

FM 3-5
MCWP 3-37.3
C1

Change 1
Field Manual
No. 3-5

Headquarters
Department of the Army

Marine Corps Warfighting Publication (MCWP)
3-37.3

Commandant
US Marine Corps
Washington, DC, 31 January 2002

NBC Decontamination Operations

1. Change FM 3-5, 28 July 2000 as follows:

Remove Old Pages

1-3 and 1-4
2-1 through 2-4
3-5 and 3-6
3-17 and 3-18
3-33 and 3-34
4-5 through 4-33
6-1 and 6-2
9-1 through 9-7
D-1 and D-2
E-1 through E-17
Glossary-3 through Glossary-6
Bibliography-3 and Bibliography-4
Index-1 and Index-2

Insert New Pages

1-3 and 1-4
2-1 through 2-5
3-5 and 3-6
3-17 through 3-18
3-33 through 3-34
4-5 through 4-35
6-1 and 6-2
9-1 through 9-7
D-1 and D-2
E-1 through E-19
Glossary-3 through Glossary-6
Bibliography-3 and Bibliography-4
Index-1 and Index-2

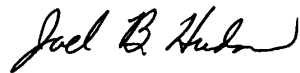
2. A bar (I) marks new or changed material.
3. File this transmittal in front of the publication.

DESTRUCTION RESTRICTION: Approved for public release; distribution is unlimited.

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

Official:



JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0202403

DISTRIBUTION:

Active Army, USAR, and ARNG: To be distributed in accordance with the initial distribution number 110737, requirements for FM 3-5.

By Direction of the Commandant of the Marine Corps:

EDWARD HANLON, JR.
Lieutenant General, US Marine Corps
Commanding General
Marine Corps Combat Development Command
PCN: 14300008000
PIN #: 058193-001

**This publication is available on the
General Dennis J. Reimer Training
And Doctrine Digital Library at
www.adtdl.army.mil**

consideration (METT-TC) and the resources available. Decon must be considered if the contamination levels exceed the negligible risk levels as follows:

- Chemical and biological contamination causes mild incapacitation in 5 percent or less of unprotected soldiers operating for 12 continuous hours within 1 meter of contamination. For the chemical-agent monitor (CAM), this equates to a one-bar reading at a distance of 1 inch from the surface.
- Radiological contamination can cause mild incapacitation in 2.5 percent or less of unprotected, nonpreviously exposed soldiers. This equates to a reading of no more than 0.33 centigray per hour (cGy/hr).

1-9. MOPP-gear exchange provides excellent protection against field concentrations of agents; however, wearing the gear causes performance degradation. Decon is performed to restore the normal operating tempo, but the logistical support that is required to keep soldiers in MOPP gear impacts operations. Therefore, decon should be conducted as soon as practical. Table 1-1 provides comparison data for decon levels/techniques.

Table 1-1. Comparison Data for Decon Levels/Techniques

Levels	Techniques ¹	Best Start Time	Performed by	Advantages
Immediate	Skin decon	Before 1 minute	Individual	Stops agent from penetrating.
	Personal wipe down	Within 15 minutes	Individual or crew	
	Operator's spray down/wipe down			
Operational	MOPP-gear exchange ²	Within 6 hours	Unit	Provides possible temporary relief from MOPP ⁴ . Limits liquid agent spread.
	Vehicle washdown ³		Battalion crew or decon platoon (-)	
Thorough	DED and DAD	When mission allows reconstitution	Decon platoon	Provides probable long-term MOPP reduction with minimum risk.
	DTD		Unit	

¹The techniques become less effective the longer they are delayed.
²Performance degradation and risk assessment must be considered when exceeding 6 hours. See FM 3-4 for battle-dress overgarment (BDO) risk assessment.
³Vehicle washdown is most effective if started within 1 hour.

DECON PRINCIPLES

1-10. Decon immediately for a chemical agent on the skin. Perform higher levels of decon as a result of the risk assessment. Personnel should—

- Decon as soon as possible. The sooner the contamination is removed, the sooner MOPP levels can be reduced and combat power can be restored.
- Decon only what is necessary. Weathering is the least costly method of decon. Expend resources where they count.
- Decon as far forward as possible. While METT-TC dependent, performing decon as close to the point as possible reduces the spread of contamination and minimizes any transfer hazard.
- Decon by priority. The commander identifies which items are most critical to the mission. Restoring combat power and reestablishing operating tempo are key.

DECON LEVELS

1-11. The three levels of decon operations are immediate, operational, and thorough (see Table 1-1, page 1-3).

IMMEDIATE

1-12. Skin decon is a soldier's basic survival skill and should be performed within 1 minute of being contaminated using the skin decontaminating kit (SDK).

1-13. Personal wipe down should be performed within 15 minutes. This is done to remove contamination from individual equipment by using an individual equipment decon kit (IEDK). Use detector paper or a CAM to locate the agent. For radiological contamination, use a radiac set to locate it and then brush, wipe, or shake it off.

1-14. Operators' spray down/wipe down should be done within 15 minutes. Operators use the M100 Sorbent Decontamination System (SDS) or the on-board M11/M13 decon apparatus to decon surfaces that they must touch or contact to operate the equipment. Radiological contamination in the form of dust particles may be wiped, scraped, or brushed off.

OPERATIONAL

1-15. A MOPP-gear exchange should be performed within 6 hours of being contaminated when thorough decon cannot be done. Soldiers will continue to wear MOPP gear and the operating tempo will be reduced.

1-16. Vehicle washdown should be performed within 6 hour of being contaminated when the mission does not permit a thorough decon. This process removes gross contamination and limits the spread of it.

THOROUGH

1-17. Detailed equipment decon (DED) and detailed aircraft decon (DAD) restore items so that they can be used without MOPP gear. Normally, the DED and the DAD are conducted as part of a reconstitution or during breaks in combat operations. These operations require support from a chemical decon unit.

1-18. Detailed troop decon (DTD) normally takes place in conjunction with DED/DAD. The contaminated unit conducts this process and supports the DED/DAD operations.

Chapter 2

Immediate Decon

Once a soldier is aware of chemical or biological contamination on his bare skin, he initiates immediate decon techniques, without command, by using his personal SDK. He decontaminates his hood, mask, gloves, and weapon using the IEDK or an additional SDK. To remove radiological contamination from equipment and personnel, brush it off and/or use soap and water.

NOTE: Throughout this manual, SDK refers to the M291 kit and IEDK refers to the M295 kit.

SKIN DECON

2-1. Start the skin-decon techniques within 1 minute of becoming contaminated. Some toxic chemical agents, especially nerve agents, kill in minutes.

CHEMICAL

2-2. Use the SDKs within 1 minute of contamination (see Figure 2-1). Instructions for use are listed on the outside of the kit itself, on the individual packet within the kit, and in STP 21-1-SMCT.

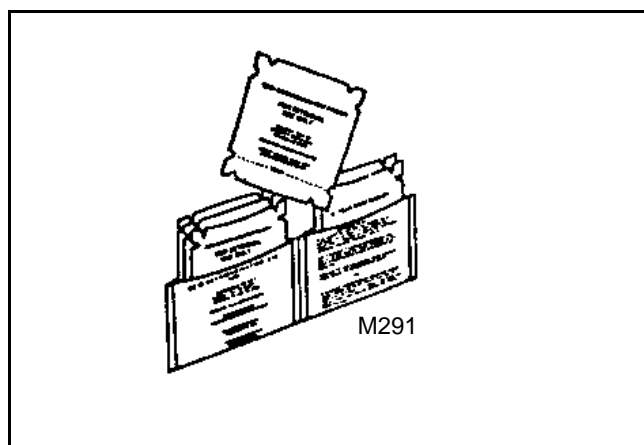


Figure 2-1. M291 SDK

2-3. If an SDK is not available, chemical contamination may be pinch-blotted from the skin with a cloth and flushed with water from a canteen. Soap, if available, can also be used to wash the agent from the skin. Washing with soap and water (or hot water) is the next best method for toxic-agent decon if SDKs are not available, but this method is not as effective as using the decon kits.

BIOLOGICAL

2-4. Washing with soap and water removes nearly all biological agents from the skin. A 0.5 percent chlorine (calcium hypochlorite [HTH] or household bleach) solution is an effective biological decontaminant. See Appendix B for details on how to make this solution.

RADIOLOGICAL

2-5. To remove radiological dust particles, brush, wash, or wipe them off.

PERSONAL WIPE DOWN

2-6. The personal wipe-down techniques are most effective when done within 15 minutes of being contaminated. The CAM and/or M8/M9 detector paper is used to detect and monitor equipment.

NOTE: Very high concentrations of DS2 can cause a CAM response in the G mode.

2-7. Wipe down your mask, hood, gloves, and other essential gear. Do not attempt to remove chemical contamination from your protective overgarment unless there are obvious clumps of the agent. In this case, scrape off the material. Brush off radiological or frozen chemical-agent contamination. See FM 3-4 for detailed information on your overgarment's protective qualities.

CHEMICAL

2-8. Decon individual equipment using the IEDKs. Wearing your Kevlar® helmet protective cover will prevent or reduce the adsorption of any liquid chemical agent. Washing with soap and water and bleach solutions is partially effective (see Appendix B).

BIOLOGICAL

2-9. Wash with soap and water. If water is not available, use SDKs in the same manner as described for chemical-agent decon.

RADIOLOGICAL

2-10. Locate radiological contamination with monitoring equipment and remove by brushing and shaking it off. Wash exposed areas of your skin and pay particular attention to your hair and fingernails. Avoid breathing the dust particles you shake off by wearing your protective mask or a piece of cloth over your nose and mouth. If wet, conduct a MOPP-gear exchange as soon as possible because brushing or shaking will not remove the contamination. Wipe off your equipment with warm, soapy water using rags or damp paper towels.

OPERATOR'S SPRAY DOWN/WIPE DOWN

2-11. Decon other mission-essential portions of your equipment before continuing your mission. The CAM and/or M8/M9 detector paper is used to determine what surfaces require decon.

2-12. Operator's spray down/wipe down is most effective when done within 15 minutes of contamination.

CHEMICAL

2-13. Decon those surfaces that you must touch on the exterior of the vehicle or the equipment you must use to do your job with the M100 SDS (see Figure 2-2) or the on-board portable decon apparatus (such as the M11 or M13) (see Figure 2-3). If the M100 SDS is not available, use the IEDK to decon the equipment that the DS2 may cause damage to by corrosive action (see Figure 2-4, page 2-4).

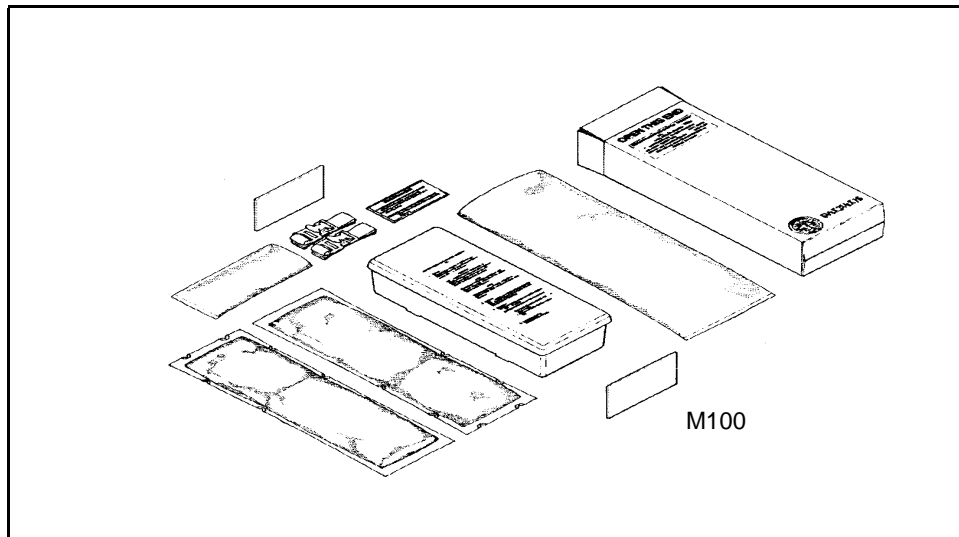


Figure 2-2. Sorbent Decontamination System

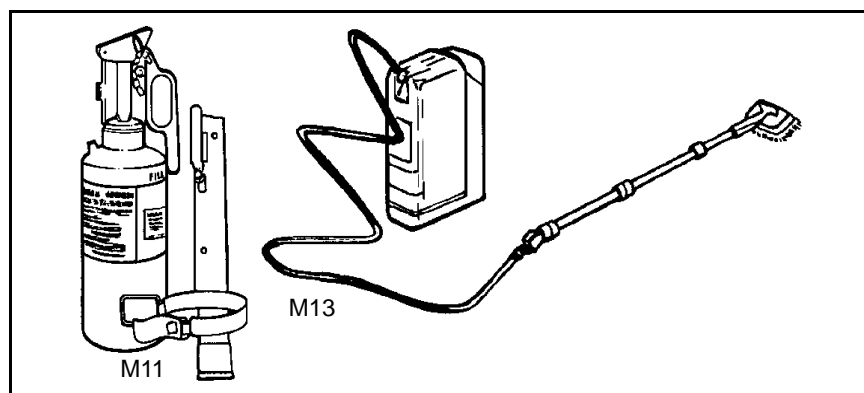


Figure 2-3. Portable Decon Apparatuses

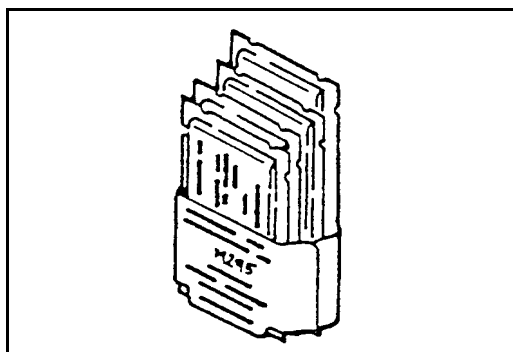


Figure 2-4. M295 IEDK

WARNING

Use extreme caution at all times when handling DS2. Do not mix DS2 and STB because it will cause a fire. Do not allow DS2 to be sprayed on personnel or protective clothing. DS2 is a combustible solution. Do not spray DS2 on hot engine blocks. Severe chemical burns can result if personnel fail to observe all safety precautions. DS2 can severely injure eyes and skin and, if inhaled, can cause illness. DS2 can damage the NBC protective overgarment. Long-term contact with DS2 can damage the NBC protective gloves, hood, and overboots.

2-14. Scrub the DS2 into the exterior surface with brushes. Wait 30 minutes, then wash off. If a decon apparatus is not available, use the field-expedient resources that are available to apply DS2 or STB from bulk containers. If necessary, use the nonstandard decontaminants that are discussed in Appendix B.

BIOLOGICAL

2-15. Use a bleach solution for biological contamination; however, if bleach is not available, use hot, soapy water. Apply with brushes and scrub the surface well. Rinse the surface after scrubbing (no wait is required). DS2 and STB are also effective against most known biological contamination, but because of their caustic nature, they are not preferred. Other nonstandard biological decontaminants are described in Appendix B.

RADIOLOGICAL

2-16. If you are contaminated by fallout, rain out, neutron-induced contamination, or any type of radiological agent, use your monitoring equipment to help locate it and decon as required. If detection equipment is not available and you suspect that you are contaminated, decon. Radiological contamination can usually be removed by brushing or scraping. Water is effective for flushing away radiological contamination; however, the runoff should be controlled by using drainage ditches that flow into a sump.

Remember, you have not destroyed the contamination, it has just been moved. The runoff will still be hazardous. If you have time, brush or scoop away the top inch of soil from your fighting position to lower the amount of radiological contamination affecting you.

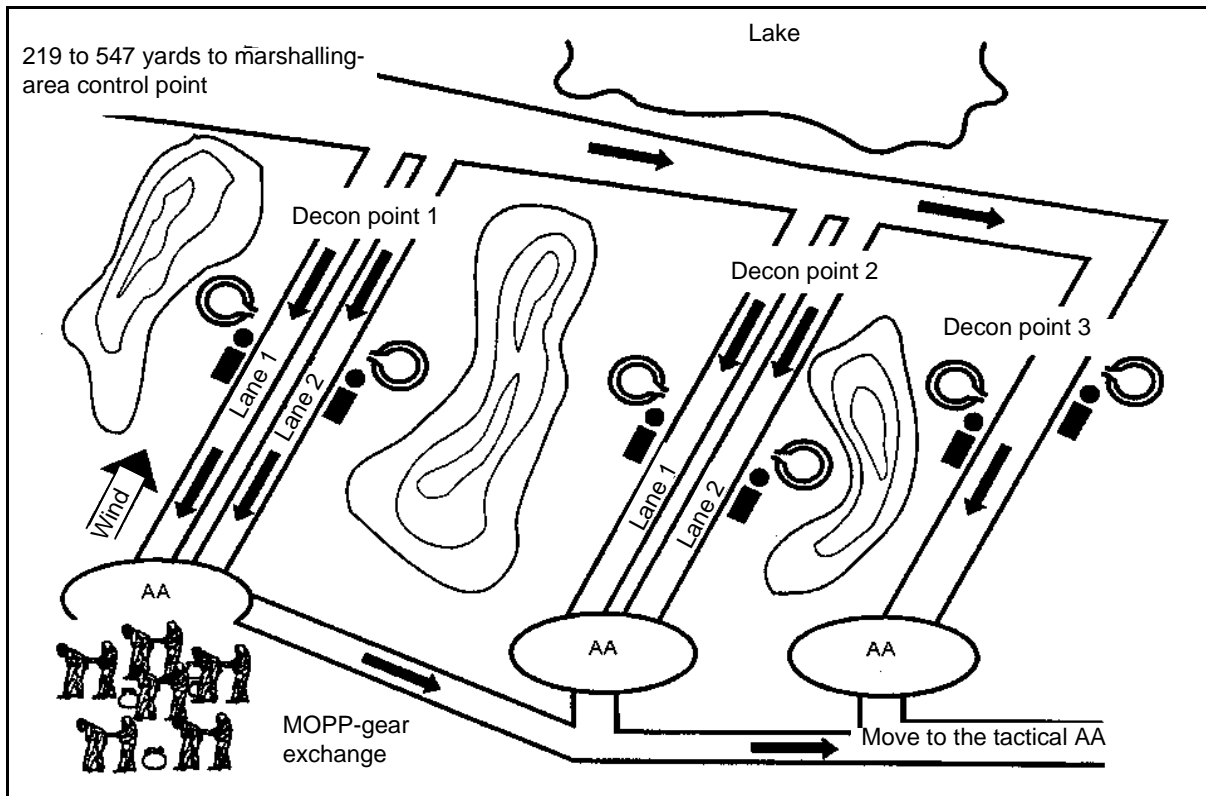


Figure 3-2. Dispersed Operational-Decon Setup

Table 3-3. Vehicle-Washdown Process

Steps	Equipment	Procedures
1. Assemble vehicles. Unit is tactically dispersed. Personnel at the control point direct movement.	Watch	Personnel at the control point supervise preparing vehicles and directing movement out of the AA.
2. Prepare vehicles.	None	Individual/crew closes all access doors, hatches, windows, and other openings. Remove camouflage and cover muzzles. If required, crews (less drivers) move to the MOPP-gear-exchange area. Move to the wash area on order.
3. Perform washdown.	Delivery system (such as the M12 and M17, 65-gallon-per-minute [GPM] pump, fire-fighting equipment, and so forth) that delivers hot, soapy water at 60 to 120 psi. Also sufficient water, fuel, and detergent for vehicles.	Soldiers/personnel wash equipment from top to bottom. Decon crew wears a toxicological apron, protective (TAP) or wet-weather gear over MOPP gear.
4. Move out to the next position.	None	Vehicles move to the MOPP-gear-exchange area (if required) or the next battle position.

BUDDY-TEAM METHOD

3-15. This method uses pairs of soldiers under the supervision of their squad/team leader to conduct the buddy-team MOPP-gear exchange. See Table 3-4, pages 3-7 through 3-17, for detailed step-by-step procedures for this method. See Table 3-4a, pages 3-17a through 3-17f, for the procedures for the buddy-team method MOPP-gear exchange with the joint lightweight integrated-suit technology (JSLIST). For units equipped with the combat vehicle crewman uniform system (CVCUS)/chemical protective undergarment (CPU), see Table 3-5, pages 3-18 through 3-21.

TRIPLE BUDDY-TEAM METHOD

3-16. This method is used by soldiers equipped with the M40A1, M42, or M43 mask with the quick-doff hood. A third soldier is needed to hold the filter canister and hose to prevent the transfer of contamination. See Table 3-6, pages 3-22 through 3-27, for detailed step-by-step procedures for this method. For units equipped with the CVCUS/CPU, see Table 3-7, pages 3-28 through 3-30.

INDIVIDUAL (EMERGENCY) METHOD

3-17. This method is used only when a soldier does not have a buddy to help him and the risk of MOPP-gear failure demands that an exchange occur. See Table 3-8, pages 3-31 through 3-33, for detailed step-by-step procedures for this method. See Table 3-8a, pages 3-33a through 3-33d, for the procedures for the individual (emergency method) MOPP-gear exchange with the JSLIST. For units equipped with the CVCUS/CPU, see Table 3-9, pages 3-34 through 3-37.

Table 3-4. Steps for the Buddy-Team Method MOPP-Gear Exchange (Continued)

Steps	Contamination Type	Required Equipment	Procedures
8. Secure hood.	All contamination	One IEDK	Buddy #1 uses an IEDK to wipe Buddy #2's gloves. He unrolls Buddy #2's hood and attaches the straps and tightens the neck cord. Buddy #1 and Buddy #2 reverse roles and repeat steps 2 through 8.
9. Secure gear.	All contamination	One chemical protective helmet cover per person	The soldier secures his individual gear and puts it back on (see Figure 3-15). He puts on a new chemical protective helmet cover and moves to the AA. He uses the buddy system to check the fit of all secured gear.



