

Field Manual  
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**FIXED SITE PROTECTION**

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## PREFACE

Field Manual (FM) 3-4-1, Fixed Site Protection, provides guidance for fixed installation commanders, planners, and engineers who are concerned about continuous and effective mission operations in a nuclear, biological, and chemical (NBC) environment. Currently, no guidance exists for implementing NBC survivability actions necessary to protect Army lives and equipment at fixed sites. It is important that commanders apply the techniques described in this FM to meet their particular protection needs.

This field manual applies those fundamentals of NBC defense contained in the following FMs to fixed sites:

- FM 3-3, NBC Contamination Avoidance.
- FM 3-4, NBC Protection.
- FM 3-5, NBC Decontamination.
- FM 3-50, Deliberate Smoke Operations.
- FM 3-100, NBC Operations.

Chapter 1 defines the Threat and provides a vulnerability analysis so that a fixed site commander can determine whether or not his site fits into the scope of this FM.

Chapter 2 defines how the fundamentals of NBC defense (contamination avoidance, protection, and decontamination) apply to fixed sites. In addition, this chapter examines nuclear survivability and the application of smoke and obscurant employment to further enhance a fixed site's survivability.

Chapters 3, 4, and 5 examine each fundamental of NBC defense and explain how each is applied to upgrade a site's survivability through principles, methods, planning, and actions.

Chapter 6 explains those NBC defense operations necessary for survivability and sustainment in a NBC environment. In addition, planning for the usage of smoke and obscurants is explained.

The Appendix implements the use of NATO Standardization Agreement (STANAG) 2047, Emergency Alarm and Warning Systems.

Unless otherwise stated, whenever the masculine gender is used, both men and women are included.

The proponent of this FM is the US Army Chemical School. Submit changes for improving this publication on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forward to Commandant, US Army Chemical School, ATTN: ATZN-CM-NF, Fort McClellan, AL 36205-5020.

## INTRODUCTION

History shows us that rear area offensive operations are extremely effective in disrupting operations throughout the battlefield. The following examples of World War II operations illustrate this point:

- Soviet special operations teams and partisan groups wrecked 20,000 trains, destroyed 12,000 highway and railroad bridges, disabled 4,000 tanks, killed or wounded 1,000,000 Fascists, and tied down 24 German divisions.
- In Burma, an indigenous regiment of Merrill's Marauders with three brigades tied down seven Japanese divisions in a rear area operations mission.

FM 90-14, Rear Battle, outlines Army organization, tactics, techniques and procedures to counter the rear operational threat. FM 3-4-1 is designed to complement current rear operational doctrine.

The NBC survivability actions outlined in this FM should be implemented now, during peacetime, rather than waiting until hostilities commence. In past wars, America had the time to mobilize her industrial and manpower base fully. The next conflict may escalate too rapidly to permit full mobilization. US Forces may be forced to fight a "come as you are" war with the soldiers, weapon systems, and supplies already on hand.

FM 100-5, Operations, the Army's keystone how-to-fight manual, defines ten combat imperatives. These imperatives are applicable to all armies and all services. The fourth combat imperative is "sustaining the fight." Battles or campaigns have often gone to the side that has been most successful in pressing the main effort to conclusion. Future conflicts will be intense and consume resources rapidly. Austerity will be the rule; efficiency will be mandatory. Commanders will have to conserve combat service support (CSS) resources, especially ammunition, fuel, and repair parts. The seventh combat imperative is "protect the force." Protection is the shielding of a force's potential so that it is available at the decisive time and place.

This FM is also designed to describe measures available to protect the force's capability to "sustain the fight." The defense measures described herein deal specifically with NBC warfare.

