

1 **Appendix C**

2 **Nuclear, Biological, and Chemical Defense**

3
4 Nuclear, Biological, and Chemical (NBC) defense is a collective term describing methods,
5 plans, and measures against biological and chemical agents, nuclear weapons or radiological
6 warfare agents. This appendix utilized in conjunction with MCWP 3-37.3, NBC
7 Decontamination, and MCRP 3-37.2A, Chemical and Biological Contamination Avoidance,
8 outline tactics, techniques, and procedures which serve as the foundation for conducting NBC
9 defense operations.

10
11
12 **Mission**

13
14 Nuclear, Biological, and Chemical defense's mission is concerned with limiting damage and
15 casualties resulting from the employment of enemy nuclear weapons and/or employment of
16 biological and chemical agents.

17
18
19 **Staff Responsibilities**

20
21 The following responsibilities and duties are assigned to regimental, battalion, and special staff
22 officers.

23
24 **a. S-2**

25
26 **(1)** In conjunction with the NBC Officer, request, research, and disseminate
27 intelligence in the following areas:

28
29 **(a)** Enemy nuclear, biological, and chemical weapons capability to include type
30 of delivery system.

31
32 **(b)** Enemy NBCD equipment and training status.

33
34 **(c)** Enemy intentions for the use of nuclear, biological, and chemical weapons.

35
36 **(2)** Develop a detailed collection plan to identify and locate targets appropriate for
37 attack with nuclear and/or chemical weapons.

38
39 **(3)** Obtain general meteorological conditions for use in defense against enemy
40 chemical or biological weapons.

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1
2 **(4)** In coordination with the NBC Officer, provide information necessary for the
3 conduct of NBC reconnaissance throughout the regiment's zone of action.

4
5 **b. S-3**

6 **(1)** Develop operation plans/orders after considering enemy NBC capabilities.

7
8 **(2)** Prepare alternate plans for accomplishment of the regiment's mission in the
9 event of mass casualties to or evacuation of a subordinate unit(s).

10
11 **(3)** When required, and as requested by the regimental surgeon, request helicopters
12 for medical evacuations. The helicopter must be approved to fly into a contaminated zone and,
13 therein, is not a standard medevac.

14
15 **(4)** Ensure the preparation and promulgation of troop safety information including
16 fallout and chemical hazards from all NBC strikes.

17
18 **(5)** Ensure coordination and support for NBC reconnaissance operations in the
19 regiment's zone of action.

20
21 **(6)** Coordinate hasty and deliberate decontamination operations.

22
23 **c. S-4**

24 **(1)** Disperse logistic facilities to provide support to widely dispersed units and
25 reduce their vulnerability to nuclear and chemical attacks.

26
27 **(2)** Assist the NBC Defense Officer in assessing area damages and prepare plans for
28 removal and/or disposal of contaminated equipment for nuclear, biological, and chemical
29 defense.

30
31 **(3)** Coordinate plans with the S-3 or higher headquarters for larger scale
32 decontamination and disposal operations generated by an NBC attack.

33 **(4)** Prepare plans for and, when directed, supervise construction and/or use of
34 personnel shelters, decontamination stations, and emergency generator power units.

35
36 **d. Regimental Surgeon**

37 **(1)** Plan for the medical problems involved with the mass casualties and the
38 treatment of the injured who may be contaminated in an NBC environment.

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1 **(2)** Inspect food and water supplies for edibility and potability following an NBC
2 attack. Assist in prevention of contamination to food and water and take measures to
3 decontaminate should contamination occur.

4
5 **(3)** Advise the Regimental Commander and other staff members of all matters
6 pertaining to unit capability as affected by previous and/or planned NBC exposure.

7
8 **(4)** Provide guidance for the control and use of contaminated supplies.

9
10 **(5)** Is responsible for forwarding all biological samples to the Division Surgeon or
11 other outside agencies.

12
13 **(6)** Is responsible for monitoring all personnel reporting to sick call for potential
14 biological agents as indicated by intelligence estimates.

15
16 **(7)** Ensure training of medical personnel in treatment and handling of nuclear,
17 radiation, and chemical casualties.

18
19 **(8)** Coordinate with higher headquarters for the procurement and distribution of
20 medical supplies required for the treatment of nuclear and chemical casualties.

21
22 **(9)** Develop plans, in coordination with the S-4 and NBC Officer/NCO for the
23 handling of contaminated chemical casualties and how NBC casualties will be prepared and
24 checked for surgery.

25
26 **(10)** In coordination with the NBC Control Center, monitor and evaluate the nuclear
27 radiation exposure history of subordinate units and advises the Regimental Commander and the
28 S-3 on the impact of additional exposure of units.

29 30 **e. Motor Transport Officer**

31 **(1)** Plan for and supervise the decontamination of all motor transport equipment.

32
33 **(2)** Ensure adequate motor transport assets are available for the conduct of NBC
34 reconnaissance in the regiment's zone of action.

35
36 **(3)** Coordinate with the S-4 on provisions for mass evacuation of personnel and
37 equipment that may be necessary under NBC conditions.

38
39 **(4)** Coordinate dispersion and employment of vehicles to minimize exposure to
40 nuclear, biological, and chemical contamination.

41
42 **f. Supply Officer.** Coordinate with the S-3 and S-4 to plan for the acquisition,
43 storage, control, issue, security, recovery, and redistribution of all NBCD equipment and
44 supplies.
45

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1
2 **g. Food Service Officer**

3
4 (1) Coordinate with the S-4 and NBCD Officer a program for cooks, bakers, and all
5 food handlers in decontamination of prepared and stored food.