Figure 3-15. Securing the Hood

Table 3-4a. Steps for the Buddy-Team Method MOPP-Gear Exchange With the JSLIST Chemical Protective Ensemble

Steps	Contamination Type	Required Equipment	Procedures
1. Decon gear—removes gross contamination from individual gear (weapons, helmet, load-bearing equipment, and mask carrier).	All contamination	Four long-handled brushes One large piece of plastic (poncho or similar material)	The soldier mixes three parts earth to two parts STB.
	Chemical/ biological	One 30-gallon container, STB dry mix, and one IEDK	The soldier removes and discards the chemical protective helmet cover. He brushes or rubs STB onto his individual gear (helmet and mask carrier) and the hose of the M42 or M43 mask if worn. He gently shakes off excess STB and sets aside his gear on an uncontaminated surface (plastic, poncho, or similar material).
	Radiological	Hot, soapy water	The soldier brushes or wipes radiological contamination from his individual gear. He washes it with hot, soapy water (if available), then sets it aside to dry on an uncontaminated surface (plastic, poncho, or similar material).
2. Prepare to decon—facilitates later removal of overgarment trousers and overboots.	All contamination	Cutting tool	Buddy #1 removes the M9 detector paper from Buddy #2's overgarment. He unties the bow in Buddy #2's coat retention cord if tied. He unfastens the webbing-strip snap at the bottom front of Buddy #2's coat and releases the coat retention-cord loop at the waist. Buddy #1 then loosens the bottom of the coat by pulling the material away from Buddy #2's body. NOTE: If wearing the M43 protective mask, tie the microphone cord to the hose of the mask. He unfastens and loosely refastens the hook-and-pile fastener tapes at Buddy #2's wrists and ankles. He unfastens or cuts the fasteners on Buddy #2's overboots. NOTE: The M40 voice amplifier (M7) and the M42A2 detachable microphone cannot be decontaminated and will be disposed of as contaminated waste; however, ensure that these items are contaminated before disposing of them.
3. Decon the mask and hood—removes gross contamination.	Chemical/ biological	Two IEDKs per person	Buddy #1 uses an IEDK to wipe Buddy #2's eye-lens outserts from the top down. (NOTE: Do not press so hard that you break Buddy #2's face-mask seal.) He then wipes the rest of Buddy #2's hood from the top of the head to the bottom of the hood (see Figure 3-5, page 3-9). After he has finished wiping Buddy #2's mask, he must wipe his own gloves in preparation for rolling Buddy #2's hood. He starts from the rear and rolls Buddy #2's hood, using 2-inch tucks, until it reaches the center of his head (see Figure 3-6, page 3-9). He rolls the front of Buddy #2's hood tightly under the outlet valve and filter. He ensures that the hood is off of Buddy #2's garment (see Figure 3-7, page 3-10).
	Radiological	Three containers (about 3-gallon capacity)	Buddy #1 wipes Buddy #2's mask and hood with a sponge dipped in hot, soapy water and rinses them with a sponge dipped in clean water. He dries Buddy #2's mask and hood with paper towels or rags. Buddy #2 wipes his own gloves.

Table 3-4a. Steps for the Buddy-Team Method MOPP-Gear Exchange With the JSLIST Chemical Protective Ensemble (continued)

Steps	Contamination Type	Required Equipment	Procedures
		Two sponges Soapy water Rinse water Paper towels	NOTE: Cool, soapy water is not as effective for removing contamination, but it can be used if you scrub longer. If the water supply is limited, use drinking water from your canteen with a wet sponge or cloth. If water is not available, brush and dust off the radioactive dust particles.
4. Remove the chemical protective coat—limits the spread of agents and helps prevent agents from penetrating through to the undergarments or the skin.	All contamination	Two discard containers (for example, plastic bags)	<p>Buddy #2 feels for and locates the suspender snap couplers on the outside of his coat and releases them. Buddy #1 unties Buddy #2's drawcord if tied, presses the barrel lock release, and unsnaps the barrel lock. (NOTE: If buddy #1 has difficulty grasping the barrel lock, he should use the drawcord to pull the barrel lock away from the mask. This will allow him to grasp and unfasten the barrel lock without touching the interior of the hood.) Buddy #1 unfastens Buddy #2's front closure flap and pulls the slide fastener down from the chin to the bottom of the coat. Buddy #1 instructs Buddy #2 to turn around. Buddy #1 grasps Buddy #2's hood, rolls it inside out, and pulls it off Buddy #2's head. Buddy #1 grasps Buddy #2's coat at the shoulders, instructs him to make a fist to prevent the chemical protective gloves from coming off, and pulls the coat down and away from him, ensuring that the black part of the coat is not touched. (NOTE: If there is difficulty removing the coat in this manner, Buddy #2 should pull one arm out at a time.) Buddy #1 lays the coat on the ground, black side up. (NOTE: Buddy #2 will use the coat later as an uncontaminated surface to stand on when putting on his new overgarment.)</p> <div data-bbox="968 906 1751 1011" style="border: 1px solid black; padding: 5px; text-align: center;"> <p>CAUTION</p> <p>Buddy #1 and Buddy #2 must take care to avoid contaminating the inside surface of Buddy #2's coat.</p> </div>
5. Remove the chemical protective trousers.	All contamination	Two discard containers (from step 4)	<p>Buddy #1 unfastens Buddy #2's hook-and-pile fastener tapes at the waistband, unfastens the two front closure snaps, and opens the fly slide fastener on the front of the trousers. Buddy #1 grasps Buddy #2's trousers at the hips and pulls them down to his knees. Buddy #1 instructs Buddy #2 to lift one leg (with the foot pointed down) and bend slightly at the knee for stability. Buddy #1 grasps the trouser leg of Buddy #2's elevated foot and with a hand on each side of the trouser leg, pulls the trouser leg in an alternating motion until Buddy #2 can step out of it. Repeat the process for the other leg. Buddy #1 discards the trousers.</p> <div data-bbox="959 1271 1749 1377" style="border: 1px solid black; padding: 5px; text-align: center;"> <p>CAUTION</p> <p>Buddy #1 and Buddy #2 must take care to avoid contaminating Buddy #2's clothing and skin.</p> </div>

Table 3-4a. Steps for the Buddy-Team Method MOPP-Gear Exchange With the JSLIST Chemical Protective Ensemble (continued)

Steps	Contamination Type	Required Equipment	Procedures
6. Remove the chemical protective overboots.	All contamination	Two discard containers (from step 4)	Buddy #1 instructs Buddy #2 to loosen his overboots by alternately stepping on each heel and pulling up on his foot (see Figure 3-10, page 3-13). Buddy #1 pulls off Buddy #2's overboots (one overboot at a time) and Buddy #2 steps directly onto the coat spread on the ground as each foot is withdrawn from the overboot. NOTE: Buddy #2 may put his hands on Buddy #1 for balance but must then decontaminate his gloves. Buddy #1 discards the overboots.
7. Remove the chemical protective gloves/liners.	All contamination	Two discard containers (from step 4)	Buddy #2 holds the fingertips of his gloves and partially slides his hands out. When both hands are free, he holds his arms away from his body and lets the gloves drop off, away from the black side of the coat. Buddy #2 removes the protective glove inserts. Buddy #1 discards the chemical protective gloves and inserts. <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>CAUTION</p> <p>Buddy #1 and Buddy #2 must take care to avoid letting their gloves come in contact with the coat spread on the ground.</p> </div>
8. Put on the chemical protective trousers.	All contamination	One JSLIST chemical protective ensemble per person	Buddy #1 opens the package containing the new trousers without touching the inside of the package. Buddy #2 removes the trousers without touching the outside of the package. While standing on an uncontaminated surface, Buddy #2 puts on his trousers, closes the slide fastener, and fastens the two fly opening snaps. He pulls his suspenders over his shoulders and fastens the snap couplers. He adjusts the length of the suspenders to ensure a comfortable fit. He adjusts the hook-and-pile fastener tape at the waistband for a snug fit. <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>CAUTION</p> <p>Buddy #2 must take care to ensure that the trousers touch only the uncontaminated surface.</p> </div>
9. Put on the chemical protective coat.	All contamination	One JSLIST chemical protective ensemble per person	Buddy #1 opens the package containing the new coat without touching the inside of the package. Buddy #2 removes the coat without touching the outside of the package. He puts on the coat, pulls the slide fastener up as far as the chest, and secures the front closure hook-and-pile fastener tape on the front flap up as far as the chest. He pulls the bottom of the coat down over his trousers. He grasps the loop on the back of the overgarment, pulls the loop out and away from the coat, and brings the loop forward between his legs, pulling on it so that the bottom of the coat fits snugly over the trousers. He places the loop over the webbing-strip snap and fastens it. He adjusts the coat retention cord if necessary and ties the excessive cord in a bow.

Table 3-4a. Steps for the Buddy-Team Method MOPP-Gear Exchange With the JSLIST Chemical Protective Ensemble (continued)

Steps	Contamination Type	Required Equipment	Procedures
10. Put on the chemical protective overboots.	All contamination	One set of chemical protective overboots per person	Buddy #1 opens the package containing the new overboots without touching the inside of the package. Buddy #2 removes the overboots without touching the outside of the package. He puts the overboots on over his combat boots and adjusts/secures the fasteners. He pulls his trouser legs over the overboots and secures the two hook-and-pile fastener tapes on each ankle so they fit snugly around the overboot.
11. Put on the chemical protective hood.	All contamination	One JSLIST chemical protective ensemble per person	<p>Buddy #2 puts the hood on his head. He completely closes the front slide fastener on the coat and secures the hook-and-pile fastener tape on the front flap as far as the top of the slide fastener. He places the edge of the hood around the edge of the mask and secures the hook-and-pile fastener tape on the hood.</p> <div data-bbox="968 634 1724 764" style="border: 1px solid black; padding: 5px; text-align: center;"> <p>WARNING The barrel lock release button must face away from the user when worn to avoid the barrel lock from unfastening and possibly exposing the user to contamination.</p> </div> <p>He pulls the drawcord tight around the edge of the mask, snaps the ends of the barrel lock together, squeezes both ends of the barrel lock while pulling the drawcord, and slides the barrel lock up under his chin to keep the cord in place. Without touching Buddy #2, Buddy #1 inspects the hood and mask to make sure that the hood is positioned properly and the skin is not exposed. Buddy #2 adjusts the hood and mask as directed. If Buddy #1's assistance is required for proper adjustment, Buddy #2 will decontaminate Buddy #1's gloves before he touches the hood and mask.</p>
12. Put on the chemical protective gloves/liners.	All contamination	One set of chemical protective gloves with liners per person (correct size)	Buddy #1 opens the package containing the new chemical protective gloves and liners without touching the inside of the package. Buddy #2 removes the gloves and liners without touching the outside of the package. He puts on the liners and gloves, pulls the cuffs of the coat over the chemical protective gloves, and fastens the hook-and-pile fastener tapes on each sleeve of the coat. He puts on the M9 detector paper as required by the SOP.
13. Reverse roles.	All contamination	One JSLIST chemical protective ensemble per person. One set of chemical protective boots per person One set of chemical protective gloves with liners per person (correct size)	Buddy #1 and Buddy #2 reverse roles and repeat steps 3 through 13.

Table 3-4a. Steps for the Buddy-Team Method MOPP-Gear Exchange With the JSLIST Chemical Protective Ensemble (continued)

Steps	Contamination Type	Required Equipment	Procedures
14. Secure the gear.	All contamination	One chemical protective helmet cover per person	Buddy #1 places the new chemical protective helmet cover on the personnel armor system ground troop (PASGT) helmet if used. He uses the buddy system to check the fit of all secured gear.

THIS PAGE IS INTENTIONALLY LEFT BLANK.

Table 3-5. Steps for the CVCUS/CPU (Buddy-Team Method) MOPP-Gear Exchange

Steps	Contamination Type	Required Equipment	Procedures
1. Decon gear—removes gross contamination from individual gear (weapons, helmet, load-bearing equipment, and mask carrier).	All contamination	Four long-handled brushes A large piece of plastic (poncho or similar material)	The soldier mixes three parts earth to two parts STB.
	Chemical/biological	One 30-gallon container, STB dry mix, and one IEDK	The soldier removes and discards the chemical protective helmet cover if worn. He brushes or rubs the STB onto his individual gear and the hose of the M42 mask if worn. He gently shakes off any excess STB and sets aside his gear on an uncontaminated surface.
	Radiological	Hot, soapy water	The soldier brushes or wipes radiological contamination from his individual gear. He washes it with hot, soapy water (if available) then sets it aside to dry on an uncontaminated surface (plastic, poncho, or similar material).
2. Prepare for decon—facilitates MOPP-gear removal.	All contamination	Cutting tool	Buddy #1 unfastens the shoulder straps on Buddy #2's hood and pulls them over his shoulder and reattaches them to the Velcro fastener. He loosens the drawcord on Buddy #2's hood. He removes the M9 detector paper from Buddy #2's CVCUS. He unzips the ankles on both legs of Buddy #2's CVCUS. He unfastens or cuts the fasteners on Buddy #2's overboots. NOTE: A soldier can do this step by himself or with the help of his buddy.
3. Decon mask and hood—removes gross contamination.	Chemical/biological	Two IEDKs per person	Buddy #1 uses an IEDK to wipe Buddy #2's eye-lens outserts from the top down. (NOTE: Do not press so hard that you break Buddy #2's face-mask seal.) He then wipes the rest of Buddy #2's hood from the top of the head to the bottom of the hood (see Figure 3-5, page 3-9). After he has finished wiping Buddy #2's mask, he must wipe his own gloves in preparation for rolling Buddy #2's hood. He starts from the rear and rolls Buddy #2's hood, using 2-inch tucks, until it reaches the center of his head (see Figure 3-6, page 3-9). He rolls the front of Buddy #2's hood tightly under the outlet valve and filter. He ensures that the hood is off of Buddy #2's garment (see Figure 3-7, page 3-10).

Table 3-8. Steps for the Individual (Emergency Method) MOPP-Gear Exchange (Continued)

Steps	Contamination Type	Required Equipment	Procedures
5. Remove gloves.	All contamination	Two discard containers (from step 4) One IEDK	The soldier wipes around the edges of the packages containing the new items (gloves, overgarments, and overboots) with an IEDK. He opens the new packages. He holds the fingertips of his gloves and partially slides his hands out. When the fingers of both hands are free, he holds his arms away from his body and lets his gloves drop.
6. Put on overgarment.	All contamination	One set of chemical protective overgarments per person One IEDK	The soldier removes the overgarment from its package without touching the outside. He puts on the overgarment and fastens it, leaving the trouser legs open until he puts on the new overboots.
7. Put on overboots and gloves.	All contamination	One set of chemical protective overboots per person One set of chemical protective gloves per person	The soldier removes the overboots (one at a time) from their package without touching the outside and puts them on. He removes the gloves from their package without touching the outside, puts them on, and fastens his trouser legs. NOTE: The gloves and overboots will have a light powdery coating. This is normal. Do not remove it. It will not affect the protective qualities.
8. Secure hood.	All contamination	One chemical protective helmet cover per person	The soldier secures his individual gear and puts it back on. He puts on a new chemical protective helmet cover and moves to the AA.

Table 3-8a. Steps for the Individual (Emergency Method) MOPP-Gear Exchange With the JSLIST Chemical Protective Ensemble

Steps	Contamination Type	Required Equipment	Procedures
1. Decon gear—removes gross contamination from individual gear (weapons, helmet, load-bearing equipment, and mask carrier).	Chemical/ biological	One IEDK	The soldier uses M8 detector paper to determine the areas of gross contamination and field-expedient absorbents (sand, dirt, or rags) to remove gross liquid contamination. He should take special care to avoid touching these areas during overgarment removal. He uses an IEDK to decon his individual gear (helmet, ICE, weapon, and mask carrier).
	Radiological	Hot, soapy water	The soldier removes and discards his chemical protective helmet cover. He brushes or wipes radiological contamination from his individual gear. He washes it with hot, soapy water (if available), then sets it aside to dry on an uncontaminated surface (plastic, poncho, or similar material).
2. Prepare to decon—facilitates later removal of overgarment trousers and overboots.	All contamination	Cutting tool	The soldier removes the M9 detector paper from his overgarment. He unties the bow in the coat retention cord if tied. He unfastens the webbing-strip snap at the bottom front of his coat and releases the coat retention-cord loop at his waist. He loosens the bottom of his coat by pulling the material away from his body. NOTE: If wearing the M43 protective mask, tie the microphone cord to the hose of the mask. He unfastens and loosely refastens the hook-and-pile fastener tapes at his wrists and ankles. He unfastens or cuts the fasteners on his overboots. NOTE: The M40 voice amplifier (M7) and the M42A2 detachable microphone cannot be decontaminated and will be disposed of as contaminated waste; however, ensure that these items are contaminated before disposing of them.
3. Decon the mask and hood—removes gross contamination.	Chemical/ biological	Two IEDKS per person	The soldier uses an IEDK to decon the exposed parts of his mask. He starts at the eye-lens outserts and wipes down. He wipes all the exposed parts of the mask. He wipes the front edge of his hood including the barrel lock and fasteners under his chin. He then decons his gloves in preparation to release the hood seal. NOTE: The soldier must pay particular attention to the areas between the fingers when decontaminating the gloves.
	Radiological	Three containers (about 3-gallon capacity) Two sponges Soapy water Rinse water Paper towels	The soldier wipes his mask and hood with a sponge dipped in hot, soapy water and rinses them with a sponge dipped in clean water. He dries his mask and hood with paper towels or rags. He then wipes his gloves. NOTE: Cool, soapy water is not as effective for removing contamination, but it can be used if you scrub longer. If the water supply is limited, use drinking water from your canteen with a wet sponge or cloth. If water is not available, brush and dust off the radioactive dust particles.

Table 3-8a. Steps for the Individual (Emergency Method) MOPP-Gear Exchange With the JSLIST Chemical Protective Ensemble (continued)

Steps	Contamination Type	Required Equipment	Procedures
<p>4. Remove the chemical protective coat—limits the spread of agents and helps prevent agents from penetrating through to the undergarments or the skin.</p>	<p>All contamination</p>	<p>Two discard containers (for example, plastic bags)</p>	<p>The soldier feels for and locates the suspender snap couplers on the outside of his coat and releases them. He unties the drawcord if tied, presses the barrel lock release, and unsnaps the barrel lock. NOTE: If the soldier has difficulty grasping the barrel lock, he should use the drawcord to pull it away from his mask, allowing him to grasp and unfasten it without touching the interior of his hood. He unfastens the front closure flap and pulls the slide fastener from the chin to the bottom of the coat. He grasps the hood by the outside surface near each end of the barrel lock, lifts it off his head, and reverse rolls the hood one time while pulling the hood towards the back of his head to remove it. He grasps the front side of the coat and pulls it back until it is off his shoulders. He puts his arms behind his back and works his arms out of the sleeves. NOTE: The soldier ensures that the outside of the coat does not touch his body. He lays the coat on the ground, black side up. NOTE: The soldier will use the coat later as an uncontaminated surface to stand on when putting on his new overgarment.</p> <div data-bbox="926 748 1780 857" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">CAUTION</p> <p>The soldier must take care to avoid contaminating the inside surface of his coat.</p> </div>
<p>5. Remove the chemical protective trousers/overboots.</p>	<p>All contamination</p>	<p>Two discard containers (from step 4)</p>	<p>The soldier unfastens the hook-and-pile fastener tapes at his waistband, unfastens the two front closure snaps, and opens the fly slide fastener on the front of his trousers. He loosens his overboots by alternately stepping on each heel and pulling up on his foot. The soldier grasps his trousers and pushes them down to his knees. He walks out of his trousers and overboots simultaneously and steps onto the black side of the coat.</p> <div data-bbox="926 1036 1780 1144" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">CAUTION</p> <p>The soldier must take care to avoid contaminating his clothing and skin.</p> </div>
<p>6. Remove the chemical protective gloves/liners.</p>	<p>All contamination</p>	<p>Two discard containers (from step 4)</p>	<p>The soldier wipes around the edges of the packages containing the new items (gloves, overgarments, and overboots) with an IEDK and then opens them. He holds the fingertips of his gloves and partially slides his hands out. When the fingers of both hands are free, he holds his arms away from his body and lets his gloves drop. He removes the protective glove inserts and discards them.</p> <div data-bbox="926 1292 1780 1401" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">CAUTION</p> <p>The soldier must take care to avoid letting his gloves come in contact with the coat spread on the ground.</p> </div>

Table 3-8a. Steps for the Individual (Emergency Method) MOPP-Gear Exchange With the JSLIST Chemical Protective Ensemble (continued)

Steps	Contamination Type	Required Equipment	Procedures
7. Put on the chemical protective trousers.	All contamination	One JSLIST chemical protective ensemble per person	<p>The soldier removes the trousers from the package without touching the outside. He puts them on, closes the slide fastener, and fastens the two fly opening snaps. He pulls the suspenders over his shoulders and fastens the snap couplers. He adjusts the length of the suspenders to ensure a comfortable fit. He adjusts the hook-and-pile tape at the waistband for a snug fit.</p> <div data-bbox="921 467 1766 578" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">CAUTION</p> <p style="text-align: center;">The soldier must take care to ensure that the trousers touch only the uncontaminated surface.</p> </div>
8. Put on the chemical protective coat.	All contamination	One JSLIST chemical protective ensemble per person	<p>The soldier removes the coat from the package without touching the outside. He puts on the coat, closes the slide fastener up as far as the chest, and secures the front closure hook-and-pile fastener tape on the front flap up as far as his chest. He pulls the bottom of his coat down over his trousers. He grasps the loop on the back of his coat and pulls it out and away from the back of the coat. He brings the loop forward between his legs, pulling on it so that the bottom of the coat fits snugly over his trousers. He places the loop over the webbing-strip snap on the front of the coat and fastens it. He adjusts the retention cord if necessary and ties the excessive cord in a bow.</p> <div data-bbox="921 829 1766 927" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">CAUTION</p> <p style="text-align: center;">The soldier must take care to ensure that his body and clothing touch only the inner surface of the coat.</p> </div>
9. Put on the chemical protective overboots.	All contamination	One set of chemical protective overboots per person	<p>The soldier removes the overboots from the package without touching the outside. He puts the overboots on over his combat boots, adjusts/secure the fasteners, pulls his trouser legs over the overboots, and secures the two hook-and-pile fastener tapes on each ankle so they fit snugly around his overboot.</p>
10. Put on the chemical protective hood.	All contamination	One JSLIST chemical protective ensemble per person	<p>The soldier puts the hood on his head, completely closes the front slide fastener on his coat, and secures the hook-and-pile fastener tape on the front flap as far as the top of the slide fastener. He places the edge of the hood around the edge of the mask and secures the hook-and-pile fastener tape on the hood. He pulls the drawcord tight around the edge of the mask, snaps the ends of the barrel lock together, squeezes both ends of the barrel lock while pulling the drawcord, slides the barrel lock up under his chin to keep the cord in place, and ties off the drawcord if needed.</p> <div data-bbox="921 1252 1766 1365" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;">WARNING</p> <p style="text-align: center;">The barrel lock release button must face away from the user when worn to avoid the barrel lock from unfastening and possibly exposing the user to contamination.</p> </div>

**Table 3-8a. Steps for the Individual (Emergency Method) MOPP-Gear Exchange With the JSLIST
Chemical Protective Ensemble (continued)**

Steps	Contamination Type	Required Equipment	Procedures
11. Put on the chemical protective gloves/liners.	All contamination	One set of chemical protective gloves with liners per person (correct size)	The soldier removes the gloves/liners from the package without touching the outside. He puts on the liners and gloves, pulls the cuffs of the coat over the gloves, and fastens the hook-and-pile tapes on each sleeve of the coat. He puts on the M9 detector paper as required by the SOP.
12. Secure the gear.	All contamination	One chemical protective helmet cover per person	The soldier places the new chemical protective helmet cover on the PASGT helmet if used. He uses the buddy system to check the fit of all secured gear.

