - i. Cut it between the cups.
    - ii. Cut both shoulder straps where they attach to the cups and remove the brassiere.
  - c. Remove the patient's undershorts or panties.
    - i. Cut from the lower side of the hip to the waist on both sides.
    - ii. Place the undergarments into the plastic garbage bag containing the other contaminated items.
4. Check the patient for contamination.
  - a. After removing the patient's duty uniform and underwear, check the skin, hair, and boots for contamination by using M8 detector paper, ICAM, or radiac meter.

- b. Carefully survey all areas of the patient's skin, paying particular attention to areas around the neck, wrist, ears, dressings, and splints.
5. Perform final decontamination. At the final contamination check area, use RSDL, soap and water, or a 0.5% hypochlorite solution, followed by a water rinse, for any places on the patient that still indicate contamination.
6. A healthcare provider removes any contaminated bandages and tourniquets.
  - a. Place new tourniquets 1/2 to 1 inch above the old tourniquets.
  - b. Remove old tourniquets.
  - c. Decontaminate the exposed skin area.
  - d. Cut away bandages. Hemostatic dressings are removed by advanced providers.
  - e. Decontaminate the exposed skin area.
  - f. Replace bandages as needed to control bleeding.
  - g. Decontaminate exposed skin.
7. Conduct final check for completeness of decontamination with the ICAM or M8 paper.
8. Move to the hot line. Instruct the patient to move to the shuffle pit and hot line.

***Step 4. The hot line and clean side actions for the ambulatory patient***

**NOTE:** *Shuffle pits straddle the hot line. The shuffle pit is two parts STB and three parts earth (by volume). The ambulatory patient shuffle pit must be wide enough for the patient and two assistants.*

**NOTE:** *Take steps to reduce the incidence of patient cold injury and hypothermia. In cold conditions, have blankets available on the warm side of the hot line.*

1. At the shuffle pit, an augmentee from the clean side meets the patient and opens a blanket or other covering for the patient appropriate for the environmental conditions.
2. The patient shuffles through the shuffle pit wearing combat boots.



3. Once across the vapor control line, ambulatory patients can remove their mask.
4. In the clean treatment area, the patient is now retriaged, treated, and evacuated.
  - a. In a hot climate, the patient will probably be significantly dehydrated. The rehydration process must begin immediately.
  - b. Provide overhead for casualties in the holding area. Masks may be removed for treatment unless circumstances dictate that the casualty remain closer to the hot line.
  - c. Personnel on the clean side, past the vapor control line, are in MOPP 2 or less.
  - d. Patient protective ensemble should not be removed until the patient is medically stable enough to undergo decontamination.
  - e. If temperatures are near freezing, use a dry decontaminant (sand, paper towel, M291, or M295) for immediate (gross) decontamination and then move the patient inside a warm area before clothing is removed. Outer protective clothing is removed in a ventilated area immediately outside or near the entrance to the heated room.
  - f. If washing the patient's entire body is not necessary, then remove the clothing and decontaminate only the exposed areas. Remember that thicker winter clothing, if worn at the time of exposure, will offer some degree of protection against chemical agents. Thicker clothing offers adequate protection against dry particles and spores.
  - g. Once clothing removal begins, make the decontamination process as fast as possible.
  - h. If a structure is available, conduct patient thorough decontamination operations inside a heated area using warm soapy water.