6
7 (2) Coordinate with the S-4 and NBCD Officer on measures to eliminate waste from
8 decontamination of contaminated foods.

9
10 (3) Coordinate with the Medical Officer to determine the possible salvage of
11 contaminated food/water prior to any disposal operation.

12
13 **h. Communications Officer**

14
15 (1) Provide communications for monitor/survey teams dispatched on NBC
16 reconnaissance missions.

17
18 (2) Provide plans for special communications for mass casualty evacuations.

19
20 **i. NBC Defense Officer**

21
22 (1) Supervise and coordinate all operations/training in order to defend against the
23 effects of nuclear, biological, and chemical weapons.

24
25 (2) Provide assistance to members of the regimental and special staffs on NBC
26 matters.

27
28 (3) Assist in the preparation of troop safety plans.

29
30 (4) Maintain a continuous estimate of vulnerability to NBC attack and assists the
31 regimental surgeon in estimating the prolonged effects of nuclear, biological, and chemical
32 agents on personnel.

33
34 (5) In coordination with the S-4, prepare initial assessment of damage to regimental
35 organizations/units resulting from NBC attacks.

36
37 (6) Determine requirements for NBC supplies and equipment.

38
39 (7) Plan and advise on requirements for and employment of NBC personnel.

40
41 (8) Establish an NBC control center when directed.

42
43 (9) Prepare all required NBC reports.

44
45 (10) Supervise all decontamination efforts.

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1
2 **(11)** Supervise all monitor/survey efforts.

3
4 **(12)** In coordination with the S-2, examine and processes captured NBC material
5 and technical intelligence pertaining to NBC operations.

6
7 **j. NBC Defense Specialist**

8
9 **(1)** Assist in the establishment, maintenance, and application of defensive measures.

10
11 **(2)** Assist in the preparation of fallout prediction messages.

12
13 **(3)** Maintain fallout prediction maps.

14
15 **(4)** Assist in supervising decontamination of terrain and equipment.

16
17 **(5)** Prepare routine and special reports concerning NBC equipment.

18
19 **(6)** The duties of the NBC specialist in an actual NBC warfare environment will also
20 include, but are not limited to, assisting the regimental or battalion NBC Defense Officer in the
21 performance of his operational duties and supervising NBC teams conducting the following
22 NBC operational activities.

- 23
24 • Radiological surveys, to include route and zone reconnaissance.
25 • Chemical detection operations to include route and zone reconnaissance.
26 • Biological sampling operations to include route and zone reconnaissance.
27 • Collection, evaluation, interpretation, and dissemination of technical
28 intelligence obtained from captured weapons, equipment, personnel, and
29 NBC reconnaissance operations.

30
31
32 **NBC Defense Team Organization**

33
34 There will be one monitor/survey and decon team per battery. Each team will consist (at a
35 minimum) of one NCO and five assistants. All members will be trained in their individual
36 duties of monitoring, surveying and decontamination. Each unit will maintain the following
37 NBCD teams:

- 38
39 • Control Center Team (regiment and battalion).
40 • NBCD Monitor Team (regiment, battalion and battery).
41 • Equipment Decon Team (regiment, battalion and battery).
42 • Personnel Decon Team (regiment, battalion and battery).
43

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1 Operations and Defensive Procedures

2
3 All enemy attacks, particularly air attacks, are assumed to be NBC attacks once NBCD warfare
4 is initiated.
5
6

7 NBC Attack Alarm System

8 9 a. Local NBC Attack Alarms

10
11 (1) **Primary:** Continuous metal on metal

12
13 (2) **Alternate:** Steady siren

14
15 **b. General Warning.** This warning is sent over the radio (regimental tac net-primary)
16 in accordance with Appendix J when a NBC hazard is expected to cover a large area.

17
18 **c. All Clear.** Commanders will initiate the "all clear." If the "all clear" is passed
19 over the radio, authentication is required if transmitted over an unencrypted net.
20
21

22 Communications

23
24 Regimental and battalion tac nets are the primary nets for passing NBC information. Alternate
25 nets will be used as required.
26
27

28 NBC Defense Alert Conditions

29 30 a. NBCD Condition I - BLACK

31
32 (1) **Meaning.** Attack in progress.

33 34 (2) **Alarm**

35
36 (a) **Primary** - continuous metal on metal.

37
38 (b) **Alternate** - continuous siren.

39 40 (3) **Action**

41
42 (a) All hands immediately don protective equipment and take cover.
43

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1 **(b)** Submit FLASH precedence NBC-1 reports as required.

2
3 **(c)** Conduct first aid and decontamination as required.

4
5 **b. NBCD Condition II - RED**

6
7 **(1) Meaning.** Attack imminent.

8
9 **(2) Alarm**

10
11 **(a) Primary** - radio.

12
13 **(b) Alternate** - continuous siren.

14
15 **(3) Action**

16
17 **(a)** All hands immediately don protective equipment and take cover.

18
19 **(b)** Be alert for NBC employment.

20
21 **c. NBCD Condition III - YELLOW**

22
23 **(1) Meaning.** Attack probable.

24
25 **(2) Alarm.** Radio.

26
27 **(3) Action**

28
29 **(a)** Activate NBCD teams.

30
31 **(b)** Distribute NBCD equipment and supplies as required.

32
33 **(c)** Test all equipment.

34
35 **(d)** Muster nonessential personnel in shelters.

36
37 **(e)** Assume appropriate MOPP level.