Table 3-9. Steps for the CVCUS/CPU, Individual (Emergency Method) MOPP-Gear Exchange

Steps	Contamination Type	Required Equipment	Procedures
1. Decon gear—removes gross contamination from individual gear (weapon, helmet, load-bearing equipment, and mask carrier).	Chemical/biological	One IEDK	The soldier uses M8 detector paper to determine the areas of gross contamination and field-expedient absorbents (sand, dirt, or rags) to remove gross liquid contamination. He should take special care to avoid touching these areas during overgarment removal. He uses an IEDK to decon his individual gear (helmet LCE, weapon, and mask carrier).
	Radiological	Hot, soapy water	The soldier brushes or wipes radiological contamination from his individual gear. He washes it with hot, soapy water (if available) then sets it aside to dry on an uncontaminated surface (plastic, poncho, or similar material).
2. Prepare to decon—facilitates removal of overgarment trousers and overboots.	All contamination	Cutting tool	The soldier unfastens the shoulder straps on his hood, pulls them over his shoulders, and reattaches them to the front of the hood. He loosens the drawcord on the hood of his protective mask. NOTE: If wearing the M43 protective mask, tie off the microphone cord to the hose of the mask. He removes the M9 detector paper from his overgarment and unties/cuts the drawcords on the trouser legs of his overgarment. He unzips the trouser legs and rolls a cuff in each trouser leg, ensuring that the cuffs do not come above the top of his overboots. He unfastens or cuts the fasteners on the overboots.
3. Decon mask and hood—removes gross contamination from the mask and hood.	Chemical/biological	One IEDK	<p>The soldier wipes the eye-lens outserts on his mask from the top down. He wipes his mask and gloves and rolls his hood. He grasps the straps of the hood and lifts the hood off his shoulders and partially over his head until most of the back of his head is exposed. He rolls the hood, starting at the chin, and works around the entire mask until the rolled hood will stay up and off of his shoulders. He tucks the straps and neck cord into the roll. He rolls the hood tightly against his mask without pulling the hood off the back of his head. He tucks the tail between the upper part of the canister and the mask. (Tie the tail over and under the hose for the M42 mask.)</p> <p>The soldier removes the applicator mitt from the package with his nondominant hand. Making a "V", he wipes down his hand, paying particular attention to the areas between his fingers. Once he has thoroughly wiped down his dominant hand, he must insert it into the applicator mitt and thoroughly wipe down his other hand.</p>

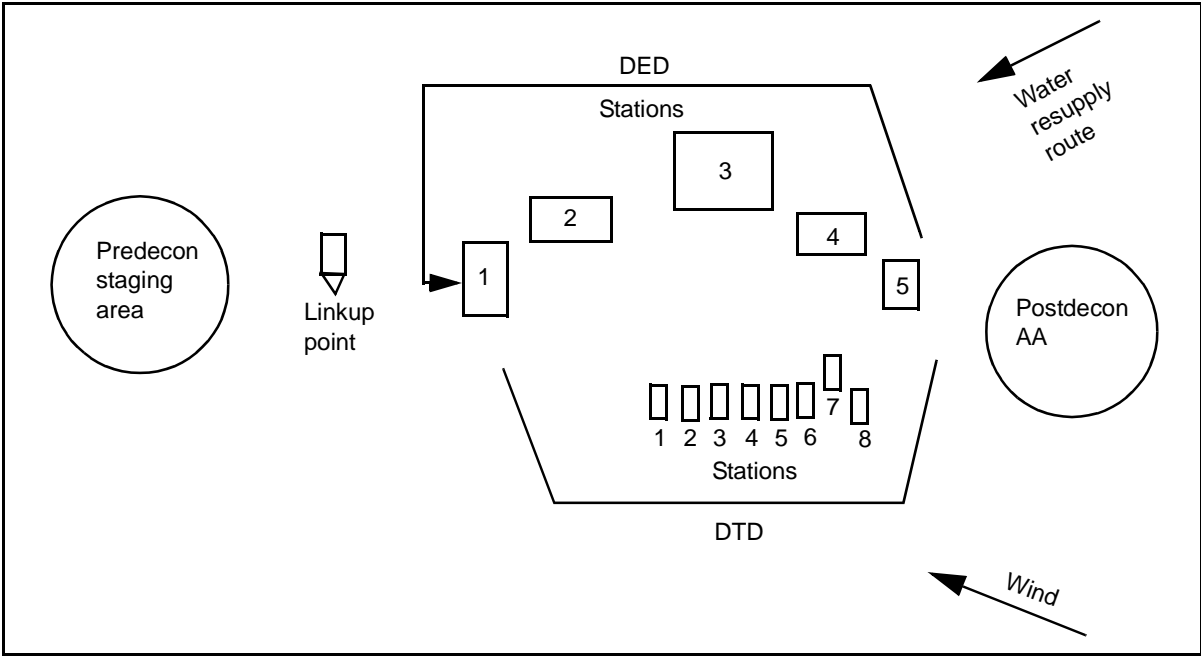


Figure 4-1. Thorough-Decon Site

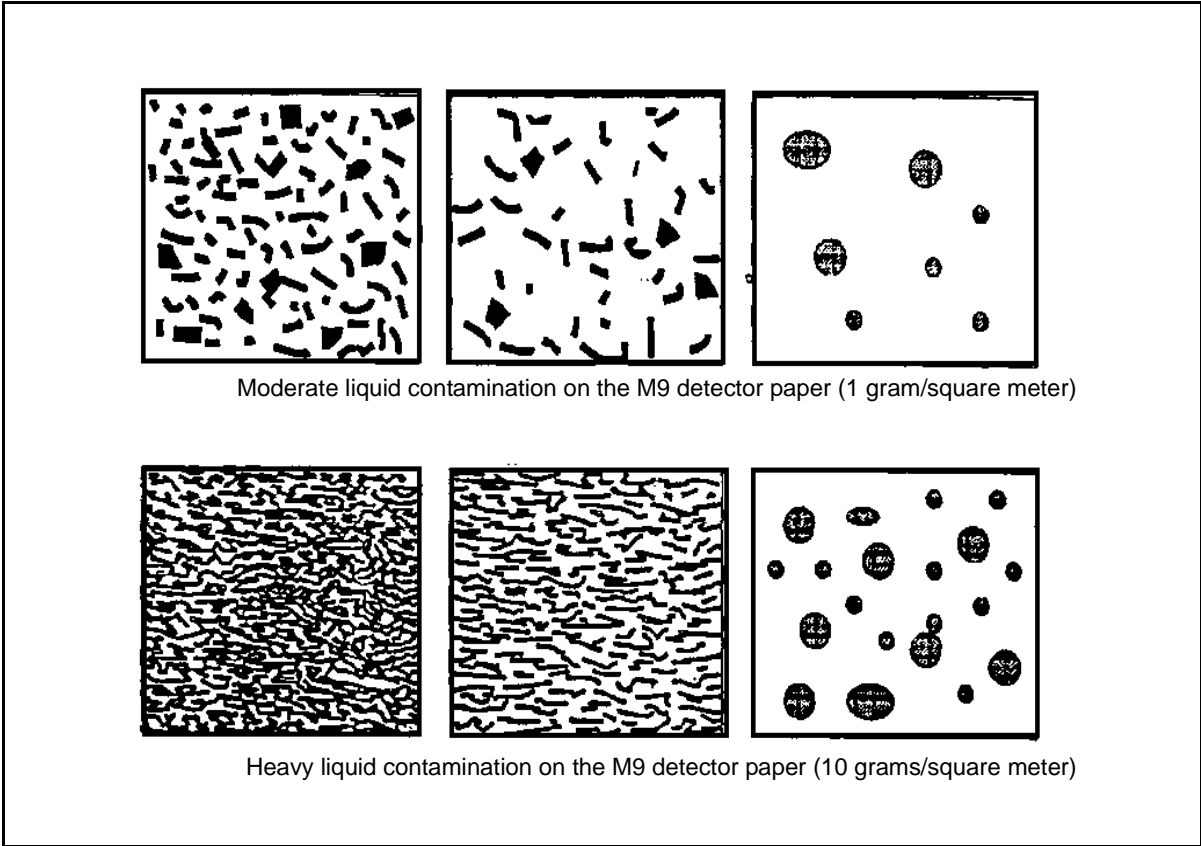


Figure 4-2. Contamination Levels

Vehicle Crews

4-19. The vehicle crews, except for the drivers, dismount. As the crews dismount, they remove all contaminated equipment, to include electro-optical systems from the top and sides of the vehicles. Once the crews have exited the vehicle, they will not reenter. This prevents contamination from being spread into the vehicle interior.

Vehicle Preparation

4-20. Using the pioneer tools from the contaminated vehicles, the crews remove all heavy mud and debris. They concentrate on the vehicle's undercarriage, which is the most likely place for contamination to collect and the hardest place to decon. Once the crews are finished with the pioneer tools, they are placed back on the vehicle. Initial removal of the mud and debris makes it more likely that the decon wash will remove any remaining contamination.

4-21. Seat covers (when applicable), canvas items, camouflage netting, and any other materials that can absorb liquid contamination are removed. These items create a potential transfer hazard and are not easily decontaminated. Left untreated, absorbed chemical agents will desorb after being decontaminated and will create a vapor hazard. Remove items that cannot be decontaminated by the standard methods used in the DTD, and place them at the collection point. Chemical-unit personnel provide advice concerning the decon or disposal of these items.

4-22. Design vehicle-loading plans to minimize the amount of equipment carried on the outside of the vehicle that cannot be readily decontaminated. Whenever possible, NBC covers should be used when a chemical attack is expected (see FM 3-4). All NBC covers are removed and disposed of as contaminated waste during the predecon actions.

DED AND DTD AREAS

4-23. In coordination with the chemical unit leader operating the decon site, the contaminated unit begins sending contaminated vehicles by priority for processing. Communication is maintained between the predecon staging area and the chemical unit leaders. All assistant vehicle drivers are the first individuals sent through the DTD to ensure that there is a driver exchange at station 3 (see paragraph 4-100).

POSTDECON AA

4-24. The chemical unit leader selects the general location for the postdecon AA. It must be big enough to hold the entire unit undergoing the thorough decon with proper cover and concealment. The postdecon AA is located about 0.62-mile upwind from the DED and DTD areas. The unit assembles in the postdecon AA after completing DTD and DED operations. The unit occupies the postdecon AA before moving to a reconstitution location or a tactical AA to prepare for future operations.

DETAILED TROOP DECON

4-25. The contaminated unit or its higher HQ is responsible for setting up, operating, manning, and closing the DTD area at the thorough-decon site. The chemical unit leader determines the general location of the DTD within the decon site and provides technical advice on setting up, operating, and closing the DTD area. The supervisor of the DTD must establish a work/rest cycle.

4-26. There are eight stations for a DTD. Spacing between the stations is 10 to 16 feet (see Figure 4-3, page 4-8). Recapitulation of personnel and equipment for a DTD is provided at Table 4-2, page 4-9.

STATION 1 - INDIVIDUAL-GEAR DECON

NOTE: Soldiers wearing the JSLIST chemical protective overgarment will execute station 1 procedures in the same manner as prescribed for the BDO.

4-27. At this station, contamination is removed from individual gear (LCE, mask carrier, helmet, and weapon) to a negligible risk level (see Chapter 1 of this manual).

Preparation

4-28. At this station, the following equipment and supplies are needed:

- Four 30-gallon containers for each two decon lanes used.
- 2 long-handled brushes for each two decon lanes used.
- Sufficient STB slurry mix for chemical contamination.
- Hot, soapy water and a sponge for radiological contamination.
- Rinse water.
- 2 ponchos or plastic sheets.
- Engineer tape.

4-29. Dig a sump that is 6 feet long, 6 feet wide, and 4 feet deep (minimum). Place three 30-gallon containers near the sump for ease of changing. Fill two containers with an STB slurry mix. Fill the other two containers with clean water for rinsing and place it about 3 feet forward of the STB cans. Place two long-handled scrub brushes at each can of STB slurry.

4-30. To prepare the slurry, mix 100 pounds of STB with 20 gallons of hot water. The chemical unit provides the hot water. Change the mixture after 20 soldiers have decontaminated their gear. The rinse water should be changed after every 10 soldiers or when it appears dirty (place the waste mixture in the sump).

4-31. Place a poncho or a plastic sheet on the ground at the checkpoint. Divide the poncho or the sheet in half using engineer tape. This is the contamination control line. The checkpoint will be a minimum of 10 feet from all other stations in order to get a true reading on the detection equipment. Place the following chemical detection/identification equipment at the checkpoint for an average company-sized unit:

- 1 CAM.
- 8 books of M8 detector paper.
- 4 M256A1 detector kits.
- 100 plastic trash bags.
- 1 AN/VDR-2 for radiological contamination.

4-32. Three soldiers are required to operate this station. One soldier supervises the decon of the individual gear and takes the decontaminated equipment to the checkpoint. He also prepares a new slurry mixture as necessary. One soldier remains at the checkpoint and checks all the gear using the detection equipment to ensure that it is decontaminated. One soldier transports the decontaminated gear to the reissue point.

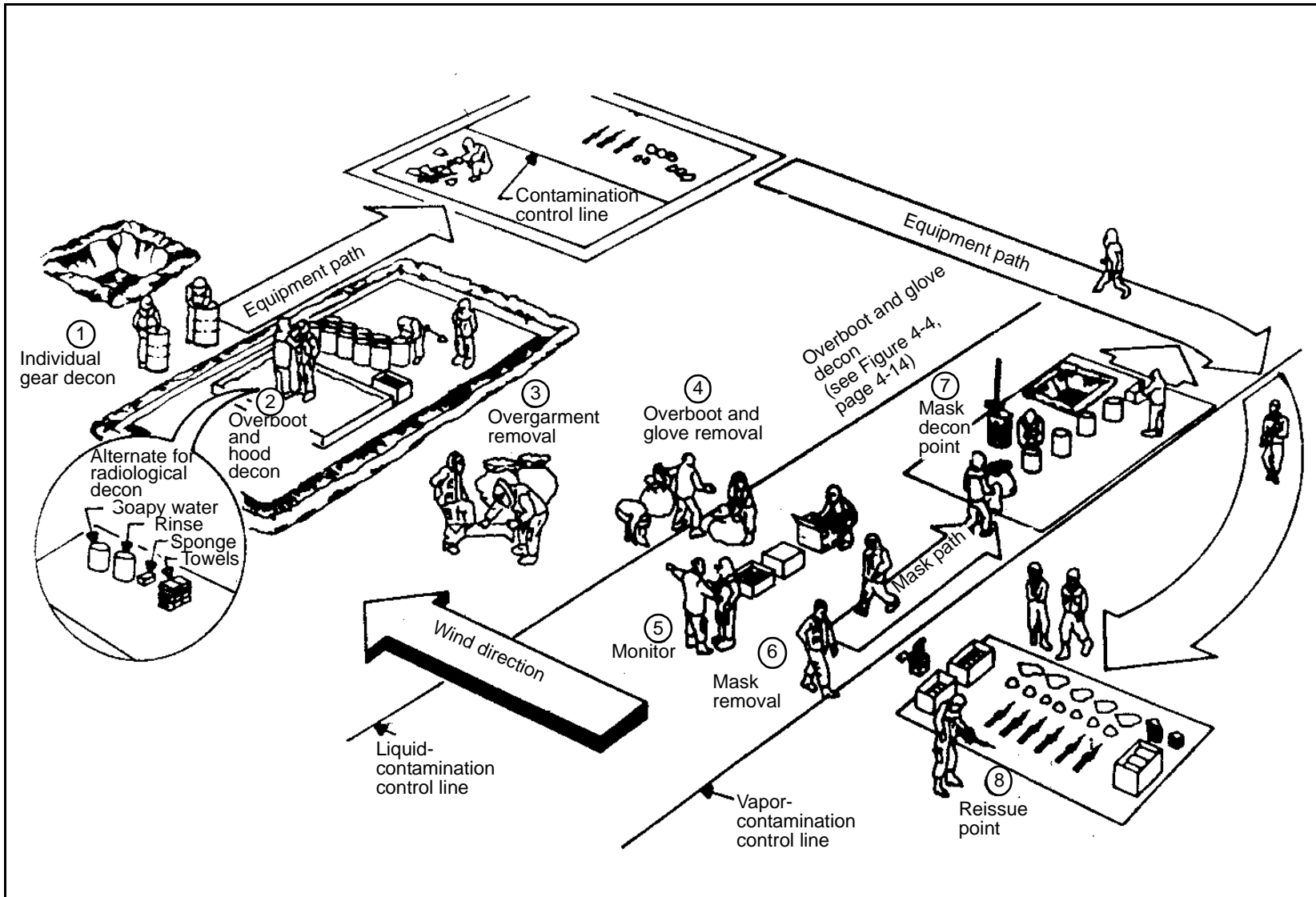


Figure 4-3. DTD Layout

Table 4-2. DTD Personnel and Equipment Recapitulation

Stations	Personnel	Equipment/Supplies
Station 1 - individual-gear decon	2 attendants 1 monitor (CAM operator)	4 30-gallon containers 2 long-handled brushes 2 ponchos or plastic sheets 1 CAM 8 books of M8 detector paper 4 M256A1 detector kits 100 plastic trash bags Sufficient STB slurry mix Rinse water *Hot, soapy water *AN/VDR-2 *Sponge
Station 2 - overboots and hood decon	1 attendant	Cutting tool One SKD or IEDK per person Large plastic sheet Plastic trash bags (as required) 10 drums of STB 1 shovel
Station 3 - overgarment removal	1 attendant	2 30-gallon containers 100 plastic trash bags 10 boxes of SDKs
Station 4 - overboot and glove removal	3 attendants	8 30-gallon containers 2 long-handled brushes M8 detector paper (as required) 1 immersion heater 100 plastic trash bags 1 CAM Engineer tape 1 cutting tool 2 ponchos or large plastic sheets 10 percent STB/HTH solution Hot, soapy water Cold rinse water
Station 5 - monitor	1 attendant (CAM operator) 1 aidman (or combat lifesaver)	1 CAM First aid supplies 5 books of M8 detector papers 1 case of SDKs
Station 6 - mask removal	2 attendants	1 M8A1 or M22 ACAA Engineer tape
Station 7 - mask decon point	2 attendants 1 monitor	1 30-gallon container 4 3-gallon containers 1 CAM 2 sponges One case of paper towels 1 immersion heater Mask sanitizing solution Hot, soapy water Rinse water
Station 8 - reissue point	Unit NBC NCO/supply sergeant	Mask PLL
* Denotes the equipment needed for radiological contamination. NOTE: Assume that an operational decon was done before the thorough decon.		

Execution

4-33. The soldier decontaminates his gear by washing and scrubbing it for 6 minutes in a decontaminant container with hot, soapy water or an STB slurry mix. If he is wearing the M42 mask, he should use hot, soapy water and a sponge or an STB slurry mix to decon the hose and canister.

4-34. The soldier dips his gear into the clean water and rinses it for 4 minutes then hands it to the attendant and proceeds to the next station. The attendant takes the gear to the equipment checkpoint and places the decontaminated gear on the "dirty" side of the contamination control line and returns to the containers to pick up more gear. The monitor at the checkpoint checks the gear using the appropriate detection device and the procedures associated with that device. If the residual contamination exceeds negligible risks, recycle the gear and decon it again (see Chapter 1 of this manual). If the gear passes the check, place it on the clean side of the contamination control line. The attendant will carry the equipment to the reissue point.

4-35. Depending on the time available, more extensive washing and checking procedures may be used. The longer the gear is washed or left out in the air after washing, the lower the contamination level. The gear may be put in closed areas or plastic bags and checked for hazardous vapors with the M256A1 detector kit or the CAM. The CAM only detects the G-series nerve-agent vapors and the H-series blister-agent vapors.

Risk

4-36. If this step is not done properly, contamination may remain on the equipment. The resulting vapor hazard could cause casualties to unmasked personnel, particularly in closed areas (vehicle interiors) or heavily wooded areas where air circulation is poor.

STATION 2 - OVERBOOT AND HOOD DECON

4-37. At this station, gross contamination on overboots, trouser legs, mask, and hood is neutralized. If ample hoods are available at the reissue point, the hood should be cut away.

Preparation

4-38. Prepare a shuffle pit by digging a shallow pit about 3 feet long, 3 feet wide, and 6 inches deep. Fill the shuffle pit with an STB dry mix or an STB slurry, depending on water availability. Prepare the STB dry mix by mixing three parts of earth to two parts of STB. Prepare the STB slurry in the same manner as at station 1 (see paragraph 4-30). Add more STB to the mix after 10 soldiers have processed through the shuffle pit. The chemical unit will provide 10 drums of STB for every company-sized unit that goes through the station.

4-39. At this station, the following equipment and supplies are needed for the mask and the shuffle pit: 1 cutting tool for each decon lane used, 1 SDK or IEDK per person, plastic trash bags (as required), 10 drums of STB, and 1 shovel (to mix).

4-40. One soldier is required to operate this station. The attendant directs and "observes" the soldiers as they decon their overboots and hoods.

Execution

4-41. The soldier walks into the shuffle pit and spreads his legs apart (double-shoulder width), bends at the waist, and uses his hands to thoroughly rub the STB dry mix or the STB slurry on his overboots and lower trousers legs. He should take special care to rub the rear of his overboots. He should also remove any excess decontaminant from his gloves.

NOTE: If the JSLIST chemical protective overgarment is worn, proceed to paragraphs 4-44 and 4-45.

4-42. If a replacement hood is available, remove the hood as follows. Buddy #1 cuts the shoulder straps and drawcord on Buddy #2's hood. Buddy #1 pulls Buddy #2's hood inside out over the front of the mask, being careful not to touch the exposed neck or head. Buddy #1 gathers Buddy #2's hood in one hand and using a cutting tool, cuts away the hood as close as possible to the eye-lens outsert, voicemitter, and inlet-valve covers. Make sure nothing is left dangling below the bottom of the mask.

4-43. If a replacement hood is not available, Buddy #1 decontaminates and rolls Buddy #2's hood in the same manner as for a MOPP-gear exchange. When the task is completed, Buddy #1 and Buddy #2 reverse roles.

NOTE: Soldiers should check their overboots, rubber gloves, and overgarment for damage. Any rips, tears, or punctures in these items should be reported to the monitor at station 5. This allows the monitor at station 5 to check the soldiers for chemical-agent symptoms and their clothing for possible contamination.

4-44. Buddy #1 decontaminates his own gloves. He loosens Buddy #2's overgarment hood by unfastening the barrel lock. **(NOTE: If there is difficulty unfastening the barrel lock, loosen the drawcord.)** He then loosens the drawcord around the edge of the hood and unfastens the hook-and-pile fastener tape at the chin. Buddy #1 must take care to avoid touching Buddy #2's skin and throat area.

4-45. Buddy #1 removes Buddy #2's overgarment hood by opening the front-closure flap and pulling the slide fastener from the chin down to the chest. Buddy #1 instructs Buddy #2 to turn around. Buddy #1 grasps the back of Buddy #2's hood, rolls the hood inside out (being careful not to contaminate the inner garment), and pulls the hood off.

Risk

4-46. If this step is not done properly, contamination can be transferred to the combat boots and the head and neck area from the hood.

STATION 3 - OVERGARMENT REMOVAL

4-47. At this station, contaminated overgarments are removed before the agent penetrates the overgarment material and touches the undergarments or the skin.

NOTE: If the JSLIST chemical protective overgarment is worn, proceed to paragraphs 4-52 through 4-56.

Preparation

4-48. At this station, the following equipment and supplies are needed:

- Two 30-gallon containers for each two decon lanes used.
- 100 plastic trash bags (or about one per soldier).
- 10 boxes of SDKs.

4-49. One soldier is required to operate this station. He directs and "monitors" the soldiers as they remove their overgarments in the same manner as a MOPP-gear exchange.

Execution

NOTE: The attendant will avoid touching the soldier's skin or inner clothing. If contact is made, decontaminate immediately and then proceed with the overgarment removal.

4-50. The attendant assists the soldier in removing his overgarment. The attendant cuts and removes the M9 detector paper from around the soldier's wrist. He unfastens the Velcro closure over the jacket zipper, waist cord, and wrist Velcro straps on the soldier's jacket. He unfastens the back snaps and instructs the soldier to make a fist. He then pulls the soldier's jacket down and away from him.

4-51. The attendant cuts and removes the M9 detector paper from the soldier's trousers. He unfastens the Velcro straps and zippers on the cuffs of the soldier's trousers. He also unfastens the front waist snaps and unzips the front zipper. He has the soldier lift one leg and point that foot down and bend slightly at the knees for stability. The attendant grasps the cuff of the elevated foot with a hand on each side and pulls the cuff in an alternating, jerking motion until the soldier can step out of the trouser leg. The process is repeated on the other leg.

NOTE: The attendant ensures that the soldier steps wide enough so as not to rub his clean leg against the contaminated boot and overgarment.

4-52. The attendant assists the soldier in removing his overgarment jacket. He cuts and removes the M9 detector paper from around the soldier's wrists and arms. He releases the hook-and-pile fastener tapes at the wrists and at the bottom of the trousers. He unties the bow in the coat retention cord, if tied. He unfastens the webbing-strip snaps at the bottom of the jacket and releases the coat retention cord. Touching only the outside surfaces of the jacket, the attendant loosens the bottom of the jacket by pulling the material at the bottom away from the soldier's body. The soldier locates his trouser suspender snap couplers by feeling for them on the outside of his jacket and releases them.

4-53. The attendant unfastens the front-closure flap on the front of the jacket and pulls the slide fastener from the top of the chest down to the bottom of the jacket. The attendant instructs the soldier to turn around, extend his arms in front of him, and make a fist to prevent the removal of his chemical protective gloves. The attendant grasps the jacket near the shoulders and removes it by pulling it down and away from the soldier's body.

NOTE: If there is difficulty removing the jacket in this manner, pull one arm out at a time.

4-54. To remove the overgarment trousers, the attendant instructs the soldier to turn back around. He cuts and removes the M9 paper from the soldier's trousers. He unfastens the hook-and-pile fastener tapes at the waistband of the trousers, unfastens the front-closure snaps, and opens the fly slide fastener.

4-55. The attendant grasps the soldier's trousers at the hips and pulls the trousers down to soldier's knees. He has the soldier lift one leg, point that foot down, and bend slightly at the knee for stability. He grasps the trouser leg of the elevated foot and with a hand on each side of the trouser leg, pulls the trouser leg in an alternating motion until the soldier can step out of it. Repeat the process on the other leg.

NOTE: The attendant ensures that the soldier steps wide enough so as not to rub his clean leg against the contaminated boot and overgarment.

Risk

4-56. If this step is not done properly, the agent may be transferred to the undergarment or the skin.

STATION 4 - OVERBOOT AND GLOVE REMOVAL

NOTE: Overboots and gloves worn with the JSLIST chemical protective overgarment are removed in the same manner as prescribed for the BDO.

4-57. At this station, contaminated overboots and gloves are removed to limit the spread of contamination. The overboots and gloves may also be decontaminated for reissue (if serviceable).

Preparation

4-58. At this station, the following equipment and supplies are needed for every two lanes used:

- Engineer tape.
- 1 cutting tool for each lane used.
- 100 plastic trash bags (or about one per soldier).

4-59. If the overboots and gloves are not being decontaminated, two 30-gallon containers are needed.

4-60. If the overboots and gloves are being decontaminated, the following are needed:

- Eight 30-gallon containers.
- 2 long-handled brushes.
- 2 ponchos or large plastic sheets.
- 1 CAM.

- 1 AN/VDR-2 for radiological contamination.
- 4 M256A1 detection kits.
- 1 immersion heater.
- 100 plastic trash bags.
- M8 detector paper, as required.
- 10 percent STB/HTH solution.
- Hot, soapy water.
- Cold rinse water.

4-61. If replacement overboots and gloves are available, set up the station as follows (see Figure 4-4). Establish a liquid-contamination control line and set two 30-gallon containers 1 foot back from the line. Soldiers support themselves using the containers and discard their overgarments into the containers. An attendant directs and monitors the soldiers as they remove their overboots and gloves in the same manner as a MOPP-gear exchange; however, the soldiers step over the control line instead of onto a jacket.

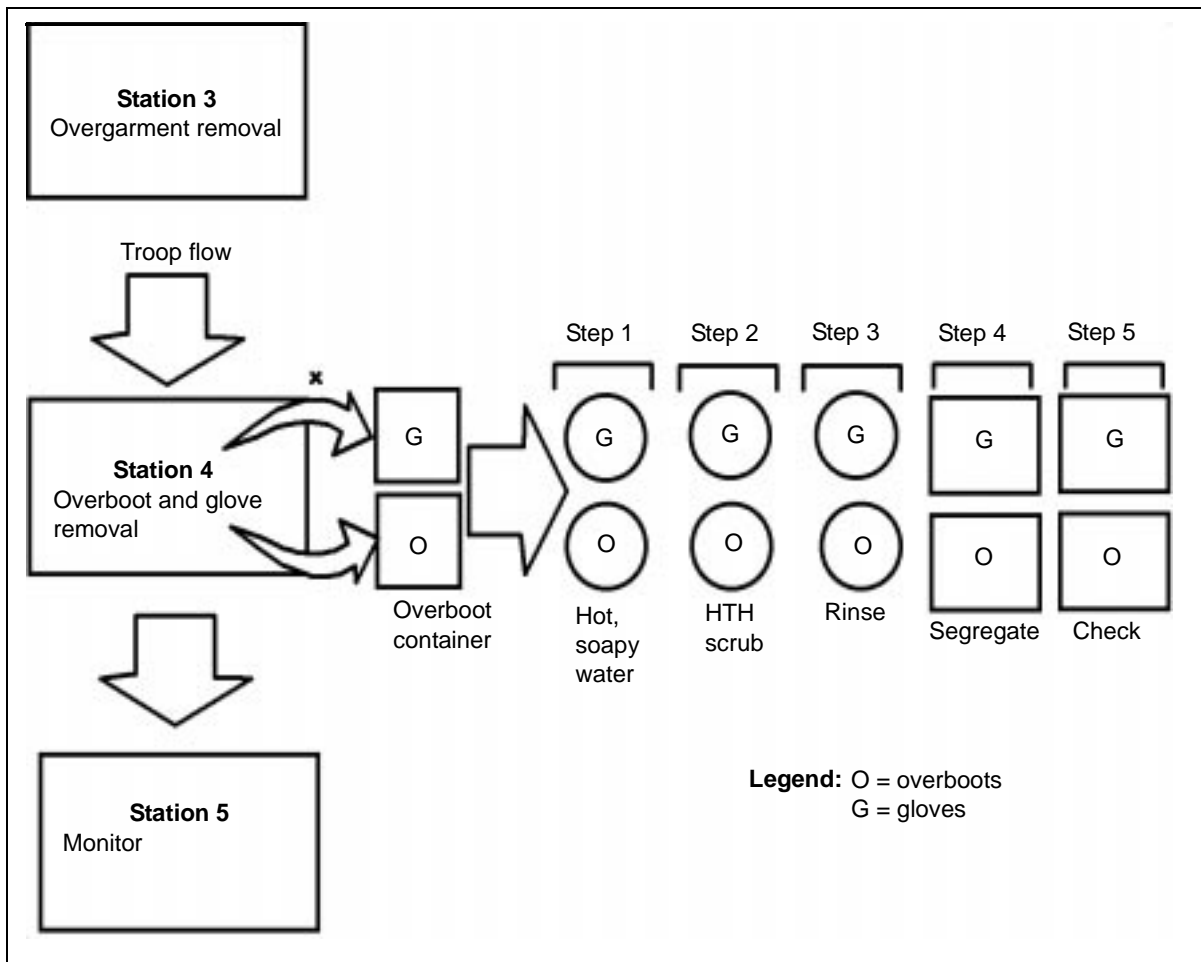


Figure 4-4. Station 4 Layout

4-62. If replacement overboots and gloves are not available, set up the station as follows: Fill two 30-gallon containers with hot, soapy water and two 30-gallon containers with a 10 percent STB/HTH solution, placing two scrub brushes near the containers. Then fill two 30-gallon containers with cold rinse water. One attendant supervises and assists the soldiers wearing the M42 mask. The other two attendants decon the overboots and the gloves; one processes the overboots, while the other processes the gloves.

NOTE: Replace the water in the container once 20 items have been processed. When available, the decon platoon will assist with the water requirements.

4-63. For both situations, use engineer tape to mark the liquid-contamination control line on the ground. Place the cutting tools, two containers, and plastic bags on the "dirty" side of the liquid-contamination control line. The liquid-contamination control line separates the "dirty" and "clean" areas. No liquid agent should be tracked on the ground beyond the liquid-contamination control line.

Execution

4-64. The liquid-contamination control line separates the "dirty" and "clean" areas. The attendant unfastens or cuts the elastic closures on the soldier's overboots. The soldier faces the liquid-contamination control line and steps back from it about 12 inches. The attendant steps on the back of the soldier's overboot and instructs him to lift his heel and work his foot out of the overboot and step across the liquid-contamination control line. Repeat the process on the other foot. If the overboot cannot be removed by this process, the attendant cuts it off and discards it in the designated container. The soldier holds the fingertips of his gloves and partially slides his hands out. The attendant remove the soldier's gloves.

4-65. If the soldier is wearing the M42 protective mask, the attendant from station 6 carries the soldier's filter canister until it is removed.

NOTE: The attendant at station 4 performs his duty from the "dirty" side of the liquid-contamination control line.

4-66. The overboots and gloves are decontaminated using the following steps:

NOTE: Check all items for holes, tears, and punctures and discard any item with this defect. Do not decon any item that is unserviceable.

- Step 1. Submerge the gloves and overboots in their respective container of hot, soapy water. Some of the contamination is removed during this step. When the overboots and gloves are removed from the container, ensure that no water remains inside them.
- Step 2. Submerge the gloves and overboots in their respective containers of STB/HTH solution. Thoroughly scrub the items until no visible contamination remains. After scrubbing, submerge each item once more before moving to the rinse container.
- Step 3. Thoroughly rinse the scrubbed items, making sure that they are rinsed inside as well as out.

- Step 4. Place usable items on a poncho or a plastic sheet to air dry and weather.
- Step 5. Place usable items in plastic trash bags along with an M256A1 detector kit. If the detector kit shows contamination remaining, the attendants can recycle the items or discard them. However, if the kit show no contamination, the items can be reused.

Risk

4-67. If the overboots are not properly removed, the combat boots may become contaminated and contamination may be spread to clean areas. If the gloves are not properly removed, the undergarments and skin may become contaminated.

STATION 5 - MONITOR

4-68. At this station, contamination on personnel is identified, spot-decon capabilities are provided, and medical aid is provided, as required.

Preparation

4-69. At this station, the following equipment and supplies are needed:

- First aid supplies.
- 1 CAM.
- 1 AN/VDR-2 for radiological contamination.
- 5 books of M8 detector paper per 100 soldiers.
- 1 case of SDKs.

4-70. An aidman should be present to treat any soldiers suffering from chemical-agent symptoms. If an aidman is unavailable, a combat lifesaver should be present.

Execution

4-71. The attendant checks the soldiers for contamination using the CAM. Liquid agents can be detected with M8 detector paper. Small quantities of agent vapor can be detected with the CAM. Symptoms of agent poisoning are the most obvious indication of skin contamination. At this station, the medic checks each soldier for symptoms of agent poisoning and treats, as required. Soldiers should report any damage to their MOPP gear that was identified at stations 2, 3, and 4. The attendant can decon any areas identified as contaminated with an SDK. Soldiers are remonitored after decon. It is possible that all liquid-chemical contamination is absorbed into the clothing. If so, M8/M9 detector paper will indicate negative, even though there is a hazard.

Risk

4-72. If this station is omitted, the soldier could become a casualty. After this station, the soldier is not checked for contamination or decontaminated again. Commanders can choose to conduct more extensive contamination checks here if medical assistance and time are available. This decreases the risk of casualties.

STATION 6 - MASK REMOVAL

4-73. At this station, the mask is removed without contaminating the soldier. The mask is taken to a mask decon point, limiting agent transfer at the station.

Preparation

4-74. At this station, the M8A1 or M22 automatic chemical-agent alarm (ACAA) and engineer tape are needed. Two soldiers are needed to operate this station. They remove and carry the masks to station 7.

Execution

4-75. If the hood is still attached to the mask, the attendant pulls the hood over the front of the mask, grabs the mask by the voicemitter cover, and pulls the mask off the soldier. The soldier holds his breath as the mask is removed. If the mask has optical inserts, the attendant holds the mask open so that the soldier can remove the inserts without touching the outside of the mask. The soldier walks upwind 16 feet, crosses the vapor-contamination control line, and then resumes breathing. The attendant brings the mask to station 7.

4-76. If the wind direction remains constant, no chemical vapor hazard is expected beyond the vapor-contamination control line. Position the M8A1 or the M22 ACAA upwind of the station to warn of vapor hazards. The soldier getting decontaminated moves straight ahead while his mask, which may still give off vapors, is held on the vapor dirty side of the line and taken to station 7 where it is decontaminated.

Risk

4-77. If the step is not done properly, the soldier could breathe toxic vapors. There is a high probability that the vapor hazard is still present on the mask and the hood. The soldier must not touch the outside of the mask because it could contaminate his bare hands. The soldier proceeds to station 8.

STATION 7 - MASK DECON POINT

4-78. At this station, all the contamination is removed from the mask.

NOTE: Once 20 items have been processed in the wash containers, replace the water. Once 10 item have been processed in the rinse water, replace it. Place the contaminated waste into the sump.

Preparation

4-79. At this station, the following materials and equipment are needed:

- 4 containers (about a 3-gallon capacity).
- 1 CAM (for chemical only).
- Hot, soapy water.
- Rinse water.
- Mask sanitizing solution.
- Immersion heater.
- One 30-gallon container.
- 2 sponges.
- 1 case of paper towels per company.

4-80. Dig a sump that is 4 feet long, 4 feet wide, and 4 feet deep in which to discard used filters and canisters. Place the equipment and materials as shown in Figure 4-3, page 4-8. Three soldiers are needed to operate this station. Two soldiers strip, wash, rinse, sanitize, and dry masks. The other soldier checks the masks and carries them to the reissue point.

Execution

4-81. Remove the eye-lens outserts and the hood if the hood was not cut off at station 2. Remove and discard the filters or canisters. Put the items into the properly marked containers. Wash the mask, hood, eye-lens outserts, and the hoses on the M42 and M43 masks in hot, soapy water. Rinse these items in clean water, dip them into the sanitizing solution, agitate them for 5 minutes, and then rinse them again in clean water. Add one tube of mask sanitizing solution (calcium hypochlorite) to each quart of water. Wipe the masks with rags until they are almost dry. Discard each container of mask sanitizing solution into a sump after every 10 masks. The attendant checks the masks for contamination with a CAM. If the masks are still contaminated, the attendant recycles them for more decon and then decons his rubber gloves. If the masks are not contaminated, the attendant takes the masks to the reissue point. The attendant must take care not to contaminate the reissue point or himself.

Risk

4-82. If this step is not done properly, the soldiers may become contaminated when the masks are reissued to them at the reissue point. Even though the step is done correctly, there is still a possible danger when many masks are stacked together. Small amounts of residual vapor from each mask can become potentially dangerous.

NOTE: Runners between stations 7 and 8 are in MOPP2 and are prepared to go into MOPP4.

STATION 8 - REISSUE POINT

4-83. At this station, the mask with its components is provided to the soldier for reassembly.

Preparation

4-84. At this station, the protective-mask prescribed load-list (PLL) parts are needed. The unit NBC NCO/supply sergeant sets up the reissue point to provide the soldiers with replacement parts for all types of protective masks and assist in mask maintenance.

Execution

4-85. The mask with its components is reissued to the soldier who assembles it in the AA. The unit chemical NCO affixes canisters to the cleaned M42 and M43 hoses. The soldier picks up individual gear and moves to the postdecon AA.

Risk

4-86. If this step is not done properly, the soldier may be inadequately equipped for future operations.

NOTE: If time is not available, the NBC NCO will have replacement chemical suits, overboots, and gloves at this station for reissue. If time is available, personnel will receive this equipment at the postdecon AA.

RESUPPLY SUPPORT RESPONSIBILITIES

4-87. The supporting chemical unit (decon or smoke/decon) must supply the majority of the equipment and supplies that are required to operate the DTD. This does not relieve the supported unit of the requirement to maintain adequate supplies to conduct DTD procedures.

4-88. A chemical unit's operational control continues to receive support from its parent organization. The supported unit provides the chemical unit with replacements, supplies, and material at the end of the DED. This shortens the time the chemical unit is nonmission capable following the DED. The supported unit must coordinate for the supplies and equipment necessary to operate the DTD.

4-89. Typical nonchemical units do not have more than two CAMs per company-sized unit. However, the DTD requires a minimum of three CAMs. The supported HQ may need to provide additional CAMs. The division support command (DISCOM) sustains the division's chemical units. A chemical unit attached to a maneuver force identifies the resources that are needed to accomplish the mission and passes these requirements to the maneuver staff's Supply Officer (S4)/Logistics Staff at Corps and Division (G4). The S4/G4 then coordinates with the supporting CSS element to fill the requirement. The supply units that operate the Class II points issue the protective masks and overgarments. They normally package protective clothing as complete sets of MOPP equipment to support a predetermined number of soldiers. Decon supplies may be issued in preconfigured "push" packages.

DETAILED EQUIPMENT DECON

4-90. Chemical units (decon and smoke/decon platoons) are responsible for setting up, operating, and closing the DED portion of the thorough-decon operation. The DED for chemical and biological contamination is comprised of five stations. For radiological contamination, the DED uses all but station 2. Stations are normally 98 to 164 feet apart; however, spacing is METT-TC dependent. Resupply procedures are of critical importance. Resupply vehicles typically operate autonomously or independently and need to maintain communications with the platoon headquarters in the event that the platoon relocates or needs to change linkup locations or mission requirements change.