38
39 **(f)** Report condition YELLOW set upon above action to the Regimental NBCD
40 Control Center.

41
42 **d. NBCD Condition IV - WHITE**

43
44 **(1) Meaning.** Enemy attack improbable or "all clear".
45

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1 **(2) Alarm** (all clear). Voice/radio.

2
3 **(3) Action** (following NBC attack)

4
5 **(a)** Determine unit combat effectiveness, assistance requirements and capability
6 for continuing mission.

7
8 **(b)** Conduct selective unmasking.

9
10 **(c)** Evacuate all NBC casualties as directed by the senior medical representative.

11
12 **(d)** Determine and mark contaminated area. Control all traffic in and out of
13 contaminated and clean areas.

14
15 **(e)** Reduce MOPP level as directed by commanding officers.

16
17 **(f)** Conduct personnel/equipment decontamination as required to continue the
18 mission.

19
20 **(g)** Send required reports to HHQ.

21 22 23 **NBC Defense Operations Prior to Attack**

24
25 **a. Action.** Prior to a NBCD attack, units will:

26
27 **(1)** Designate and train a NBCD Officer and NBCD NCO.

28
29 **(2)** Organize and train NBCD teams.

30
31 **(3)** Procure and maintain NBCD equipment in accordance with unit T/E and
32 appropriate TMs.

33
34 **(4)** Conduct individual, team, and unit NBCD training, drills, and exercises.

35
36 **(5)** Plan and rehearse distribution of NBCD supplies and equipment.

37
38 **(6)** Establish unit evacuation plans.

39
40 **(7)** Exercise NBC alert conditions.

41
42
43
44 **b. NBC Defense Team Operations**

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1
2 **(1) Regimental Control Center.** The Regimental Control Center will be collocated
3 with the Regimental CP. The NBCD Officer will activate it immediately upon determination
4 of a NBC threat. Its primary purpose is to provide information to the commander, staff and
5 other organizations within the regiment and to determine hazard probability and safety.

6
7 **(2) Battalion Control Centers**

8
9 **(a)** Battalions will activate their Control Centers when NBC operations are
10 probable. Battalion Control Centers will be capable of:

- 11
12 • Receiving and transmitting information.
13 • Performing computations necessary to convert basic incoming reports to
14 data of significance to the commander.
15 • Plotting, displaying and evaluating assembled data.
16 • Disseminating NBC intelligence.

17
18 **(b)** Individual duties of team members at his level will not be as complex. A
19 complete log will be maintained. Overlays will be used to the maximum extent possible to
20 indicate the current operations.

21
22 **(3) Monitor/Survey Teams.** Detection teams will assemble in response to
23 established NBC condition. Team members will be briefed and assigned missions. Necessary
24 RADIAC equipment, report forms, chemical agent detection devices and individual protective
25 equipment/ supplies must be ready for issue when the NBCD Control Centers activate the
26 monitor/survey teams.

27
28 **(a) Monitoring Procedures (Nuclear).** Periodic monitoring with the VDR-2
29 will be initiated on order. Required readings will normally be taken every six hours (0600,
30 1200, 1800 and 2400 local). Monitors must be familiar with local background count and will
31 report any initial increase which is twice the normal background level. Radiation Exposure
32 Status (RES) Levels will be reported in accordance with Table C- 1. Continuous monitoring
33 will be initiated under the following circumstances.

- 34
35 • On order or on receipt of a NBC-3 (NUC) report
36 • When any nuclear strike is observed or suspected.
37 • During any tactical move once nuclear operations have commenced.

38
39
40
41
42
43

RES	DESCRIPTION
0	Applies to a unit that has never been exposed to nuclear radiation; a unit which

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	has received no dose.
1	Applies to a unit that has been exposed to nuclear radiation but has a militarily negligible radiation exposure history; total dose is greater than 0 but less than 70 centigrays (cGy).
2	Applies to a unit that has received significant, but not a dangerous dose of radiation; the total dose is greater than 70 but less than 150 cGy.
3	Applies to a unit that has already received a dose of radiation which makes further exposure dangerous; the total dose is greater than 150 cGy. The unit should not be further exposed, if at all possible, because additional exposure in the immediate future will result in casualties.

Table C-1. Radiation Status Levels.

(b) Monitor Procedures (Chemical/Biological). Teams will be physically checked for complete and functioning protective equipment by the appropriate NBCD Officer/NCO prior to deployment. Briefings will be conducted to stress mission requirements, reporting procedures, and emergency actions. Teams will consist of more than one person.

(4) Decontamination Teams. Procedures for all decontamination efforts will be in accordance with FM 3-5. Safety of team members must be considered in large scale or long duration operations. The Division Control Center will monitor and confirm unusual or large decontamination efforts.

c. Special Measures

(1) Crew served weapons, vehicles and buildings will be covered and secured at all times, when practical. Every effort will be made to ensure that interiors are not contaminated.

(2) All M11/M13 decontamination apparatuses will be mounted on assigned vehicles or allotted to specific areas with personnel designated as responsible for each piece of equipment.

NBC Defense Operations During Attack

a. Attack/Contamination. Monitor/Survey teams will evaluate the threat. A rapid analysis is required to implement protective measures and warn other organizations of the possible hazard. The commander will ensure the following action is taken:

(1) Alert all personnel. Ensure all personnel reach a covered position and remain there until the situation can be clarified. All movement within the unit position must be kept to a minimum.

(2) All assigned NBCD personnel will assume those duties as a primary assignment. Control centers will check in with their HHQ control center. Communications will be checked.