DECON STATIONS

4-91. The actions that are taken at each of the stations are as follows:

Station 1 - Primary Wash

4-92. At this station, the gross contamination and dirt are removed from the vehicle. The vehicle is sprayed for 2 to 3 minutes with hot, soapy water. The vehicle is then scrubbed to help remove caked-on dirt. The mechanical action of scrubbing also helps remove thickened chemical agents. Although the undersurfaces are difficult to reach, try to remove as much dirt as possible. After scrubbing the vehicle, spray it again for 2 to 3 minutes to remove loosened dirt and contamination. This station uses about 250 gallons of water per vehicle. Larger vehicles with large quantities of dirt use more water. The runoff from this station is contaminated and must be treated as hazardous. The contaminated runoff must be controlled; if available, engineer support

may be used. This station requires high water-pressure systems (M12A1 power-driven decon apparatus [PDDA] and M17 Lightweight Decontaminating System [LDS]) rather than low water-volume systems (65-GPM pumps).

NOTE: Thirty-five cubic feet of space per 250 gallons of liquid runoff should be used when calculating the size for the drainage pump.

4-93. The effectiveness of the wash depends on the type of wash (hot, soapy water; hot water; cold water; or steam). The relative effectiveness rankings for selected surfaces are listed in Table 4-3. Hot, soapy water is water heated to about 120° to 140° F to which a detergent has been added to reduce its surface tension. The detergent removes the agent by emulsification, which is followed by the mechanical displacement of the suspension. Hot water alone is less effective than hot, soapy water. Because of the high temperature, some agents are best removed by steam through vaporization. Finally, for some chemical agents, cold water exhibits better solvent characteristics.

Table 4-3. Effectiveness of Types of Wash

Agents/Surfaces	Relative Effectiveness ¹
TGD on alkyd-painted metal	Hot water and/or steam; hot, soapy water; cold, soapy water
TGD on CARC-painted metal	Hot, soapy water; hot water and/or steam; cold water
THD on alkyd-painted metal	Hot water and/or steam; hot, soapy water; cold water
THD on CARC-painted metal	Hot, soapy water; hot water and/or steam; cold water
HD on alkyd-painted metal	Hot, soapy water; hot water and or steam; cold water
HD on CARC-painted metal	Hot, soapy water and/or steam; cold water; hot water
VX on alkyd-painted metal	Steam; cold water; hot water and/or hot, soapy water
TGD on canvas/webbing	Steam; hot water and/or hot, soapy water; cold water
GD on canvas/webbing	Steam; hot, soapy water and/or hot water; cold water
THD on canvas/webbing	Steam; hot, soapy water; cold water; hot water
HD on canvas/webbing	Steam; hot water; hot, soapy water; cold water
VX on canvas/webbing	Steam; hot water and/or hot, soapy water; cold water
Overall	Steam; hot water and/or hot, soapy water; cold water

¹The types of wash are listed in the order of effectiveness, starting with the most effective to the least effective.

Station 2 - DS2 Application

4-94. At this station, a decontaminant is applied to the entire vehicle. The vehicle is divided into four parts, and a member of the scrubbing team is assigned that part of the vehicle. This limits the workload of each member of the scrubbing team and avoids duplication of work. DS2 is applied starting at the top of the vehicle and working towards the undercarriage. Every effort is made to apply DS2 to the undercarriage, especially if the vehicle has crossed a contaminated area. The mop is the least tiring method of applying DS2. Using a mop to apply DS2 creates a large amount of spillage. However, continual use of the M13 decontaminating apparatus, portable (DAP) requires the scrubbing team to exert more energy than with using the mop. The M13 DAP can be

used to apply DS2 to hard-to-reach areas. Planning factors for DS2 application are provided at Table 4-4.

Table 4-4. Planning Factors for DS2 Application

Planning Categories	Tank	Truck	APC
Gallons of DS2 applied	15	8	7
Minutes to apply solution	35	29	18

4-95. Before starting the decon operation, the scrubbing team pours 5-gallon cans of DS2 into 30-gallon containers if mops are going to be used instead of M13 DAPs. Each member of the scrubbing team wears a TAP apron or wet-weather gear to protect himself from the DS2.

4-96. Water adversely affects the DS2's ability to react with chemical agents. If there is excess water remaining on the vehicle from station 1, the scrubbing team can—

- Wait for the majority of the water to evaporate.
- Remove the excess water.
- Increase the amount of DS2 applied.

4-97. There must be sufficient DS2 on the item being decontaminated for complete neutralization to occur. The DS2-to-agent ratio needs to be 55 to 1 for H agents and 25 to 1 for G agents. For a vehicle the size of an M1A1 tank, this corresponds to 15 and 7 gallons, respectively.

Station 3 - Contact Time/Interior Decon

4-98. At this station, the DS2 is allowed to completely neutralize the chemical agent and the interior of the vehicle is decontaminated. Vehicles are moved to a concealed position. Vehicles will remain in station 3 for no less than 30 minutes. DS2 reacts with most chemical agents within 5 minutes. However, by allowing the DS2 to remain on the contaminated surface for 30 minutes, the amount of agent that will later desorb (off gas) will be significantly reduced. When there is a 30-minute contact time, there will be no desorption after decon operations for most chemical agents. However, studies indicate that distilled-mustard (HD) vapors desorb after decon even if DS2 is allowed to remain for 30 minutes.

4-99. While the vehicle is held at this station for the DS2 to completely react, the driver inspects the interior of the vehicle for liquid contamination. He is given M8 detector paper to check for chemical contamination. If he identifies chemical contamination, he is given decon supplies to decon the interior of the vehicle. The best decon solution for use in the interior of vehicles is a 5 percent solution of HTH or STB. The driver wipes all reasonably accessible surfaces with a rag or sponge soaked in the HTH or STB solution. He should not attempt to decon areas where there is little likelihood of contamination (electrical assemblies, area beneath the turret floor, and so forth).

CAUTION

Do not mix HTH or STB with DS2. If mixed, a violent reaction will occur.

4-100. Once the interior decon is completed, the driver places a cover over the seat and floor of the vehicle. Then he dismounts from the vehicle and proceeds to the start of the DTD. The assistant driver, having completed the DTD, mounts the vehicle and moves it to the next station. Drivers must exercise caution when entering or exiting the vehicle. A DS2-coated surface is slippery, and the DS2 may react with chemical protective footwear. Personnel should avoid stepping in DS2 and tracking it into the vehicle.

4-101. For radiological contamination, use an AN/PDR-77 or AN/VDR-2 radiac detector to determine the extent and location of contamination inside the vehicle. If there is contamination, determine the intensity of the contamination inside the vehicle. If the contamination has an intensity greater than 0.33cGy, the interior of the vehicle must be decontaminated. Use a sponge to wipe the interior of the vehicle.

Station 4 - Rinse

4-102. At this station, the DS2 is removed from the vehicle. The vehicle is sprayed with water from top to bottom. Take care to rinse the undercarriage. This station uses about 200 gallons of water per vehicle. Failure to remove all DS2 from the vehicle may cause a false-positive reading at station 5. If high water-pressure systems (M12A1 PDDA and M17 LDS) are not available, large-volume water pumps (65-GPM pumps) should be used at this station. The driver removes plastic or other material (if present) covering the seats and floor and disposes of it as hazardous waste. See Table 4-5 for the planning factors for the rinse station.

Table 4-5. Planning Factors for the Rinse Station

Planning Categories	M1 Tank	M2 BFV	M113 APC	M109A PALADIN	HEMTT	5-Ton Truck	HMMWV
M12A1 PDDA rinse (gallons applied)	325	325	203	325	180	158	90
M12A1 PDDA rinse (minutes applied)	12	12	9	12	8	7	4
M17 LDS rinse ¹ (gallons applied)	57	57	38	57	30	42	23
M17 LDS rinse ¹ (minutes applied)	14	14	10	14	12	11	6
¹ Rinse is done with a spray wand.							

Station 5 - Check

4-103. At this station, the vehicle is checked to see if it has a negligible contamination level or if it still has significant contamination remaining. Detection procedures will vary depending on the type of contamination. If significant contamination is found on the vehicle, the vehicle will be recycled to station 2 for chemical contamination or station 1 for radiological contamination. An assistant driver takes the vehicle to the AA.

4-104. **Chemical.** The CAM is used to check for the presence of vapor from residual liquid contamination. A one bar or lower reading on the CAM indicates a negligible contamination level. Once the CAM indicates the presence of vapor contamination, M8 detector paper is used to verify the presence of liquid contamination. If it is suspected that both the CAM and M8

detector paper are producing a false positive, use an M256A1 detector kit to confirm or deny the presence of contamination. See Table 4-6 for a list of common interferences that can cause false-positive readings on the CAM. If the vehicle has significant contamination remaining, recycle it. The commander may modify the recycle criteria based on mission requirements.

Table 4-6. Common Interferences of the CAM

Interferences	G-Bar Response	H-Bar Response
DS2	Low	
Insect repellent	Low to very high	
Brake fluid	High to very high	Very high
General-purpose cleaner	High	
Burning kerosene		High
Breath mints	High	
Gasoline vapors	Low	Low
Burning grass	Low to high	Low
Burning gas	Low	
Green smoke	Low	Low to high
Break-free oil	Low	
Ammonia	Very high	

4-105. There will be desorption of chemical agents from the surfaces after decon. The desorption of vapors on surfaces painted with the CARC will stop sooner than those surfaces painted with alkyd. Consider this when checking decontaminated items for overall decon effectiveness.

4-106. **Radiological.** Use the AN/PDR-77 or AN/VDR-2 to determine if any contamination remains. If there is contamination remaining, determine the intensity of the contamination inside and outside of the vehicle. If the contamination has an intensity greater than 0.33cGy/hr, the vehicle is recycled to station 1.

RECYCLE CRITERIA

4-107. The commander, with the chemical unit leader's help, establishes the recycle criteria before starting decon operations. The recycle criteria determines which vehicles will return to station 1 after contamination is detected at station 5. If the unit has sufficient time and resources, any vehicle having more contamination than the acceptable level should be recycled. However, time and resources are usually limited, and not all vehicles can be recycled. The recycle criteria is based on the weathering effects.

RECONSTITUTION CRITERIA

4-108. The operational- and thorough-decon operations that are performed on vehicles or major equipment will be recorded on DA Form 2404 (Army) or NAVMC 10245 (Marine). This information will become a permanent record for these vehicles or major equipment. The entries that are required on these

forms are the type of decon performed, decontaminant used, date/time group completed, location of decon site, and type of monitoring equipment used to verify decon completeness. These forms will remain a permanent part of the unit's, vehicle's, and equipment's records. This information will assist with reconstitution operations once the conflict or war has ended.

DED LAYOUTS

4-109. Dual-purpose and decon platoons establish thorough decon sites differently because of organization and equipment differences. The optimum layout for each type of platoon is described in the following paragraphs (see Figures 4-5 through 4-8, pages 4-25 through 4-28). This layout provides the maximum output for platoons at 100 percent personnel and equipment. The equipment and personnel requirements for the optimum layout are identified for both the chemical unit (decon platoon) and supported unit (augmenter) (see Tables 4-7 through 4-10, pages 4-29 through 4-32).

4-110. Since it is likely that all platoons will not be at 100 percent strength, alternate layouts are discussed. For each alternate layout, chemical-unit equipment requirements are identified. However, personnel requirements are not identified by chemical unit and supported unit. The total number of personnel that are needed is identified, with a minimum number of chemical unit personnel.

ALTERNATE-LAYOUT PLANNING CONSIDERATIONS

4-111. Chemical unit leaders use METT-TC to determine the best possible DED layout to execute their mission. When determining alternate DED layouts, use the following guidelines:

- The ability to spray hot, soapy water or steam under pressure must be retained at station 1.
- The largest number of people is required at station 2.
- Experienced and qualified CAM operators are required at station 5.
- Water does not have to be hot to rinse off the DS2; however, the lower the water pressure the more water that is required for the rinse.

DECON PLATOON

4-112. The optimum DED layout for an M12A1 PDDA-equipped platoon requires the use of all authorized equipment and personnel (see Figure 4-5). While this DED layout is manpower and equipment intensive, it provides for the rapid decon of vehicles and equipment (eight vehicles processed per hour). This layout uses dual lanes at stations 1, 4, and 5 to process two vehicles at one time. Since the most time- and labor-intensive work takes place at station 3, this station is designed to process three vehicles at a time. The processing rate of this layout will be affected by any work/rest cycle (see Table 4-11, page 4-33).

SMOKE/DECON PLATOON

4-113. Smoke/decon platoons equipped with the M17 LDS will set up the DED differently than the decon units equipped with the M12A1 PDDA. While the optimum DED layout is manpower and equipment intensive, it provides for the rapid decon of vehicles and equipment (eight vehicles processed per hour). The layout uses a dual lane at stations 1, 4, and 5 to process two vehicles at a time. Since the most time- and labor-intensive work takes place at station 3, this station is designed to process three vehicles at a time. The processing rate of this layout will be affected by any work/rest cycle (see Table 4-11, page 4-33).

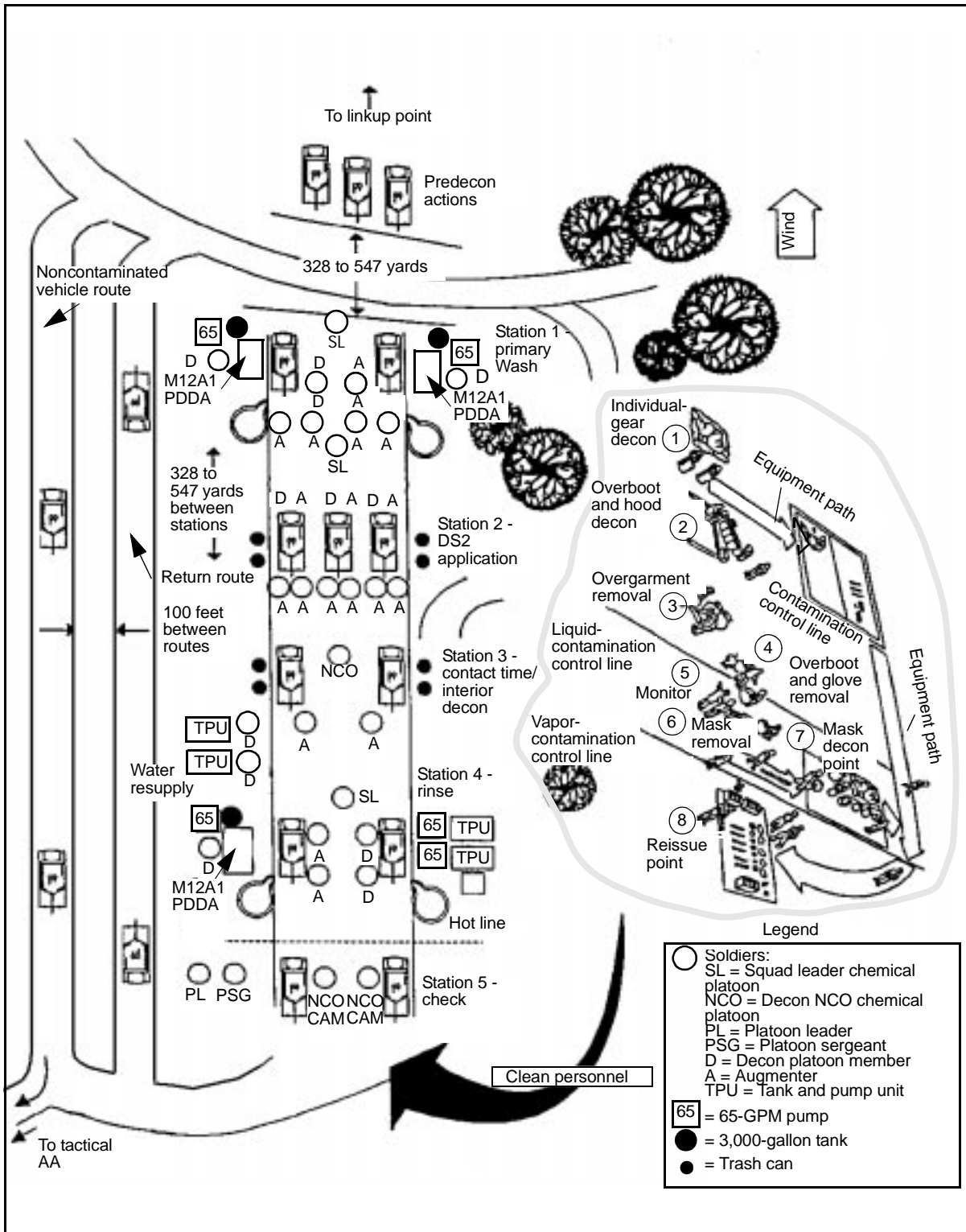


Figure 4-5. Optimum DED Layout for the M12A1 PDDA-Equipped Unit

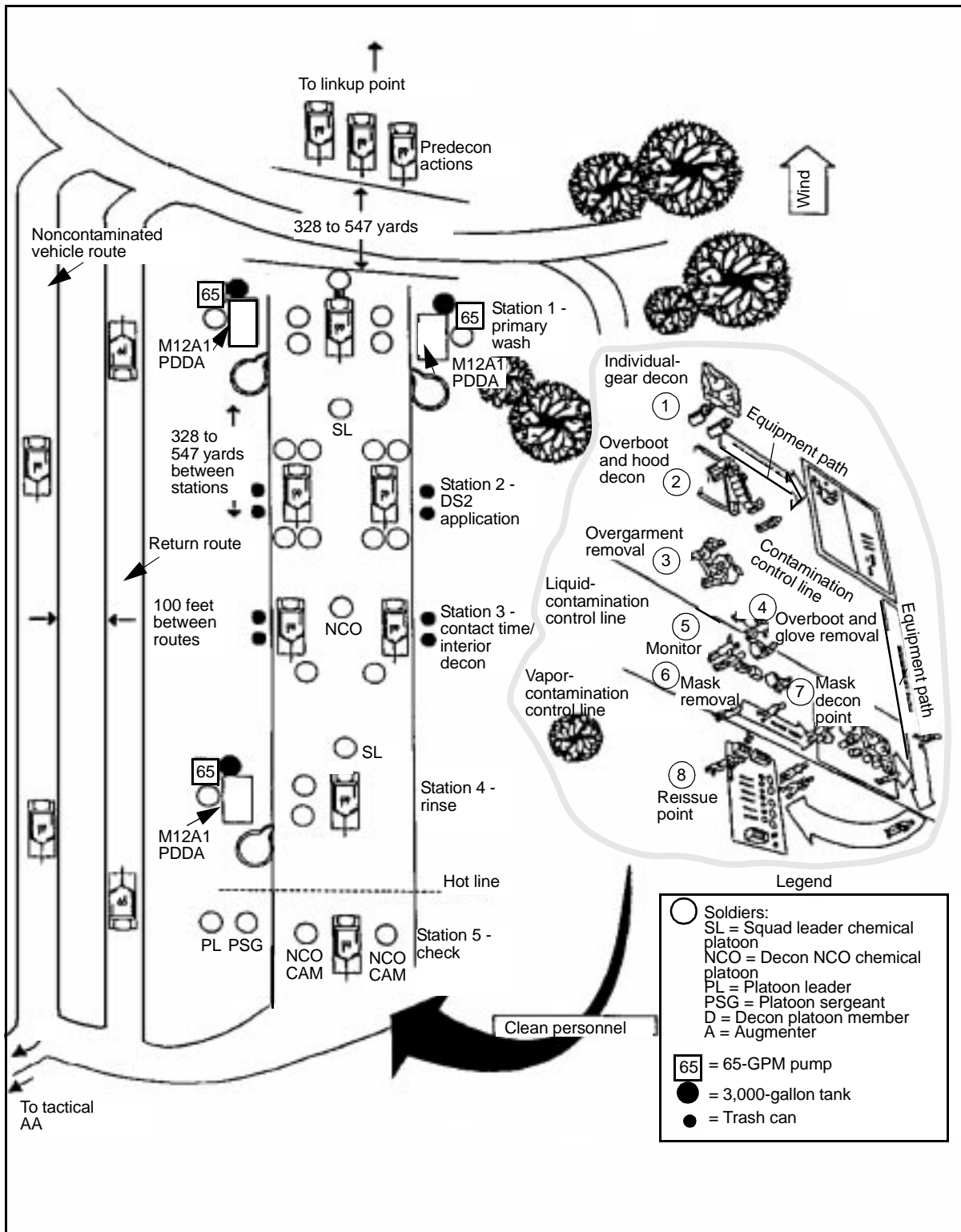


Figure 4-6. Alternate DED Layout for the M12A1 PDDA-Equipped Unit

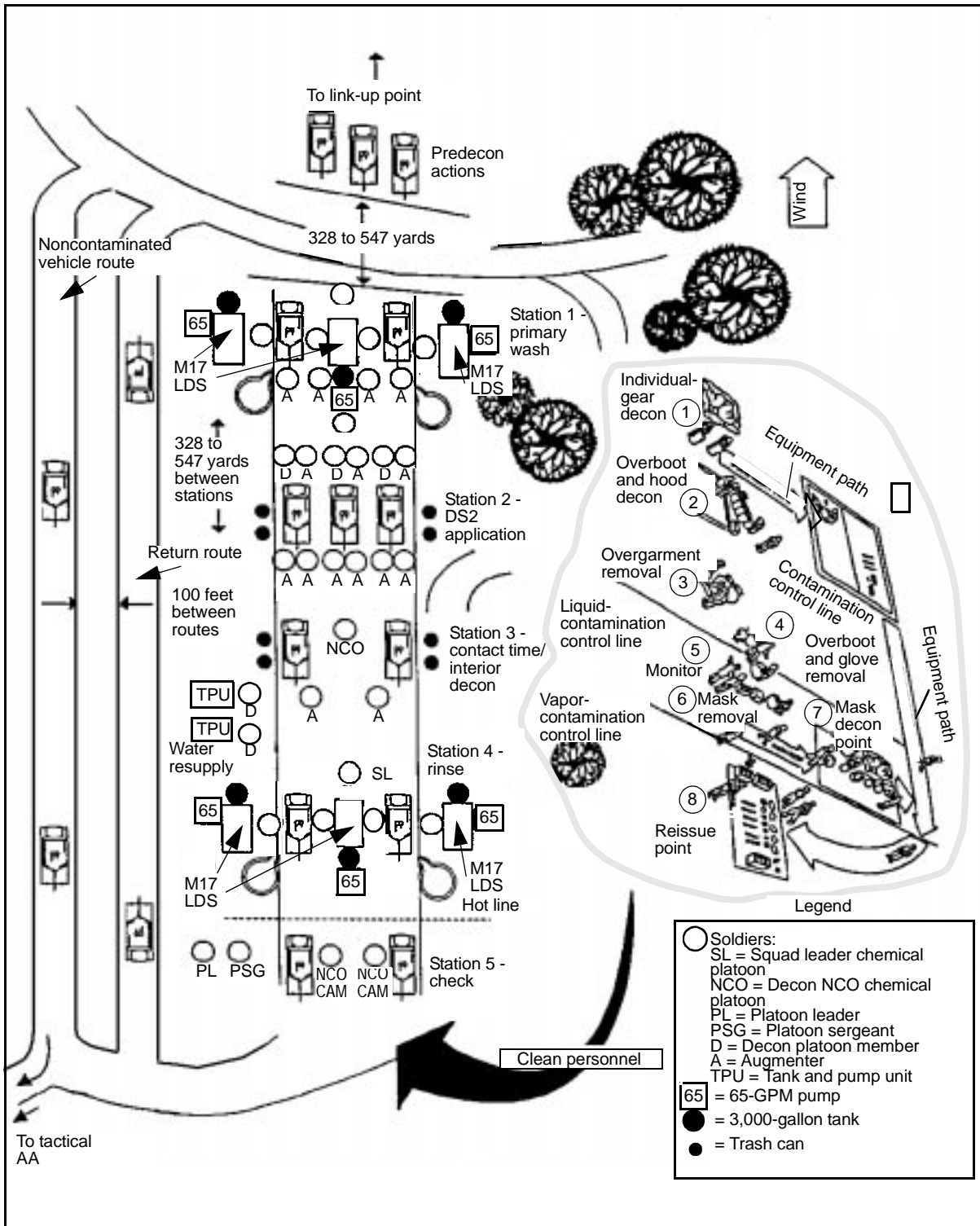


Figure 4-7. Optimum DED Layout for the M17 LDS-Equipped Unit

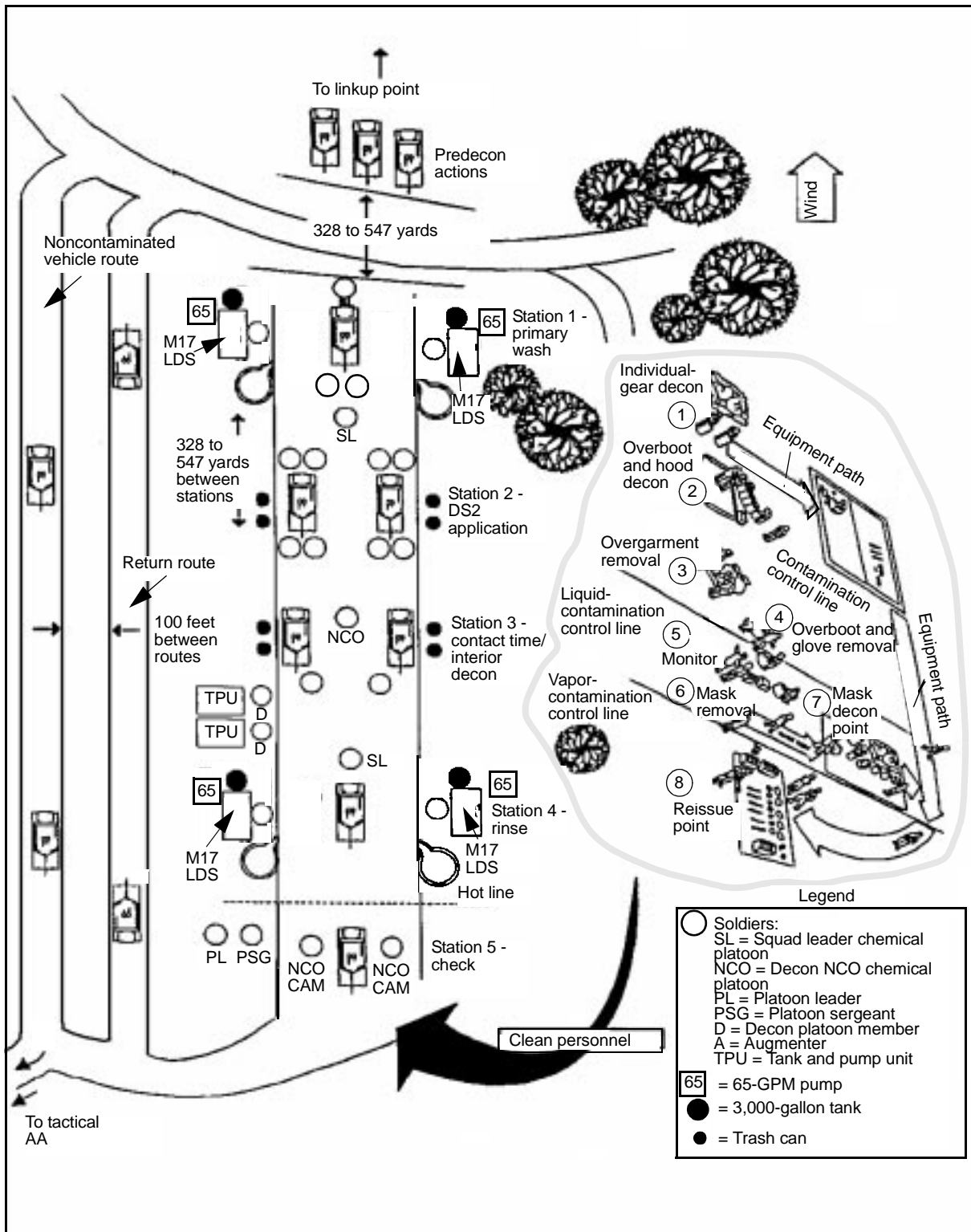


Figure 4-8. Alternate DED Layout for the M17 LDS-Equipped Unit

Table 4-7. Personnel and Equipment Requirements for the Optimum DED Layout of the M12A1 PDDA-Equipped Unit

Stations	Personnel		Equipment/Supplies
	Decon Platoon	Augmenter	
Station 1 - primary wash	1 squad leader 2 PDDE operators 4 sprayers	4 scrubbers	2 M12A1 PDDAs 2 3,000-gallon tanks 2 65-GPM pumps 6 long-handled brushes 8 TAP aprons Liquid detergent
Station 2 - DS2 application	1 squad leader 3 applicators	9 applicators	18 long-handled brushes 9 mops with extra mop heads 3 30-gallon containers 9 M13 DAPs Sufficient DS2
Station 3 - contact time/ interior decon	1 NCO	2 interior decon assistants	2 AN/VDR-2 3 TAP aprons 6 30-gallon containers 10 books of M8 detector paper 30 sponges 8 M256A1 detector kits 50 trash bags 1 clipboard with a pen 1 stopwatch
Station 4 - rinse	1 squad leader 1 PDDE operator 2 pump operators	2 sprayers	1 M12A1 PDDA 1 3,000-gallon tank 3 65-GPM pumps 2 TPUs 2 TAP aprons
Station 5 - check	2 NCO/CAM operators		2 CAMs 10 M256A1 detector kits 20 books of M8 detector paper 2 AN/VDR-2 2 M8A1 or M22 ACAAs
C ²	1 PL 1 PSG		1 HMMWV with a radio 3 NBC marking kits
Total personnel	20	17	

WARNING

Chemical-unit leaders must consider the impact of the work/rest cycle on their unit's ability to process vehicles through the DED. Failure to initiate a work/rest cycle could result in heat casualties and mission failure.

4-114. It may not be possible, for a variety of reasons, for an M17 LDS-equipped decon platoon to use the optimum DED layout. Figure 4-7, page 4-27, shows an example of an optimum DED layout. Limited personnel or equipment will affect the DED layout. Figure 4-8 shows an example of an alternate DED layout.

Table 4-8. Personnel and Equipment Requirements for the Alternate DED Layout of the M12A1 PDDA-Equipped Unit

Stations	Personnel	Equipment/Supplies
Station 1 - primary wash	1 NCOIC* 2 PDDE operators* 4 sprayers 2 scrubbers	2 M12A1 PDDAs 2 3,000-gallon tanks 2 65-GPM pumps 4 long-handled brushes 6 TAP aprons Liquid detergent
Station 2 - DS2 application	1 NCOIC* 8 applicers	14 long-handled brushes 8 mops with extra mop heads 3 30-gallon containers 8 M13 DAPs Sufficient DS2
Station 3 - contact time/ interior decon	1 NCO* 2 interior decon assistants	2 AN/VDR-2 3 TAP aprons 6 30-gallon containers 10 books of M8 detector paper 30 sponges 8 M256A1 detector kits 50 trash bags 1 clipboard with a pen 1 stopwatch
Station 4 - rinse	1 NCOIC* 1 PDDE operator* 2 sprayers	1 M12A1 PDDA 1 3,000-gallon tank 1 65-GPM pumps 2 TPUs 2 TAP aprons
Station 5 - check	2 NCO/CAM operators*	2 CAMs 10 M256A1 detector kits 20 books of M8 detector paper 2 AN/VDR-2 2 M8A1 or M22 ACAAs
C ²	1 PL* 1 PSG*	1 HMMWV with a radio 3 NBC marking kits
Total personnel	29 (Minimum of 11 soldiers from the decon platoon)	
* These individuals should be from the decon platoon.		

4-115. It also may not be possible, for a variety of reasons, for an M12A1 PDDA- equipped decon platoon to use the optimum DED layout. Limited personnel or equipment will affect the DED layout. Figure 4-6, page 4-26, shows an example of an alternate DED layout.

THOROUGH-DECON-SITE CLOSURE

4-116. Once all vehicles and soldiers from the contaminated unit have processed through the thorough-decon site, the site can be closed. Coordination with the supported unit is necessary before actually closing the site to ensure that all contaminated elements have been processed.

Table 4-9. Personnel and Equipment Requirements for the Optimum DED Layout of the M17 LDS-Equipped Unit

Stations	Personnel		Equipment/Supplies
	Decon Platoon	Augmenter	
Station 1 - primary wash	1 squad leader 4 sprayers 2 scrubbers	2 scrubbers	2 M17 LDSs 2 3,000-gallon tanks 2 65-GPM pumps 6 long-handled brushes 8 TAP aprons Liquid detergent
Station 2 - DS2 application	1 squad leader 3 appliers	9 appliers	18 long-handled brushes 9 mops with extra mop heads 3 30-gallon containers 9 M13 DAPs Sufficient DS2
Station 3 - contact time/ interior decon	1 NCO 2 interior decon assistants		2 AN/VDR-2 3 TAP aprons 6 30-gallon containers 10 books of M8 detector paper 30 sponges 8 M256A1 detector kits 50 trash bags 1 clipboard with a pen 1 stopwatch
Station 4 - rinse	1 squad leader 4 sprayers		2 M17 LDSs 2 3,000-gallon tanks 2 65-GPM pumps 2 TPUs 4 TAP aprons
Station 5 - check	2 NCO/CAM operators		2 CAMs 10 M256A1 detector kits 20 books of M8 detector paper 2 AN/VDR-2 2 M8A1 or M22 ACAAs
C ²	1 PL 1 PSG		1 HMMWV with a radio 3 NBC marking kits
Total personnel	23	11	

4-117. The chemical unit (decon or smoke/decon platoons) closes the DED first. Once the DED is closed, the chemical unit processes through the DTD. After the chemical unit has processed through the DTD, the DTD is closed. At that point, the chemical unit marks the area as a contaminated area and reports its exact location to the supported unit, using an NBC-5 report. The exact procedures for closing the DED and DTD are described as follows:

CLOSING THE DED AREA

4-118. The DED is closed in sequence, starting at station 1. All vehicles, equipment, and nonexpendable supplies are inspected for contamination. If contamination is found on an item, it is decontaminated. The actions at each station are described as follows:

Table 4-10. Personnel and Equipment Requirements for the Alternate DED Layout of the M17 LDS-Equipped Unit

Stations	Personnel	Equipment/Supplies
Station 1 - primary wash	1 NCOIC* 4 sprayers 4 scrubbers	2 M17 LDSs 2 3,000-gallon tanks 2 65-GPM pumps 4 long-handled brushes 8 TAP aprons Liquid detergent
Station 2 - DS2 application	1 NCOIC* 8 applicers	14 long-handled brushes 8 mops with extra mop heads 3 30-gallon containers 8 M13 DAPs Sufficient DS2
Station 3 - contact time/ interior decon	1 NCO* 2 interior decon assistants	2 AN/VDR-2 3 TAP aprons 6 30-gallon containers 10 books of M8 detector paper 30 sponges 8 M256A1 detector kits 50 trash bags 1 clipboard with a pen 1 stopwatch
Station 4 - rinse	1 NCOIC* 4 sprayers	2 M17 LDS 2 3,000-gallon tanks 2 65-GPM pumps 4 TAP aprons
Station 5 - check	2 NCO/CAM operators*	2 CAMs 10 M256A1 detector kits 20 books of M8 detector paper 2 AN/VDR-2 2 M8A1 or M22 ACAAs
C ²	1 PL* 1 PSG*	1 HMMWV with a radio 3 NBC marking kits
Water resupply	2 drivers*	2 TPUs
Total personnel	32 (Minimum of 10 soldiers from the smoke/decon platoon)	
* These individuals should be from the smoke/decon platoon.		

Station 1 - Primary Wash

4-119. Spray all vehicles and equipment with hot, soapy water to remove any contamination that could have been transferred during the primary wash operations. Drain the water billets or fabric tanks of water. Inspect all equipment and vehicles for contamination using the appropriate detection equipment.

Station 2 - DS2 Application

4-120. Throw the mops and brushes that were used in applying the DS2 into a sump or bury them. Load the unused cans of the DS2 and the M13 DAPs on a vehicle.

Station 3 - Contact Time/Interior Decon

4-121. Inspect any unused supplies and equipment for contamination. If no contamination is detected, load the equipment and supplies on a vehicle. Throw all contaminated supplies into the nearest sump. In calculating sump requirements, 35 cubic feet of space is required for 250 gallons of liquid drain off. Once a sump is 2/3 full, prepare a new sump.

Table 4-11. Work/Rest Table

Temperatures	Stations and Workload				
	Station 1 – Primary Wash	Station 2- DS2 Appli- cation	Station 3 – Contact Time/Inte- rior Decon	Station 4 - Rinse	Station 5 - Check
	Physical Exertion				
	Moderate	Heavy	Moderate	Moderate	Light
Cool (<68°F)	60 work 15 rest	30 work 30 rest	60 work 15 rest	60 work 15 rest	60 work 15 rest
Warm (68° - 74°F)	45 work 45 rest	20 work 20 rest	45 work 45 rest	45 work 45 rest	50 work 50 rest
Hot (74° - 84°F)	30 work 60 rest	15 work 30 rest	30 work 60 rest	30 work 60 rest	40 work 80 rest
Very Hot (>84°F)	20 work 60 rest	10 work 30 rest	20 work 60 rest	20 work 60 rest	25 work 75 rest
<p>NOTE: When operating in temperatures above 75°F, consider the ability of the soldiers to accomplish the mission. Once the soldiers have reached their maximum workload for heat stress, they cannot recover quickly enough to accomplish the decon mission. A viable option is to postpone the decon operation until a cooler part of the day or evening. This will reduce the heat-stress load on the soldiers and increase the probability of mission success. For further information, see FM 3-4.</p>					

Station 4 - Rinse

4-122. Spray all vehicles and equipment with hot, soapy water to remove any contamination that could have been transferred during the rinse operations. Drain the water billets or fabric tanks of water. Inspect all equipment and vehicles for contamination using the appropriate detection equipment. If no contamination is detected, load the equipment on the vehicles. Spread one can of STB dry mix into each of the sumps and then cover them. Ensure that DS2 is not present in the sumps. Post NBC hazard markers near the covered sumps. **(NOTE: DS2 destroys chemical agents; however, some of the by-products created from it are toxic.)**

Station 5 - Check

4-123. Ensure that all equipment has been checked for contamination. If it is not contaminated, load it on a vehicle. If it is contaminated, decon it according to the appropriate technical manual (TM). Throw any contaminated supplies into the nearest sump. Move all vehicles upwind of station 5 and inspect them again for contamination. If any contamination is detected, the crew will use

either the M11 or M13 DAP to decon the identified areas. Once the vehicles are staged, all the soldiers will proceed to the DTD.

CLOSING THE DTD AREA

4-124. Once all the soldiers from the DED have processed through the DTD, it may be closed. After the last person has exited the DTD—

- Pick up all the used supplies from station 7 and put them in station 7's sump. Take up the contamination control line. If engineer tape was used, dispose of it in station 7's sump.
- Move all usable supplies and equipment from all the stations to station 1. Discard all unusable supplies from stations 3, 4, and 5 in station 1's sump.
- Decon all supplies and equipment collected at station 1 using the decon and rinse water at station 1. Empty the decon and rinse water from the station into the sump and decontaminate the containers.
- Mark the entire decon area. Remove your overgarment using the MOPP-gear-exchange technique and dispose of it in the sump at station 1.
- Move any equipment used to fill the sump upwind of the decon area. Decon your rubber gloves and move all equipment and supplies in station 1 upwind of the decon area. Keep this equipment and supplies separate from that used to fill the sump.

THOROUGH DECON UNDER UNUSUAL CONDITIONS

4-125. Decon operations are not restricted to daylight hours. The enemy may employ chemical and biological weapons at night, since weather conditions are usually more favorable for their employment at that time. Consequently, NBC contamination encountered at night may require decon before daylight.

4-126. Conducting decon operations at night is a challenge. "White light" cannot be used without possibly revealing your location. However, decon personnel must have illumination to perform such essential decon tasks as spraying water, applying decontaminants, using detection equipment, and taking off the MOPP gear.

4-127. Use M8/M9 detector paper to check for chemical contamination and to see how well the chemical decon was performed. If contamination is present, the paper color changes to red and cannot be seen if red-filtered light is used. The CAM and M256A1 detector kit can be used to identify and detect chemical agents but will require a light source in order to obtain a reading.

4-128. Several vehicles awaiting or undergoing decon present a significant infrared "signature" due to the hot engines. To enter, exit, and move within the decon site is difficult under blackout conditions.

4-129. Night-decon operations are difficult but can be accomplished. Whenever possible, conduct thorough-decon operations in built-up areas. Use a building for DTD operations and a warehouse for DED operations. This allows for the use of white light. Soldiers can see what they are decontaminating, see where they are going, and read the color changes of the M8/M9 detector paper.

4-130. There will be a need for additional soldiers to act as ground guides in the DED area. The NCOICs of stations 1, 2, and 4 will inspect each vehicle with a flashlight or chemical light before the vehicle proceeds to the next station. There should be at least two flashlights at each station in both the DED and DTD areas.

Chapter 6

Effects of Environmental Conditions

US forces may find themselves anywhere in the world and subjected to the conditions in that region. Weather and terrain conditions will dictate how to fight and what equipment is most effective to support the fighting force under NBC conditions. The conditions in cold- and arctic-weather areas, warmed areas, urban areas, mountains, jungles, and deserts impact how decon operations are performed.

COLD- AND ARCTIC-WEATHER AREAS

6-1. These regions comprise about 45 percent of the North American continent and about 65 percent of the Eurasian land mass. They are characterized by extreme cold weather and deep snow during winter months. Spring breakup and mud restrict mobility. Whiteout and grayout cause loss of depth perception, making vehicle movement hazardous. Ice fog (clouds of ice crystals) covers troops, vehicles, bivouac areas, and permanent facilities, marking their location. Chemical agents become more persistent in low temperatures (see Table 6-1, page 6-2). As a result, some normally nonpersistent chemicals, such as sarin (GB), become persistent; this nerve agent could remain a transfer hazard for up to 30 days in arctic climates. Normally, persistent agents become more persistent. Although frozen agents do not present a significant problem in solid state, they become hazards when they warm up. Decon is a problem because low temperatures also reduce the effect of decontaminants.

6-2. The freezing points of decontaminants are as follows:

- Water, 32^oF.
- STB slurry with antiset, 0^oF.
- DS2, -25^oF.
- SKD, -50^oF.
- IEDK, -50^oF.
- SDS, -50^oF.

DECONTAMINANTS

6-3. When temperatures reach 32^oF, water can no longer be used as a decon. In such situations, use DS2. DS2 is effective down to -25^oF. For temperatures below -25^oF, use STB or HTH as a dry mix (two parts of STB to three parts of earth or snow) for decon. Apply the dry mix by shoveling it on contaminated surfaces or by filling sandbags with the mix and dusting it on the surfaces. Remove the dry mix by brushing, scraping, or using uncontaminated earth or snow to "wash" it off. Other decontaminating methods using nonstandard solvents and fuels may be used, but observe fire safety, protect personnel from corrosives, and take precautions against super-cooling effects. Because of

their low freezing points, solvents such as aviation fuel (JP8), diesel fuel, and kerosene may be used to physically remove contamination. These solvents only flush the agent from the surfaces. They generally do not neutralize agents nor do they eliminate agents that soak into surfaces. Nonstandard solvents generally are very flammable and must be handled with care. See Appendix B for specific nonstandard solvents.