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1 **(3)** All non-vital operations will cease while the suspected hazard is analyzed and
2 reports from monitor/survey teams are correlated and confirmed by appropriate control
3 centers.

4
5 **(4)** Confirmed attack/contamination will be reported to the 10th Marines Control
6 Center by FLASH precedence NBC-1 report.

7
8 **b.** In those situations involving fallout:

9
10 **(1)** All fallout predictions will be in accordance with FMFM 3-3.

11
12 **(2)** In those areas not predicted to receive fallout, a reading twice the normal
13 background level will be reported via NBC-4 (NUC) report. This report will be sent by
14 IMMEDIATE precedence.

15
16 **(3)** Those units that detect a reading of one Rad/hr will be reported by NBC-1
17 report by FLASH precedence, in those areas predicted to receive fallout (any zone).

18
19 **(4)** Peak intensities will be logged by time. Special reports may be required from
20 all involved units.

21
22 **(5)** Personnel will use prepared positions for shelter when authorized. If no shelter
23 is available, hasty shelters should be constructed. Movement of units is authorized whenever
24 50 Rads are received in 30 minutes or less if the tactical situation permits. Areas of lower
25 intensity must be positively located and control of all evacuation efforts will be maintained by
26 the regiment.

27
28 **(6)** Operational Exposure Guides (command dosages) will be promulgated as
29 required.

30
31
32 **NBC Defense Operations**

33
34 **a.** Attack/Contamination Evaluation (actions after attack)

35
36 **b.** Known contamination perimeters will be marked and the boundaries must be
37 checked periodically, so that markers reflect changes in the contaminated area brought on by
38 weather/aging. Nuclear contamination markers are normally removed in tactical situations
39 when readings drop below one Rad/hr. Rear area situations will be handled on a case-by-case
40 basis, and will not be removed without permission of the area commander.

41
42 **(3)** Ensure unit personnel maintain a protected posture and that decontamination is
43 accomplished as required. Continuing operations will be carefully supervised, employing the
44 concept of semi-clean crew served weapons and vehicles (partial decontamination for

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gunner/driver safety) while under immediate threat. Complete decontamination will occur prior to necessary maintenance periods. Isolation or other "safe" means will be used to ensure contamination spread is minimized. Regiment and battalions will provide centralized personnel decontamination stations as required. NAVMED P5505 will be used as a guide in determining a protective program involved in extensive work with radiation contamination.

(4) In residual nuclear contamination situations:

(a) The division Control Center will determine decay rate/soil type data as rapidly as possible and disseminate this information to all subordinate control centers. Once nonstandard conditions are accounted for, corrections will be made to all radiation computations to reflect the new data.

(b) Radiation status reports will be made periodically.

(5) **Evacuation.** The S-4 will establish procedures for mass evacuation NBC attack condition. No unit will initiate evacuation procedures without approval by division.

(6) **Situation Report.** Subordinate control centers will forward SITREPs to HHQ control centers once NBCD operations have commenced/ended and as the situation dictates.

Mission Oriented Protective Posture (MOPP)

MOPP LEVEL	0	1	2	3	4
Mask/Hood	Carried	Carried	Carried	Worn O/C	Worn
Overgarment	Available	Worn O/C	Worn O/C	Worn O/C	Worn
Overboots	Available	Carried	Worn	Worn	Worn
Gloves	Available	Carried	Carried	Carried	Worn

Table C-2. MOPP Level Equipment.

NOTE: O/C refers to the suit (or hood) being Opened (O) or Closed (C), depending upon guidance based on the mission, threat, temperature, and work load.

NBC Attack Events Checklist

The following checklist is provided for quick reference:

a. Before Attack

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1 **(1)** Unit will probably receive some type of warning regarding enemy NBC
2 capability. This warning precipitates the following actions:

3
4 **(a)** Direct the unit to assume MOPP 0.

5
6 **(b)** Issue M-11 and M-13 decon apparatuses to designated personnel for vehicle
7 mounting.

8
9 **(c)** Check remaining NBCD equipment for availability, serviceability and
10 resupply.

11
12 **(2)** Unit receives reports that NBC warfare has begun. The following actions apply:

13
14 **(a)** Assume appropriate MOPP level.

15
16 **(b)** Fill M-11 decon apparatuses.

17
18 **(c)** Cover/protect all exposed equipment, food, etc. IOT reduce future
19 decontamination requirements.

20
21 **(d)** Put M-9 paper on overgarments and vehicles.

22
23 **(e)** Be alert and be prepared to occupy shelter.

24 25 **b. During Attack**

26
27 **(1) Unit Actions.** Sound/pass the alarm locally and to HHQ.

28
29 **(2) Individual Actions** (from MOPP 1).

30
31 **(a)** Mask.

32
33 **(b)** Sound alarm.

34
35 **(c)** Take cover (vehicle, building, tent, poncho).

36
37 **(d)** Put on gloves with liners.

38
39 **(e)** Zip, fasten and secure the hood and overgarment.

40
41 **(f)** Put on overboots.

42
43 **(g)** If contaminated, conduct skin decon within one minute using the M-291 or
44 M258A1 kit.

45

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1 **c. After Attack**

2
3 **(1) Unit Actions**

4
5 **(a)** Treat casualties.

6
7 **(b)** Send NBC-1 report to HHQ in accordance with Appendix H.

8
9 **(c)** Determine when attack has ended (fallout, chemical or biological agent has
10 settled to the ground). Continue the mission in MOPP 4.

11
12 **(d)** Determine following:

13 **1** When and where do you evacuate casualties?

14 **2** When and where will you conduct hasty decon, MOPP gear exchange and
15 vehicle wash down?
16

17 **3** Does the unit require additional personnel to replace casualties?
18

19 **4** Do you mark the contaminated area?
20

21 **5** Does the unit have to displace? If so, when?
22

23 **(e)** Survey and mark the contaminated area as required.

24 **(f)** Send NBC 4 report to HHQ as required.

25 **(g)** Conduct hasty decon within six hours of contamination (if contaminated with
26 a persistent agent).
27

28 **(h)** Request support for deliberate decon (normally done when unit mission is
29 complete as this requires a shut down of the unit).
30

31
32 **(2) Individual Actions**

33 **(a)** Conduct personal wipedown within 15 minutes after attack.

34 **(b)** Conduct operator spray down of equipment within 15 minutes after attack.

35 **(c)** Watch for symptoms in yourself and others.

36 **(d)** Administer antidote/first aid if required.
37
38
39
40
41
42
43
44
45

1 NBC Reports

2
3 NBC-1 through NBC-5 and chemical downwind report formats are found in Appendix J.
4
5

6 Decontamination

7
8 The presence of contamination generally reduces the effectiveness of our combat power.
9 Contamination forces us into protective equipment that degrades our ability to perform
10 individual and collective tasks. Decontamination operations reduce or eliminate those hazards
11 and allow units to continue with the mission.
12

13 **a. Principle of Decontamination.** The resources of manpower, time and material are
14 critical for the commander's decision on how to sustain combat operations. He must know
15 when, where, what, and how to perform decon by following four principles. Those principles
16 are: Decon as soon as possible, decon only what is necessary, decon as far forward as
17 possible, and decon by priority.
18

19 **(1) Decontaminate as soon as Possible.** This is the most important principle of the
20 four. Consider this principle before you consider any other. Contamination hazards force you
21 into higher levels of MOPP and immediately begin to degrade your combat power. The sooner
22 the contamination is removed, the sooner you can reduce MOPP levels and begin restoring
23 combat power.
24

25 **(2) Decontaminate Only what is Necessary.** Decontaminate only what is
26 necessary to continue your mission. Consider the following factors when you decide whether
27 decon will interfere with the mission or help you continue the mission.
28

29 **(a)** Mission - "tempo of battle."

30 **(b)** Time available.

31 **(c)** Degree of contamination.

32 **(d)** Length of time you have been in MOPP 4.

33 **(e)** Decon assets available.
34
35
36
37
38

39 **(3) Decontaminate as Far Forward as Possible (limit spread).** Do not transport
40 contaminated personnel and equipment away from your operational area if you can bring decon
41 assets forward safely. This will keep your equipment on locations, where it is needed, allow
42 decon to begin earlier, and limit the spread of contamination to other areas.
43

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1 **(4) Decontaminate by Priority.** Clean important items of equipment first and less
2 important items of equipment last (i.e., equipment that is vital to successful completion of the
3 mission takes priority over equipment that is not vital). Commanders must set priorities and
4 concentrate decon assets to best support the battle.

5
6 **b. Levels of Decontamination.** The three levels of decontamination are Immediate,
7 Operational, and Thorough.

8
9 **(1) Immediate Decontamination.** The scope of immediate decon is to minimize
10 casualties, save lives, and limit the spread of contamination. Immediate decon is carried out
11 by individuals upon being contaminated. There are three immediate decon techniques: skin,
12 personal wipedown, and operator's spraydown.

13 14 **(a) Skin Decontamination**

15
16 **1 Chemical.** The M291 decon kit provides the best means of skin decon.
17 The M291 is a powder substance. Use water to wash toxic agent out of eyes or wounds and
18 seek medical treatment. Washing with soap and water (or hot water) is the next best method
19 for toxic agent decon if the M291 kit is not available, but this method is not as effective as
20 using the decon kit.

21
22 **2 Biological.** Currently, no means exist in detecting biological agents.
23 Most Marines will not know immediately when they have become contaminated. Most
24 biological agents, except toxins, pose their primary threat through inhalation or ingestion. The
25 skin is an effective barrier against most biological agents if there are no cuts or scratches. The
26 best biological defense is to keep immunizations current, observe basic sanitary precautions,
27 and keep skin breaks covered.

28
29 **3 Radiological.** Because no immediate life threatening hazard is caused by
30 radiological contamination, no immediate skin decon is required. If the skin is contaminated
31 by radiological contamination, use operational decon techniques as soon as possible.

32 33 **(b) Personal Wipe-down**

34
35 **1 Chemical.** The personal wipe-down technique is most effective when
36 done within 15 minutes of being contaminated. The two primary types of chemical protective
37 overgarments are the chemical protective overgarment (CPOG), which provides at least six
38 hours of protection from liquid contamination and the battle dress overgarment (BDO) which
39 provides protection for 24 hours after becoming contaminated with liquid chemical agents.
40 The stocks and handgrips of individual weapons also tend to absorb chemical agents and one
41 absorbed, they may present a vapor hazard for days. To reduce penetration and vapor hazard,
42 decontaminate individual equipment using the M291 kit. Marines must decon gloves, hood,
43 mask, helmet, and weapon if contaminated. Perform personal and equipment wipe-down
44 within 15 minutes after being exposed to liquid contamination. If agent is globbed on
45 overgarment, scrape it off with a stick or other object, otherwise, do not attempt to decon

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1 chemical agents on overgarments. This will provide little, if any extra protection and units
2 probably will not have enough M291 kits. Washing with soap, water, and bleach solutions are
3 partially effective.