Table 6-1. Freezing Points of Selected Chemical Agents

Agents	Symbols	Contact Hazard	Vapor Hazard	Freezing Point
Nerve				
Tabun	GA	Extreme	Low-moderate	+23°F
Sarin	GB	Extreme	Extreme	-69°F
Soman	GD	Extreme	Probable	-44°F
	GF	Extreme	Probable	-22°F
	VX	Extreme	Negligible	-60°F
	VR-55	Extreme	Probable	Unknown
	TGD	Extreme	Probable	Depends on the percent of thickener
Blister				
Distilled mustard	HD	Extreme	Negligible	+57°F
Mustard-lewisite	HL	Extreme	Low	-14°F (Pure) -44°F (Plant purity)
Nitrogen mustard	HN-1	Extreme	Low	-29°F
Nitrogen mustard	HN-2	Extreme	Low	-76°F
Lewisite	L	Extreme	Negligible	0°F
Nitrogen mustard	HN-3	Extreme	Low	+25°F
Phosgene oxime	CX	Extreme	Low	+95°F
Blood				
Hydrogen cyanide	AC	Low	Extreme	+8°F
Cyanogen chloride	CK	Low	Extreme	+20°F
Arsine	SA	Low	Extreme	-177°F
Choking				
Phosgene	CG	Slight	Extreme	-198°F
Diphosgene	DP	Slight	Extreme	-71°F

Chapter 9

Logistics

The materials that are needed to conduct decon operations are identified in this chapter.

SKIN DECON AND PERSONAL WIPE DOWN

9-1. Each soldier carries his own skin-decon supplies. The SDK is stored in the right cargo pocket of the overgarment trousers or BDU trousers. The basis of issue per soldier is two SDKs (12 packets). Each kit contains six individual decon packets. The unit maintains at least one SDK per assigned person for resupply. Personal wipe down is also done with these kits.

INDIVIDUAL-GEAR DECON

9-2. The standard decon kit for individual gear is the IEDK. Each soldier carries an IEDK in the right cargo pocket of his overgarment trousers or BDU trousers. The basis of issue per soldier is one IEDK. Each kit contains four individual decon packets, enough to decon two complete sets of individual gear. The unit maintains at least one IEDK per assigned soldier for resupply.

OPERATOR'S SPRAY DOWN/WIPE DOWN

9-3. The M100 SDS is the preferred decon system to be used for the operator's wipe down portion of an immediate decon. If the M100 SDS is not available, the M11 or M13 decon apparatus can be used. Fill the M11 with a 1 ¹/₃-quart can of DS2 before use. If the M100 SDS is not available, use the IEDK to decon the equipment that the DS2 may cause damage to by corrosive action.

9-4. Four nitrogen cylinders and two 1 ¹/₃-quart cans of DS2 should be carried in the vehicle with each M11 (two nitrogen cylinders are authorized per can of DS2). Use the nitrogen cylinders to pressurize the M11 during use. Operating the M11 in below-freezing weather (below 32°F) requires two nitrogen cylinders to expend its contents.

9-5. Units maintain limited spare parts and accessories. They are not required to maintain additional stocks of 1 ¹/₃-quart cans of DS2. The 5-gallon pails that are authorized to each unit can be used to refill empty M11s until a resupply of 1 ¹/₃-quart cans of DS2 is received from the battalion.

9-6. The M13 comes with a 3.7 gallon DS2 container.

MOPP-GEAR EXCHANGE

9-7. Each soldier wears or carries one complete set of MOPP gear. The unit stocks a second complete set, which is sized and identified for each soldier. When a squad or platoon undergoes a MOPP-gear exchange, the unit sends a supply vehicle with replacement MOPP gear and any decontaminants (STB) to rendezvous with the contaminated element at the operational-decon site. (The procedure on how to prepare the STB dry mix is discussed in Appendix

B.) Use about 40 pounds of the STB dry mix per squad-sized element. In wartime, 5-pound quantities of the STB dry mix can be put in 1-gallon airtight containers and stored in the company's supply section.

NOTE: Do not leave a 50-pound drum of STB dry mix open because it loses its effectiveness if left open to the air for extended periods. The unit is resupplied with MOPP gear and decontaminants from its battalion.

9-8. Units maintain a 5 percent overage of MOPP gear based on their personnel strength or authorization (whichever is greater) to ensure a complete range of sizes and replacement gear. All MOPP gear, serviceable and unserviceable, is handled as organizational clothing and equipment (Class II supplies). The higher HQ is responsible for resupply of these items.

VEHICLE WASHDOWN

9-9. Like the MOPP-gear exchange, a vehicle washdown is done in the unit's AO. The battalion's PDDE crew, stationed in the battalion trains, conducts the washdown. The crew moves to the operational-decon site, rendezvous with the contaminated element, and conducts the washdown. The crew uses its PDDE to spray about 100 to 150 gallons of hot, soapy water on each vehicle to wash off the gross contamination. For vehicles such as the M1-series armored fighting vehicles, about 200 gallons of water may be required per vehicle. One hundred gallons of water per vehicle provides a 2- to 3-minute wash. To speed up the operation, the crew should heat the water before arriving at the operational-decon site. See Chapters 2 and 3 and Table 9-1 for the planning and coordination of and the requirements for a vehicle washdown.

9-10. The M12A1 PDDA injects detergent into the water as it operates. It uses 2.5 quarts of detergent for every 1,200 gallons of water (about 1 quart of soap per 450 gallons of water). The battalion decon crew should maintain a basic load of liquid all-purpose detergent, which is sufficient to decon 30 percent of the battalion's organic vehicles.

DETAILED TROOP DECON

9-11. Generally, units conduct DTD in the brigade support area. Battalions conduct it in the division/corps support area. Materials for this technique usually are stocked in the battalion or brigade trains. Reconstitution operations should be closely associated with decon operations. The battalion's assessment and recovery team (ART) ensures that the material and equipment are available for the decon operation as part of the reconstitution effort.

DETAILED EQUIPMENT DECON

9-12. A chemical platoon must have access to large water sources—rivers, ponds, and public water systems—to conduct the DED. The chemical unit leader estimates the amounts of decontaminants that are needed. The platoon sets up the DED site, supplies the decontaminants, and conducts the DED. The platoon should carry enough decontaminants to service one company/team/battery. A decon platoon that is assigned to support a maneuver company (about 16 vehicles per tank company) should carry a minimum of 4 gallons of liquid detergent, 48 5-gallon cans of DS2, and 10 50-pound drums of STB. The chemical platoon is usually resupplied through its parent unit. Command-assignment relationships can change the resupply channels.

Table 9-1. Estimated Water Consumption for Decon

Required Equipment	Time	Water Consumption
Operational Decon¹		
M12A1 PDDA or M17 LDS	1-3 minutes	100 to 150 gallons per regular vehicle 150 to 200 gallons per armored or larger vehicle Example: 15 (contaminated vehicles) x 150 (gallons of water) = 2,250 gallons ²
Detailed Equipment Decon³		
M12A1 PDDA ⁴ or M17 LDS ⁴	See Chapter 4 for the time allowed during a primary wash and rinse. Use the proper decon method.	Vehicles: Station 1 - primary wash, 250 gallons Station 4 - rinse, 200 gallons Armored or larger vehicle: Station 1 - primary wash, 300 gallons Station 4 - rinse, 200 gallons Example: 6 vehicles x 450 gallons of water = 2,700 gallons 4 tanks x 500 gallons of water = 2,000 gallons Total: 4,700 gallons ²
Detailed Troop Decon		
30-gallon container		The initial setup requires 258 gallons of water. The water must be exchanged after 10 troops have been decontaminated through the DTD to avoid the transfer of contamination. Station 1 (120 gallons, 4 30-gallon containers).
3-gallon container		Station 2 (6 gallons, 2 3-gallon containers).
30-gallon container		Station 4 (180 gallons, 6 30-gallon containers).
3-gallon container		Station 7 (12 gallons, 4 3-gallon containers). Example: About 150 troops are to be decontaminated through the DTD. You will need 258 gallons of water per every 10 troops. Example: 150 (number of troops) ÷ 10 (required water exchange) = 15 (the amount of times the water will need to be exchanged) 15 x 258 (gallons of water per every 10 troops) = 3,870 gallons of water for 150 troops ²
<p>¹To reduce contamination, conduct the operator's spray down before the operational decon. This process requires less water consumption during a thorough decon.</p> <p>²Always include a 10 percent planning factor to the total estimate of the water consumption for the DED and the DTD. Example: 2,250 (gallons of water for the DTD) x 10 percent = 225 (additional gallons of water). A total of 2,250 + 225 = 2,475 (gallons of water required for the DTD).</p> <p>³The planner should consider vehicle predecon action to estimate water consumption. He should consider vehicles that were processed through operational decon because they will normally increase the weatherization process and may reduce water usage.</p> <p>⁴The M17 LDS with two wands uses 14 gallons of water per minute. The M17 LDS with only one wand, which is fitted with an injector, uses 25 gallons per minute. The M12A1 PDDA pumps 25 gallons of water per minute.</p>		

9-13. Chemical platoons attached to division engineers may be resupplied through the division engineer battalion instead of their parent company. See Table 9-2 for the decon resources that are available at each organizational level. For the equipment and supplies that are needed for decon operations, see Table 9-3, pages 9-5 through 9-7.

Table 9-2. Decon Resources Available at Each Organizational Level

Organizational Level	Decon Resources
Individual soldiers	2 SDKs 1 canteen of water 2 IEDKs
Operators and crews	2 SDKs 2 IEDKs 1 on-board decon apparatus (M11 or M13) Soap and water 2 50-pound drums STB
Companies	2 5-gallon pails of DS2 2 immersion heaters 2 to 3 30-gallon containers 6 3-gallon containers 6 long-handled brushes 6 sponges 300 plastic trash bags
Battalion PDDE crews	PDDE (M17 LDS) Basic load, liquid detergent
Chemical company decon squad	PDDE (M12A1 PDDA/M17 LDS) Basic load, liquid detergent
Chemical company decon platoon	PDDE (M12A1 PDDA/M17 LDS) Interior decon equipment Sufficient materials to set up a DTD

Table 9-3. Equipment and Supplies Needed for Decon Operations

Minimum Amounts of Equipment and Supplies Needed for Decon Techniques								Nomenclature	NSN	Class of Supply	Unit of Issue	Basis of Issue (See TOE for Actual Authorization)***
SD*	PW*	OS*	OW*	MGX**	VW**	DTD**	DED**					
		1					*** 9	Decon apparatus, DS2, ABC-M11 or M13 DAP	4230-00-720-1618 4230-01-113-4124	II II	Each Each	1 per every major equipment
		2						Cylinder, nitrogen filled	4230-00-775-7541	II	Box	2 per can, DS2 5 per box
2	1		1	1		35		Decon kit, M291 SDK M295 IEDK M100 SDS	6850-01-276-1905 6850-01-357-8456 4230-01-466-9095	II II II	Box Each Case	1 per mask 2 per soldier 1 per every major equipment
		1						Fluid-filled container, DS2	4230-01-136-8888	II	Each	1 per M13 DAP
						1		Filter canister, C2, or filter canister, C2A1	4240-01-119-2315 4240-01-361-1319	II	Each	1 per M40-series mask
						1		Hood, M40 mask	4240-01-376-3152	II	Each	1 per mask
				1		2		Shears	5111-00-223-6371	II	Each	As needed
								Knife	5110-00-240-5943	II	Each	As needed
				***			***	Axe, single bit	5110-00-293-2336	II	Each	1 per most vehicles
				***		***	***	Shovel, hand, RD, PT, D handle	5120-00-293-3336	VII	Each	1 each for most vehicles
							***	NAAK, MK1	6505-01-140-6455	VII	Each	3 per individual
							***	CANA	6505-01-274-0951	VII	Each	1 per individual 5 per combat life saver 10 per combat medic
				1				Paper, chemical agent, detector, M9	6665-00-049-8982	II	Roll	1 per squad 3 per platoon

Table 9-3. Equipment and Supplies Needed for Decon Operations (Continued)

Minimum Amounts of Equipment and Supplies Needed for Decon Techniques								Nomenclature	NSN	Class of Supply	Unit of Issue	Basis of Issue (See TOE for Actual Authorization)***
SD*	PW*	OS*	OW*	MGX**	VW**	DTD**	DED**					
						***	***	Paper, chemical agent, detector, M8	6665-00-050-8529	II	Book	6 books per company
						***	***	Radiac meter, AN/PDR-2	6665-01-222-1425	VII	Each	Per MTOE
						2	***	Radiac meter, IM-93/UD	6665-00-752-7759	VII	Each	Per MTOE
						1	2	Alarm, chemical agent, M8A1 or M22	6665-00-935-6955 6665-01-438-6963	VII VII	Each Each	Per MTOE
						4	2	CAM	6665-01-199-4153	VII	Each	Per MTOE
						4		Detector kit, chemical agent, M256A1	6665-01-016-8399	II	Kit	1 per squad
						1		Mask sanitizing solution	6810-00-266-6979	III	Tube	4 per 10 masks
						**	1	Decontaminating agent, STB	6850-00-297-6653	III	Drum	2 50-pound drums per company
							***	Decontaminating agent, DS2	6850-00-753-4870	II	Can	5 gallons, 25 cans per decon
		1				2	24	Brush, scrub, long-handled	7920-00-141-5452	II	Each	As required
						7		Pail, metal, 14-quart	7240-00-160-0455	II	Each	As required
				1		9	4	Garbage can, galvanized, 30-gallon	7240-00-160-0440	II	Each	2 per company
							6	Mop	7920-00-224-8756		Each	As required
						5		Sponge, cellulose	7920-00-240-2559	II	Each	As required
				2		4	6	Brush, scrub	7920-00-240-7171	II	Each	As required
				2		2		Towels, paper	7920-00-823-6931	II	Box	As required
				1	1	1	1	Detergent, GP, liquid	7930-00-282-9699	II	Gallon	As required

Table 9-3. Equipment and Supplies Needed for Decon Operations (Continued)

Minimum Amounts of Equipment and Supplies Needed for the Decon Techniques								Nomenclature	NSN	Class of Supply	Unit of Issue	Basis of Issue (See TOE for Actual Authorization)***
SD*	PW*	OS*	OW*	MGX**	VW**	DTD**	DED**					
				1		1	1	Bag, plastic	8105-00-655-8286	II	Box	125 count
					**		10	TAP apron	8415-00-281-7813 through 8415-00-281-7816	II	Each	10 per platoon
				1		1		Suit, clothing, protective, See CTA 50-909 for clothing tariff	8415-01-137-1700 through 8415-01-137-1707	II	Each	2 per soldier
				1		1		Glove set, CP, See SB 10-523 for clothing tariff	8415-01-033-3517 through 8415-01-033-3520	II	Pair	1 per soldier
								Cover, helmet, chemical protective	8415-01-111-9028	II	Each	1 per soldier
				1		1		Overboots	8430-01-048-6305 through 8430-01-049-0887	II	Pair	1 per soldier
				2	2	2	2	NBC marking kit	9905-12-124-5955	II	Kit	1 per squad
						2		Immersion heater		II	Each	2 per company
*Techniques executed by individual soldiers								SD – Skin decon PW – Personal wipe down OS – Operator's spray down OW – Operator's wipe down	Amount is consumption rate for 1 soldier			
**Techniques executed by units								MGX – MOPP-gear exchange VW – Vehicle washdown DTD – Detailed troop decon DED – Detailed equipment decon	Amount is consumption rate for 1 platoon (4 vehicles, 40 personnel) Amount is consumption rate for 1 company (20 vehicles, 150 personnel)			
***Amounts vary, depending on situation												

Appendix D

Decon Kits, Apparatuses, and Equipment

Various materials and equipment are used in decon operations. Some are simple to use and are readily available to individual soldiers. Others are very complex to use and are available only to specially trained teams. Table D-1, pages D-1 and D-2, lists the decon equipment and materials for the different use levels; Table D-2, pages D-3 through D-5, lists the detection equipment and materials for the different use levels.

Table D-1. Decon Equipment and Materials

Item and Description	Use	Limitations	Reference
Individual			
Decontaminating kit, skin, M291 SDK, (NSN 4230-01-276-1905) (20 kits per box)	To decon your skin, completely, through physical removal, absorption, and neutralization of toxic agent with no long-term effects NOTE: Use this kit for both actual combat and training purposes.	Is for external use only. <div style="border: 1px solid black; padding: 5px; text-align: center;">WARNING Keep decon powder out of eyes, cuts, or wounds. It could slightly irritate the skin or eyes.</div>	TM 3-4230-229-10
Decon kit, individual equipment, M295, IEDK, (NSN 6850-01-357-8456)	To decon your chemical protective gloves, mask, hood, overboots, LCE, and weapon.	<div style="border: 1px solid black; padding: 5px; text-align: center;">WARNING Do not use for skin decon. Keep off the skin and out of wounds, eyes, and mouth.</div>	TM 3-4230-235-10
Decontaminating apparatus, portable, M13 DAP, (3.7 gal), (NSN 4230-01-133-4124). It has a 3.7-gallon disposable DS2 container. The apparatus can be mounted to a standard 5-gallon fuel can mount on vehicles and equipment.	To spray DS2 on surfaces of vehicles and equipment.	Cannot refill DS2 container. See Table A-2, page A-2, for a list of replacement containers.	TM 3-4230-214-12&P TM 43-0001-26-1

Table D-1. Decon Equipment and Materials (Continued)

Item and Description	Use	Limitations	Reference
Battalion Decon Crew and Chemical Company			
Decontaminating apparatus, power driven, skid mounted, multipurpose, integral, 500 gallon, M12A1 PDDA, (NSN 4230-00-926-9488), LIN F81880. Apparatus includes pump unit, tank unit, and M2 water heater (all mounted on skids).	To spray decon agent, STB slurries, and solutions as well as hot, soapy water rinses during field decon operations. To pump water or foam to fight fires, de-ice items, wash vehicles, and pump various fluids.	Do not use with defoliants, herbicides, or insecticides.	LO 3-4230-209-12 LO 5-2805-259-12 TM 3-4230-209-20&P TM 43-0001-26-1
Decontaminating system, lightweight, M17 LDS, (NSN 4230-01-251-8702). The M17 is a portable pump and water-heating unit for producing hot water and steam. The system incorporates a 1,580- to 3,000-gallon collapsible water tank, two wand assemblies, and connecting hoses.	To perform operational and thorough decon of vehicles and equipment. Can also be used for troop showers, as necessary.		TM 3-4230-228-10
Decontaminating system, sorbent, M100 (NSN 4230-01-466-9095)	To perform immediate decon of equipment, vehicles, and crew-served weapons. NOTE: Use this kit for training purposes and actual combat.	Do not use on sensitive items. Operating temperature is -25°F to 120°F. <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;">WARNING Do not use for skin decon. Keep off the skin and out of wounds, eyes, and mouth.</p> </div>	TM 3-4230-236-10

Appendix E

DTD Station Charts for Chemical Unit Leaders and NBC NCOs

This appendix provides station charts for the DTD. They can be laminated and posted at each station. They provide the station number and instructions for the station supervisor/attendant. They are not meant to be all-inclusive and do not include setup procedures or equipment requirements. They are an easy guide for soldiers going through a decon and for station supervisors/attendants.

STATION 1

**INDIVIDUAL-
GEAR
DECON**

**TASK: Remove contamination to
a negligible risk from individual gear
(LCE, mask carrier, helmet, and weapon)**

- **The soldier—**
 - **Decontaminates his own gloves with hot, soapy water or an STB slurry.**
 - **Decontaminates his hose and canister (if wearing the M42 mask) with either hot, soapy water and a sponge or an STB slurry mix.**
 - **Decontaminates his own gear by washing and scrubbing it for 4 minutes in a decontaminant container with hot, soapy water or an STB slurry mix.**

- **The attendant—**
 - **Takes the gear to the equipment checkpoint and places it on the "dirty" side of the contamination control line (engineer tape).**
 - **Waits as the monitor holds the detection device 1 inch from the gear and checks it for residual contamination.**
 - **Recycles any gear that is above one bar.**
 - **Places the gear on the clean side of the contamination control line if it passes the check.**
 - **Carries the gear to the reissue point.**

NOTE: CHANGE THE SLURRY MIX AFTER 20 SOLDIERS HAVE DECONTAMINATED THEIR GEAR AND THE RINSE WATER AFTER 10 SOLDIERS OR WHEN IT APPEARS DIRTY (PLACE THE WASTE IN THE SUMP).

STATION 2

OVERBOOT

AND

HOOD DECON

TASK: Neutralize gross contamination on overboots, lower trouser legs, protective mask, and hood

NOTE: IF THE JSLIST CHEMICAL PROTECTIVE OVERGARMENT IS WORN, GO TO THE JSLIST PROCEDURES.

- **The soldier walks into the shuffle pit and spreads his legs apart (double-shoulder width), bends at the waist, and uses his hands to thoroughly rub the STB dry mix or the STB slurry on his overboots and lower trouser legs.**
- **Buddy #1 cuts the shoulder straps and drawcord on Buddy #2's hood. He pulls Buddy #2's hood inside out over the front of the mask, being careful not to touch the exposed neck or head. Buddy #1 gathers Buddy #2's hood in one hand and using a cutting tool, cuts away the hood as close as possible to the eye-lens outsert, voicemitter, and inlet-valve cover. Make sure nothing is left dangling below the bottom of the mask. If a replacement hood is not available, decon Buddy #2's hood in the same manner as for a MOPP-gear exchange.**
- **The attendant—**
 - **Instructs Buddy #1 on how to roll Buddy #2's hood to ensure that it is accomplished to standard.**
 - **Monitors the shuffle pit and adds more STB after 10 soldiers have processed through it.**

JSLIST Chemical Protective Overgarment Procedures

- **Buddy #1—**
 - **Loosens Buddy #2's overgarment hood by unfastening the barrel lock. (NOTE: IF THERE IS DIFFICULTY UNFASTENING THE BARREL LOCK, LOOSEN THE DRAWCORD.)**
 - **Loosens the drawcord around the edge of the hood and unfastens the hook-and-pile fastener tape at the chin. Buddy #1 must take care to avoid touching Buddy #2's skin and throat area.**

- **Removes Buddy #2's overgarment hood by opening the front-closure flap and pulling the slide fastener from the chin down to the chest.**
- **Instructs Buddy #2 to turn around. Buddy #1 grasps the back of Buddy #2's hood, rolls the hood inside out (being careful not to contaminate the inner garment), and pulls the hood off. When the task is completed, Buddy #1 and Buddy #2 reverse roles.**
- **The attendant—**
 - **Instructs Buddy #1 on how to roll Buddy #2's hood to ensure that it is accomplished to standard.**
 - **Monitors the shuffle pit and adds more STB after 10 soldiers have processed through it.**

STATION 3

OVERGARMENT REMOVAL

TASK: Remove contaminated overgarment before the agent penetrates material and touches the undergarments or the skin

NOTE: IF THE JSLIST CHEMICAL PROTECTIVE OVERGARMENT IS WORN, GO TO THE JSLIST PROCEDURES.