4
5 **2 Biological.** If toxins are suspect or other biological agents are present,
6 remove the contamination with soap and water.

7
8 **3 Radiological.** Radiological contamination can readily be detected and
9 located with monitoring equipment. Removing the contamination will reduce the hazard.
10 Brush the dust off load bearing equipment and mask carrier. If contaminated with a dry
11 contaminant, such as fallout, shake out clothing and gear. Wash exposed areas of skin. Pay
12 particular attention to hair and fingernails. Avoid breathing the dust shaken off clothing by
13 wearing the protective mask. Wipe off the mask, hood, helmet, gloves, footwear cover, and
14 other personal equipment with warm, soapy water. If warm, soapy water is not available, use
15 rags or damp paper towels. Ensure contamination is not spread to clean areas. If
16 contaminated by a wet radiological contaminant, you must conduct a MOPP gear exchange as
17 soon as possible because brushing or shaking will not remove the contamination or its hazard.

18
19 **(c) Operator's Spraydown.** After Marines and their personal equipment have
20 been wiped down, other mission essential portions of equipment may need to be
21 decontaminated before continuing the mission. To ensure contamination from these items is
22 not spread, decontaminate those surfaces which must be touched while operating the
23 equipment. This is called operator's spraydown and is most effective when done within 15
24 minutes after personal wipedown.

25
26 **1 Chemical.** Decon those surfaces that must be touched to complete the
27 operator's spraydown. Use an on board portable decon apparatus (M11 or M13). This
28 apparatus should be filled with decontaminant as soon as the unit is directed to go into any
29 level of MOPP. Spray Decontamination Solution number two (DS2) onto those surfaces that
30 must be touched to accomplish the mission. Scrub the DS2 into the surface with brushes, wait
31 30 minutes if the mission permits, then wash or wipe off the equipment. If the decon
32 apparatus is not available, use DS2 or super tropical bleach (STB) from bulk containers, or use
33 any nonstandard decontaminant available. Do not use decontaminants (DS2 or STB) on
34 sensitive equipment such as radios, computers, etc.

35
36 **2 Biological.** A bleach solution is the preferred decontaminant for
37 biological contamination. Apply with brushes and scrub the surface well. Rinse surface after
38 scrubbing. DS2 and STB are also effective against most known biological contamination but
39 because of their caustic nature are not preferred.

40
41 **3 Radiological.** If you are contaminated by fallout, rain-out, neutron
42 induced contamination, or any type of radiological agent, use the monitoring equipment to help
43 locate the contamination. Radiological contamination can usually be removed by brushing or
44 scraping. Water is effective for flushing away radiological contamination.

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1 **(2) Operational Decontamination.** Operational decon generally follows
2 immediately after personnel decon. The objective of operation decon is to reduce the level of
3 contamination to regenerate needed combat power. Operational decon will further reduce the
4 risk of contamination transfer, the spread of contamination, and speed the weathering process
5 by removing much of the gross contamination. Operations decon makes use of two decon
6 techniques: MOPP gear exchange and vehicle wash-down. Operational decontamination will
7 be coordinated and performed at the battalion level.
8

9 **(a) Chemical.** Chemical contamination is usually the most dangerous form of
10 contamination and the most difficult to decontaminate. The Chemical Agent Monitor (CAM)
11 can detect concentrations of nerve (G) and blister (H) agents. The M256 Series chemical
12 detector kit will detect chemical agent vapors. Use M8/M9 paper, M256A1 kit, and/or CAMs
13 to check for effectiveness of decon and/or level of contamination remaining. Decon is
14 accomplished primarily by using M17 Lightweight Decontaminating System (LDS).
15

16 **(b) Biological.** Procedures used to decontaminate chemical contamination can
17 also be used for biological contamination.
18

19 **(c) Radiological.** For radiological contamination, only hot, soapy water is
20 required. When performing radiological decon, check on the effectiveness by using the
21 AN/VDR2.
22

23 **(3) Thorough Decontamination.** Thorough decon operations reduce
24 contamination levels to a negligible risk. They restore combat power by removing nearly all
25 contamination from unit and individual equipment. The exact layout of the thorough decon is
26 determined by METT-TSL. There are three thorough decon techniques: detailed troop,
27 detailed equipment, and detailed aircraft, but the regiment is only concerned with the first two.
28 Detailed decontamination is normally coordinated at the regimental level with personnel and
29 equipment augmentation from subordinate units.
30

31 **(a) Detailed Equipment.** There are five stations in the detailed equipment
32 decon.
33

34 **1 Station 1 - Initial Washdown.** The objective of this station is to remove
35 the gross contamination and dirt from the vehicle. Using the M17, the vehicle is sprayed,
36 scrubbed, and sprayed again. Hot water alone is less effective than hot, soapy water.
37

38 **2 Station 2 - DS2 Application.** The objective of this station is to apply
39 decontaminant to the entire vehicle. The vehicle is divided into four parts with a Marine
40 assigned to each. Either a mop or the M13 Decontaminating Apparatus (DAP) may be used.
41

42 **3 Station 3 - Wait/Interior Decon.** The objective of this station is to allow
43 the DS2 to completely neutralize the chemical agent and to decontaminate the interior of the
44 vehicle. While the vehicle is held in this station for the DS2 to completely react, the driver
45 inspects the interior of the vehicle for liquid contamination with M8 paper. If some

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1 contaminant is found further decontamination is required with the best available solution. The
2 best solution is a 5 percent solution of High Test Hypochlorite (HTH) or STB. Use hot, soapy
3 water to wash radiological contamination.