The attendant—

- **Assists the soldier in removing his overgarment.**
- **Cuts or removes the M9 detector paper from around the soldier's wrist.**
- **Unfastens the Velcro closure over the jacket zipper.**
- **Unties the waist cord and unfastens the Velcro straps on the soldier's jacket.**
- **Unfastens the back snaps.**
- **Cuts or removes the M9 detector paper from the soldier's trousers, if binding.**
- **Unfastens the Velcro straps and zipper on the cuffs of the soldier's trousers.**
- **Unfastens the front waist snaps and unzips the front zipper. He has the soldier lift one leg and point that foot down and bend slightly at the knees for stability.**
- **Grasps the cuff of the elevated boot with a hand on each side and pulls the cuff in an alternating, jerking motion until the soldier can step out of the trouser leg. The process is repeated on the other leg.**

JSLIST Chemical Protective Overgarment Procedures

The attendant—

- **Assists the soldier in removing his overgarment jacket.**
- **Cuts and removes the M9 detector paper from around the soldier's wrists and arms.**
- **Releases the hook-and-pile fastener tapes at the wrists and at the bottom of the trousers.**
- **Unties the bow in the coat retention cord, if tied. He unfastens the webbing-strip snaps at the bottom of the jacket and releases**

the coat retention cord. Touching only the outside surfaces of the jacket, the attendant loosens the bottom of the jacket by pulling the material at the bottom away from the soldier's body. The soldier will locate his trouser suspender snap couplers by feeling for them on the outside of his jacket and release them.

- Unfastens the front-closure flap on the front of the jacket and pulls the slide fastener from the top of the chest down to the bottom of the jacket. The attendant instructs the soldier to turn around, extend his arms in front of him, and make a fist to prevent the removal of his chemical protective gloves. The attendant grasps the jacket near the shoulders and removes it by pulling it down and away from the soldier's body.

NOTE: IF THERE IS DIFFICULTY REMOVING THE JACKET IN THIS MANNER, PULL ONE ARM OUT AT A TIME.

- Instructs the soldier to turn back around. The attendant cuts and removes the M9 paper from the soldier's trousers.
- Unfastens the hook-and-pile fastener tapes at the waistband of the trousers, unfastens the front-closure snaps, and opens the fly slide fastener.
- Grasps the soldier's trousers at the hips and pulls the trousers down to soldier's knees. The attendant has the soldier lift one leg, point that foot down, and bend slightly at the knee for stability. He grasps the trouser leg of the elevated foot and with a hand on each side of the trouser leg, pulls the trouser leg in an alternating motion until the soldier can step out of it. Repeat the process on the other leg.

NOTE: THE ATTENDANT ENSURES THAT THE SOLDIER STEPS WIDE ENOUGH SO AS NOT TO RUB HIS CLEAN LEG AGAINST THE CONTAMINATED BOOT AND OVERGARMENT.

STATION 4

OVERBOOT AND GLOVE REMOVAL

TASK: Remove contaminated overboots and gloves to limit the spread of contamination (the overboots and gloves may also be decontaminated for reissue, if serviceable)

- **Engineer tape is used to mark the liquid-contamination control line.**
- **The attendant unfastens or cuts the elastic closures on the soldier's overboots.**
- **The soldier stands next to and faces the liquid-contamination control line.**
- **The soldier steps back about 12 inches from the liquid-contamination control line.**
- **The attendant steps on the back of the soldier's overboot and instructs him to lift his heel and work his foot out of the overboot and step across the liquid-contamination control line. Repeat the process on the other foot.**
- **The attendant discards the overboots.**
- **The soldier holds the fingertips of his gloves and partially slides his hands out.**
- **The attendant removes the soldier's gloves.**
- **The attendants—**
 - **Put the gloves and overboots into the containers on the "dirty" side of the control line.**
 - **Submerge the gloves and overboots in the container of hot, soapy water, ensuring that no water remains inside when removed from the container.**
 - **Submerge the gloves and overboots in the STB/HTH solution and thoroughly scrub them.**
 - **Rinse the scrubbed items and check for holes, tears, or punctures. If found, discard the items.**
 - **Place the usable items on a poncho or a plastic tarp to air dry.**
 - **Place the air-dried usable items into plastic trash bags along with an M256A1 detector kit. If the kit shows contamination remaining, the attendants can recycle the items or discard them. However, if the kit shows no contamination, they can be reused.**

STATION 5

MONITOR

TASK: Identify contamination on personnel (spot-decon capability and medical aid are provided, as required)

- **The monitor checks the soldiers for contamination.**
- **The aidman checks the soldiers for any chemical-agent symptoms and treats as necessary.**
- **The monitor asks the soldiers about any damage to their MOPP gear that was identified at stations 2, 3, or 4.**

NOTE: IF ALL THE LIQUID CONTAMINATION IS ABSORBED INTO THE CLOTHING, THE M8 DETECTOR PAPER WILL BE NEGATIVE EVEN THOUGH THERE IS A HAZARD.

STATION 6

MASK REMOVAL

**TASK: Remove the mask
without contaminating the soldier**

- **The attendant pulls the hood over the front of the mask, grabs the mask by the voicemitter cover, and pulls the mask off the soldier while he holds his breath.**
- **The attendant holds the mask open so that the soldier can remove the inserts without touching the outside of the mask if the mask has optical inserts.**
- **The soldier walks upwind 16 feet, crosses the vapor-contamination control line, and then resumes breathing.**
- **The attendant brings the mask to station 7.**

NOTE: NO VAPOR HAZARD IS EXPECTED BEYOND THE VAPOR-HAZARD CONTAMINATION CONTROL LINE.

- **The chemical unit positions the M8A1 or M22 ACAA upwind of the site.**
- **The soldier moves straight ahead while his mask, which may still be emitting vapors, is held on the "dirty" side of the vapor-contamination control line and taken to the next station.**

STATION 7

MASK DECON POINT

TASK: Remove all contamination from the protective masks

The attendants—

- **Discard the winterization kits, if used.**
- **Remove the eye-lens outserts and the hoods if the hoods were not cut off at station 2.**
- **Remove or discard the filters or canisters and dispose of them in the properly marked containers.**
- **Wash the masks, hoods, eye-lens outserts, and hoses on the M42 and M43 masks in hot, soapy water.**
- **Rinse these items in clean water.**
- **Dip them in the sanitizing solution and agitate for 5 minutes.**
- **Rinse them in clean water again.**
- **Add one tube of mask sanitizing solution (calcium hypochlorite) to each quart of water.**
- **Wipe the masks with rags until they are almost dry.**
- **Discard each gallon of mask sanitizing solution into a sump after every 10 masks.**
- **Check for contamination with a CAM.**
- **Recycle the masks if they are still contaminated and then decon their gloves.**
- **Take the unassembled masks to the reissue point if they are not contaminated.**

STATION #8

REISSUE POINT

**TASK: Reissue the masks
with their components to the soldiers**

- **The unit NBC NCO reissues the masks with their components to the soldiers.**
- **The soldiers will reassemble the masks in the postdecon AA.**
- **The unit NBC NCO provides the soldiers with replacement parts for all types of protective masks.**
- **The soldiers pick up individual gear and move to the postdecon AA.**

FRAGO	fragmentary order
FSB	forward-support battalion
G4	Assistant Chief of Staff, G4 (Logistics)
G5	Assistant Chief of Staff, G5 (Civil Affairs)
GA	tabun
GB	sarin
GD	soman
GF	soman
GI	Government issue
GP	general purpose
GPM	gallons per minute
Gy	gray
HD	distilled mustard
HE	high explosive
HEMTT	heavy expanded-mobility tactical truck
HEPA	high-efficiency particulate air filter
HL	mustard-lewisite
HMMWV	high-mobility multipurpose wheeled vehicle
HN-1	nitrogen mustard
HN-2	nitrogen mustard
HN-3	nitrogen mustard
HP	horsepower
HQ	headquarters
HTB	high-test bleach
HTH	high-test hypochlorite
IEDK	individual equipment decon kit
JMAO	Joint Mortuary Affairs Office
JP8	aviation fuel
JSLIST	joint-services lightweight integrated-suit technology
L	lewisite
LAW	light antitank weapon
LCE	load-carrying equipment
LDS	Lightweight Decontaminating System
LIN	line-item number

LO	lubrication order
LTA	launcher-tube assembly
MADCP	mortuary affairs decontamination collection point
METT-TC	mission, enemy, terrain, troops, time available,
MGX	MOPP-gear exchange
MOPP	mission-oriented protective posture
MP	military police
MRE	meals, ready-to-eat
MTF	medical-treatment facility
MTOE	modification table of organization and equipment
NATO	North Atlantic Treaty Organization
NAVMC	Navy/Marine Corp
NBC	nuclear, biological, and chemical
NBC5 report	once the NBC reports are posted on the situation map, an NBC5 report showing the contaminated area is prepared by the division
NCO	noncommissioned officer
NCOIC	noncommissioned officer in charge
NSN	national stock number
OEG	operational exposure guidance
OPORD	operation order
OS	operator's spray down
PAA	peracetic acid
PALADIN	artillery howitzer
PASGT	personnel armor system ground troops
PDDA	power-driven decon apparatus
PDDE	power-driven decon equipment
PL	platoon leader
PLL	prescribed load list
PNVS	Pilot Night-Vision System
POL	petroleum, oils, and lubricants
POMCUS	prepositioning of material configured to unit sets
PPW	patient protective wrap
PSG	platoon sergeant
psi	pounds per square inch

PT	pointed
PW	personal wipe down
rad	radiological
RD	rounded
RPO	radiological protection officer
S4	Supply Officer (US Army)
SA	arsine
SAW	squad automatic weapon
SB	supply bulletin
SD	skin decon
SDK	skin decontaminating kit
SDS	Sorbent Decontamination System
SMCT	soldiers' manual of common tasks
SOI	signal operating instructions
SOP	standing operating procedure
STANAG	Standardized North Atlantic Treaty Organization Agreement
STB	supertropical bleach
STP	soldier training publication
T20	tritium oxide
TADS	Tactical Air-Defense System
TAP	toxicological apron, protective
TB	technical bulletin
TC	training circular
TGD	thickened soman
THD	thickened distilled mustard
TM	technical manual
TO	technical order
TOE	table of organization and equipment
TOW	tube launched, optically tracked, wire guided
TPU	tank and pump unit
TRADOC	United States Army Training and Doctrine Command
uGy	microgray
US	United States
USMC	United States Marine Corp

UV	ultraviolet
VDR-2	radiac meter
VR-55	soman
VW	vehicle washdown
VX	soman
WBG	wet-bulb gradient temperature
WO	warning order

- TB 43-0116. *Identification of Radioactive Items in the Army*. 1 April 1998.
- TC 3-4-1. *Chemical Agent Monitor Employment*. 17 December 1991.
- TC 3-11-55. *Joint Services Lightweight Integrated-Suit Technology (JSLIST)*. 1 July 2001.
- TM 3-4230-209-20&P. *Unit Maintenance Manual Including Repair Parts and Special Tools List Decontaminating Apparatus: Power-Driven, Skid-Mounted, 500 Gallon, M12A1 (NSN 4230-00-926-9488)*. 28 June 1986.
- TM 3-4230-214-12&P. *Operator's and Unit Maintenance Manual Including Repair Parts and Special Tools List for Decontaminating Apparatus: Decontaminating Apparatus: Portable, 14 Liter, M13 (Practice) (NSN 4230-01-345-5172)*. 15 August 1992.
- TM 3-4230-228-10. *Operator's Manual for Decontaminating Apparatus: Power Driven, Lightweight, M17 (NSN 4230-01-251-8702)*. 15 May 1989.
- TM 3-4230-229-10. *Operator's Manual for Decontaminating Kit, Skin: M291, (NSN 4320-01-251-8702) (SS010-AA-MMO-1-0; TO 11D1-1-131; TM 4230-10/1)*. 2 October 1989.
- TM 3-4230-235-10. *Operator's Manual for Decontamination Kit, Individual Equipment: M295 (NSN 6850-01-357-8456) (EIC: Y67)*. 20 February 1994.
- TM 3-4230-236-10. *Operator's Manual for Decontamination System, Sorbent: M100 (NSN 4230-01-466-9095)*. 29 June 2001.
- TM 3-6665-254-12. *Operator's and Organizational Maintenance Manual: Detector Kit, Chemical Agent, ABC-M18A2 (NSN 6665-00-903-4767)*. 16 February 1976.
- TM 3-6665-268-10. *Operator's Manual for Sampling Kit, CBR Agent 34*. 6 September 1968.
- TM 3-6665-307-10. *Operator's Manual for Chemical Agent Detector Kit, M256 (NSN 6665-01-016-8399) and M256A1 (NSN 6665-01-133-4964)*. 1 September 1985.
- TM 3-6665-311-10. *Operator's Manual for Paper, Chemical Agent Detector: M9 (NSN 6665-01-226-5589 (TO 11H2-2-21)*. 31 August 1998.
- TM 3-6665-312-12&P. *Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools List for M8A1 Automatic Chemical Agent Alarm (NSN 6665-01-105-5623) and Auxiliary Equipment M10 Power Supply (NSN 6665-00-859-2225); M10A1 Power Supply (NSN 6665-00-093-2739); M228 High Profile Mounting Kit (NSN 6665-00-859-2212) and M182 Low Profile Mounting Kit (NSN 6665-00-110-9492) (TO 11H2-17-1)*. 17 March 1985.
- TM 3-6665-321-12&P. *Operator's and Unit Maintenance Manual (including Repair Parts and Special Tools List) for Alarm, Chemical Agent, Automatic: M22 (NSN 6665-01-438-6963) (EIC: Y14) and Auxiliary Equipment Power Supply, Chemical Agent Automatic Alarm: M28 (6130-01-438-6960) (EIC: Y40) Mounting Kit, Chemical Agent Automatic Alarm: M281 (NSN 6665-01-438-6959) (EIC: Y38) Alarm Unit, Chemical Agent Automatic Alarm:*

ABCA-M42 (NSN 6665-00-859-2215) (EIC: 399) (TO 11H2-23-1; MC 10434A-12&P; EE168-DB-OMP-010). March 98.

TM 3-6665-331-10. *Operator's Manual for Chemical Agent Monitor (CAM) (TO 11H2-20-1). 12 June 1992.*

TM 10-277. *Chemical, Toxicological, and Missile Fuel Handlers Protective Clothing. 1 November 1980.*

TM 10-8415-220-10. *Operator Manual for Joint Service Lightweight Integrated Suit Technology (JSLIST) Chemical Protective Ensemble. 1 September 1998.*

TM 11-6665-251-10. *Operator's Manual for Radiac Set AN/VDR-2 (NSN 6665-01-222-1425). 1 March 1988.*

TM 43-0001-26-1. *Army Equipment Data Sheets: Chemical Defense Equipment. 12 May 1982.*

NAVMC 10245. *Equipment Maintenance Request. February 1994.*

Index

A
agent classification
 nonpersistent 1-2
 persistent, 1-2
aircraft decon, 7-2

B
battalion aid station, *see* MTFs

C
calcium hypochlorite, *see*
 decontaminants, standard, HTH
CARC, 1-5, 4-21
chemical-agent monitor, *see*
 detection and warning devices,
 CAM
chemical-agent-resistant coating,
 see CARC
chemical protective undergarment,
 see CPU
combat vehicle crewman uniform
 system, *see* CVCUS
common interferences of the CAM,
 4-22
contamination avoidance, 7-1
contamination forms
 aerosols, 1-1
 liquids, 1-1
 solids, 1-1
 vapors or gases, 1-1
contamination levels, 4-5
CPU, 3-6, 3-19, 3-30, 3-36
CVCUS, 3-6, 3-19, 3-29, 3-30, 3-35,
 3-36

D
decon
 concepts, 1-2
 decisions, 1-2
 fixed site, 5-5
 in combat, 1-5
 levels
 immediate, 1-4, 2-1
 operational, 1-4, 3-1
 thorough, 1-4, 4-1
 of contaminated remains, 5-12
 of depleted uranium, 5-11

 of radiological contamination,
 5-12
 of vulnerable equipment, 5-7
 principles, 1-3
decon devices for equipment
 M11 DAP, 2-3, 6-3
 M12A1 PDDA, 4-18, 6-3, 9-3,
 D-2
 M13 DAP, 2-3, 6-3, D-1
 M17 LDS, 4-18, 6-3, 9-3, D-2
decon procedures for
 patient
 biological agent, 8-15
 chemical agent, 8-4
 radiological agent, 8-22
 specific surfaces and material,
 C-1–C-7
 weapons
 60-millimeter mortar, 10-4
 66-millimeter rocket
 launcher, 10-4
 AT4 light antitank weapon,
 10-4
 Javelin, 10-5, 10-6
 M203 grenade launcher,
 10-2
 M249 squad automatic
 weapon, 10-2
 M47 Dragon, 10-2
 M60 machine gun, 10-1
 tube-launched, optically
 tracked, wire-guided
 (TOW) missile (M220
 series), 10-3

decontaminants
 natural, 1-2, B-13–B-14
 soap and water, 7-2
 nonstandard, 1-2, B-4–B-12
 diesel fuel, 7-2
 JP8, 7-2
 kerosene, 7-2
 sodium carbonate, 7-2
 sodium hypochlorite, 7-2
 standard, 1-2, B-1–B-14
 DS2, 2-3, 7-2
 HTH, 2-2, 8-4, B-4
 STB, 7-2

decontaminating solution number 2,
 see decontaminants, standard,
 DS2
DED, 1-4, 4-18, 9-2
DED layout, 4-22, 4-24–4-27
detailed aircraft decon, *see types of*
 aircraft decon, DAD
detailed equipment decon, *see* DED
detailed troop decon, *see* DTD
detection and warning devices
 CAM, 4-10, 4-21, 6-3, D-4
 M22 ACAA, D-3
 M256A1 detector kit, 4-10, 6-3,
 D-4
 M8 detector paper, 6-3, D-3
 M8A1 ACAA, 6-4, D-3
 M9 detector paper, 6-3, D-3
DTD, 1-4, 4-6, 9-2
DTD layout, 4-8
DTD station charts, E-1

E
effects of environmental conditions
 on
 cold- and arctic-weather areas,
 6-1
 desert, 6-6
 jungle, 6-6
 mountains, 6-5
 urban areas, 6-5
 warmed areas, 6-4
engineer support, 4-1, 4-2
equipment and supplies needed for
 decon, 9-5–9-7
essential information for decon
 support, 4-3

F
fragmentary order, *see* FRAGO
FRAGO, 4-3
freezing points of
 decontaminants, 6-1
 selected chemical agents, 6-2

I
IEDK, 1-4, 2-1, 2-3, 9-1
individual equipment decon kit, *see*
 IEDK

J

joint services lightweight integrated-suit technology, *see JSLIST*
JSLIST, 3-6

L

layout of patient-decon station, 8-5
layout of thorough decon site, 4-5

M

M11 decontaminating apparatus, portable, *see decon devices for equipment, M11 DAP*
M12A1 power-driven decon apparatus, *see decon devices for equipment, M12A1 PDDA*
M13 decontaminating apparatus, portable, *see decon devices for equipment, M13 DAP*
M17 Lightweight Decontaminating System, *see decon devices for equipment, M17 LDS*
M22 automatic chemical-agent alarm, *see detection and warning devices, M22 ACAA*
M291 kit, 2-1, D-1
M295 kit, 2-1, 2-3, D-1
M8A1 automatic chemical-agent alarm, *see detection and warning devices, M8A1 ACAA*
MADCP, 5-12
medical-treatment facilities, *see MTFs*
methods of terrain decon
 burning, 5-3
 clearing, 5-5
 exploding, 5-3
 flushing, 5-4
 neutralizing, 5-2
 removing/covering, 5-2
 weathering, 5-2

MOPP-gear exchange, 3-1, 9-1
 buddy-team method, 3-6, 3-7, 3-11, 3-15, 3-17–3-19, 3-21
 individual (emergency) method, 3-6, 3-31–3-37
 triple buddy-team method, 3-6, 3-22, 3-24, 3-25, 3-27–3-30
mortuary affairs decontamination collection point, *see MADCP*
MTFs, 8-2
 BAS, 8-3
 hospital, 8-3
 medical company's clearing station, 8-3

N

negligible risk levels of contamination, 1-3

O

operation order, *see OPORD*
operational-decon phases
 execution, 3-2
 preparation, 3-1
 site clearance, 3-2
operator's spray down, 2-2, 9-1
OPORD, 4-3

P

PASGT, 3-17e
personnel armor system ground troops, *see PASGT*
personal wipe down, 2-2, 9-1
personnel and equipment requirements for
 DAD layout, 7-15
 DED layout, 4-28–4-31
 DTD layout, 4-9
planning factors for DS2 application, 4-20
planning factors for rinse station, 4-21

preparation of chlorine-solution for patient decon, 8-4
preparing vehicles for decon, 4-6
priority of work for equipment decon, 4-2

R

radiac detector
 AN/PDR-75, D-5
 AN/PDR-77, 4-4
 AN/VDR-2, 4-4, D-5
responsibility for DTD setup, 4-6

S

SDK, 1-4, 2-1, 9-1
SDS, 1-4
Sorbent Decontamination System, *see SDS*
skin decon, 1-4, 2-1
skin decontaminating kit, *see SDK*
supertropical bleach, *see decontaminants, standard, STB*

T

types of aircraft decon
 aircrew spot decon, 7-3
 aircraft washdown, 7-3
 DAD, 1-4, 7-8

V

vehicle washdown, 3-3, 9-2

W

warning order, *see WO*
WO, 4-3
work/rest cycle, 4-23, 4-32
water consumption for
 DED, 9-3
 DTD, 9-3
 operational decon, 9-3