4
5 **4 Station 4 - Rinse.** The objective of this station is to remove the DS2
6 from the vehicle. The vehicle is sprayed with water from top to bottom.

7
8 **5 Station 5 - Check.** The objective of this station is to check the
9 completeness of the decon. Detection procedures will vary depending on the type of
10 contamination.

11
12 **(b) Detailed Troop Decon.** The major action in detailed troop decon is to
13 remove contaminated MOPP gear to include the protective mask. See MOPP exchange for
14 details.

- 15
- 16 • **Station 1** - Individual gear decon.
- 17 • **Station 2** - Overboot and hood decon.
- 18 • **Station 3** - Overgarment removal.
- 19 • **Station 4** - Overboots and gloves removal.
- 20 • **Station 5** - Monitor.
- 21 • **Station 6** - Mask removal.
- 22 • **Station 7** - Mask decon point.
- 23 • **Station 8** - Reissue point.
- 24

25 **c. Chemical Casualty Decontamination.** The regiment will more than likely be
26 tasked with supporting deliberate casualty decontamination. Such sites will probably involve
27 elements of the entire CSS, not just medical personnel. The following factors should be
28 considered when establishing a deliberate casualty decon site:

29
30 **(1)** Several skeleton sites must be planned to take into account the change of wind
31 directions which result in a vapor hazard.

32
33 **(2)** Ensure medical/non-medical personnel are properly trained in NBC individual
34 decon procedures.

35
36 **(3)** Liquid contamination control line and vapor contamination control line must be
37 established.

38
39 **(4)** If contamination is spread beyond control lines, that control line must be moved
40 to include new contamination, or move site to a new location.

41
42 **(5)** Strict control must be maintained throughout the site, especially at the initial
43 triage station and where uncontaminated vehicles enter to pickup decontaminated casualties.

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MOPP Gear Exchange with the BDO

The rate of degradation of personnel peaks about six hours after being in full MOPP. MOPP gear exchange is managed with squad size elements. MOPP gear exchange does not begin until replacement overgarments are available.

TYPE	BEST START TIME*	DONE BY	TECHNIQUE	GAINS MADE
BASIC SKILLS	BEFORE 1 MINUTE	INDIVIDUAL	SKIN DECON	STOPS AGENT FROM PENETRATING
	WITHIN 15 MINUTES	INDIVIDUAL OR CREW	PERSONAL WIPEDOWN/ OPERATOR'S SPRAYDOWN	
HASTY DECON OPERATION	WITHIN 6 HOURS	UNIT	MOPP GEAR EXCHANGE	POSSIBLE TEMPORARY RELIEF FROM MOPP 4. LIMIT LIQUID AGENT SPREAD
		BN CREW OR DECON TEAM	VEHICLE WASHDOWN	
DELIBERATE DECON OPERATION	WHEN MISSION ALLOWS RECONSTITUTION	UNIT	DETAILED TROOP DECON	PROBABLE LONG TERM MOPP REDUCTION WITH MINIMUM RISKS
		DECON PLATOON	DETAILED EQUIPMENT DECON	

Table C-3. Decontamination Techniques.

* The techniques become increasingly less effective the longer they are delayed. Vehicle washdown is most effective if started within one hour but will often have to be delayed for logistical reasons.

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1

TYPE OF AGENT	DISSEMINATED	SYMPTOMS	EFFECTS	RATE OF ACTION	FIRST AID	DECONTAMINATION	PROTECTION REQUIRED
AC BLOOD	VAPOR	CONVULSIONS, COMA	INCAPACITATES: KILLS IF HIGH CONCENTRATION INHALED	RAPID	NONE	NONE	MASK
G SERIES GA GB* GD	VAPOR OR AEROSOL	DIFFICULTY IN BREATHING; DROOLING; NAUSEA;	INCAPACITATES: KILLS IF HIGH CONCENTRATION INHALED	DELAYED THRU THE SKIN, VERY RAPID THRU INHALATION	NERVE AGENT	NONE REQUIRED	MASK PROTECTIVE CLOTHING
V SERIES VX* VR55 GD (T) NERVE	LIQUID DROPLETS	CONVULSIONS; SOMETIMES DIMNESS IN VISION	INCAPACITATES: KILLS IF CONTAMINATED SKIN IS NOT DECONTAMINATED RAPIDLY	DELAYED THRU THE SKIN; MORE RAPID THRU THE EYES	ANTIDOTE ARTIFICIAL RADIATION	FLUSH EYES WITH WATER, USE M258 KIT TO DECONTAMINATE SKIN	
H* HN H/L L CX BLISTER	LIQUID DROPLET: CX AS A FINE POWDER OR LIQUID	H, HN – NO EARLY SYMPTOMS. L- SEARING PAIN IN EYES, STINGING OF SKIN. CX-IRRITATES EYES AND NOSE.	BLISTER SKIN; DESTROYS LUNG TISSUE	DELAYED, BLISTERS, HOURS TO DAYS. EYES EFFECTED MORE RAPIDLY, H/L, L, AND CX CAN BE VERY RAPID	NONE	FLUSH EYES WITH WATER, USE M258 KIT ON SKIN; WASH WITH SOAP AND COLD WATER	MASK; PROTECTIVE CLOTHING

Table C-4. Characteristics and Defense Against Types of Chemical Agents.

2
3
4
5

* Indicates standard U.S. toxic chemical agents

TYPES OF AGENTS	SYMBOL	PERSISTENCE		RATE OF ACTION	ENTRANCE	
		SUMMER	WINTER		VAPOR AEROSOL	LIQUID
NERVE	G -AGENTS	10 MIN TO 24 HRS	3 HRS TO 3 DAYS	VERY QUICK	EYES, LUNGS	EYES, SKIN, MOUTH
	V - AGENTS	2 DAYS TO 1 WEEK	2 DAYS TO WEEKS	QUICK	EYES, LUNGS	EYES, SKIN, MOUTH
CHOKING	CG, DP	1 TO 10 MIN	10 MIN TO 1 HR	IMMEDIATE	LUNGS	EYES
BLISTER	HD, HN	3 DAYS TO 1 WEEK	WEEKS	SLOW	EYES, SKIN, LUNGS	EYES
	L	1 TO 3 DAYS	WEEKS	QUICK	EYES, SKIN, LUNGS	EYES, SKIN, MOUTH
	CX	DAYS	DAYS	VERY QUICK	LUNGS	
BLOOD	AC, CK	1 TO 10 MIN	10 MIN TO 1 HR	VERY QUICK	LUNGS	EYES OR INJURED SKIN

Table C-5. Characteristics and Types of Chemical Agents.

6

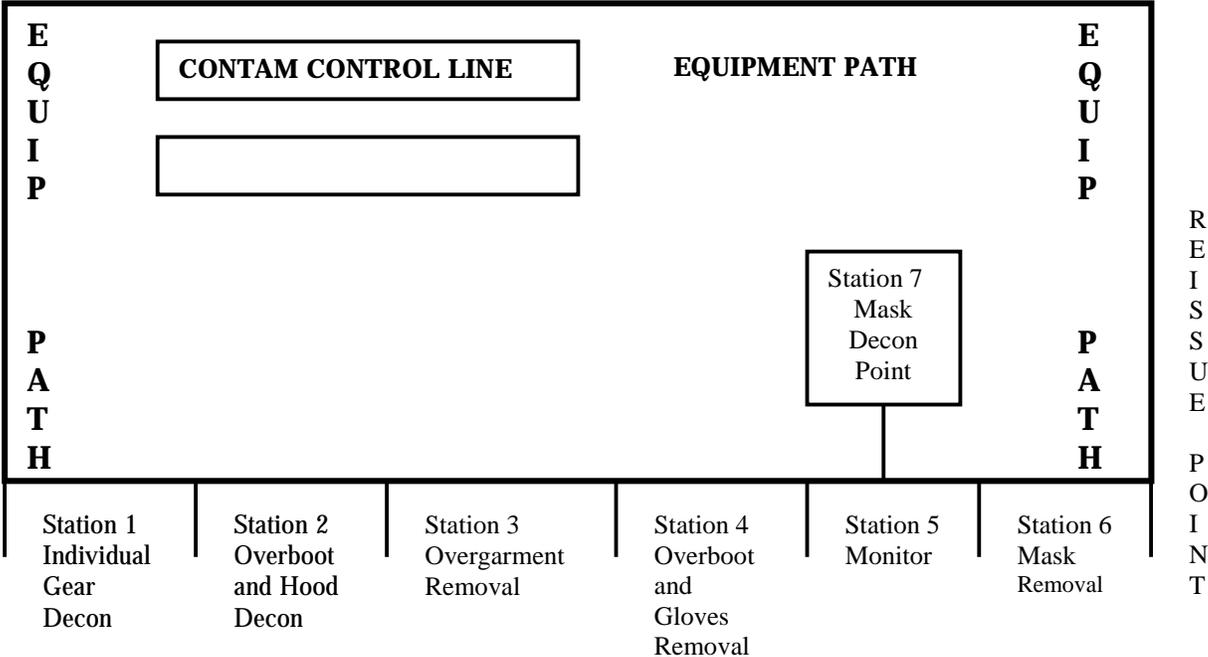


Figure C-1. Example Detailed Troop Decon Layout.

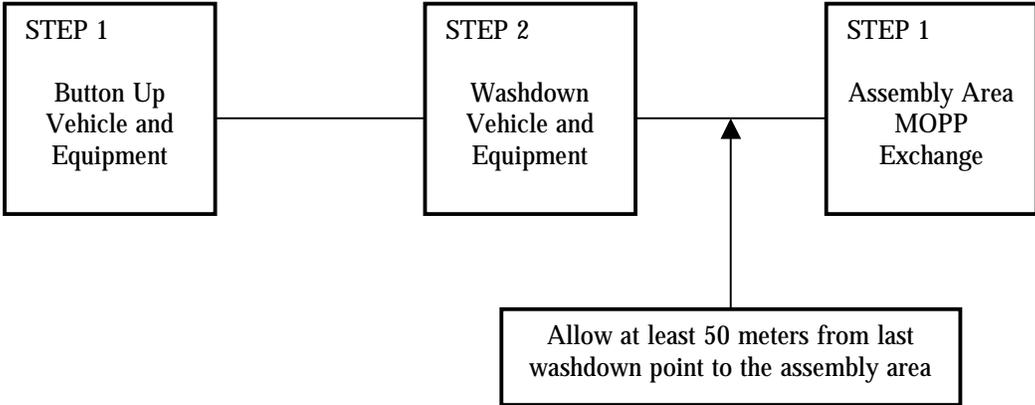


Figure C-2. Example Unsupported One-Lane Washdown.