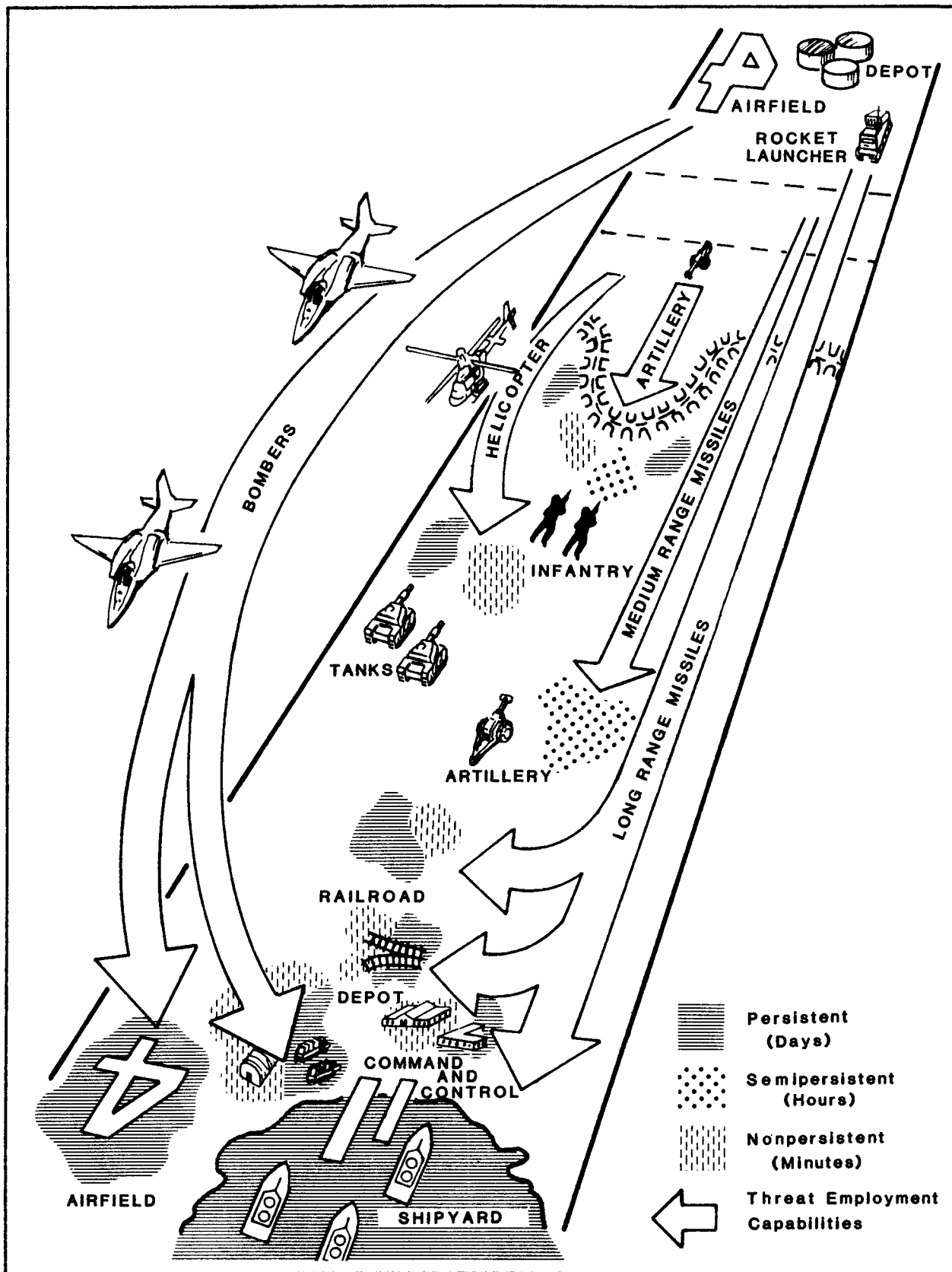


Figure 1-1. The Threat.

CHAPTER 1

THREAT

The rear area threat is very complex. The threat includes --

- Controlled agent activity.
- Terrorist and dissident groups.
- Special purpose forces.
- Naval infantry.
- Reconnaissance elements.
- Airborne and heliborne forces.
- Aircraft, artillery, and missile strikes.
- Radioelectronic combat.
- NBC warfare.

FM 90-14 provides details on the rear area threat.

CAPABILITIES

The Soviets are capable of disrupting, disabling, or neutralizing fixed site operations with their conventional and NBC weapons arsenal. This is accomplished by killing troops, denying use of equipment or facilities (airfields, ports, and so forth) through contamination, or degrading combat efficiency by forcing troops into mission-oriented protective posture (MOPP) and requiring time-consuming decontamination operations. The delivery means for conventional and NBC weapons are aircraft, multiple rocket launchers, tube artillery and missiles. Figure 1-1 shows these Threat employment capabilities on a typical US Army front and expected chemical persistency throughout the front. In addition, Threat special purpose forces (spetsnaz) and agents are capable of using chemical and biological (CB) munitions, as well as conventional weapons, in sabotage operations.

Figure 1-2 illustrates Soviet missiles by range and deployment level used in deep-battle attack on US forces. For the first time in history this Soviet chemical threat has been verified. In October 1987 the Soviets invited delegates from 40 nations to a display of chemical weapons at Shikhany, their central chemical test facility. This display (see Figure 1-3) included





	SS-21	SS-1 SCUD B	SS-23	SCALEBOARD
				
RANGE (KM)	120	300	500	900
DEPLOYMENT LEVEL	DIVISION	ARMY/ FRONT	ARMY/ FRONT	FRONT/ THEATER

Figure 1-2. USSR surface-to-surface missiles.

chemical warheads with persistent nerve agent for the SCUD-B and FROG-7. Also displayed were a variety of aerial chemical bombs (100 to 1,500 kilograms), chemical-filled artillery shells (122 mm, 130 mm and 152 mm), and chemical munitions for multiple rocket launchers.

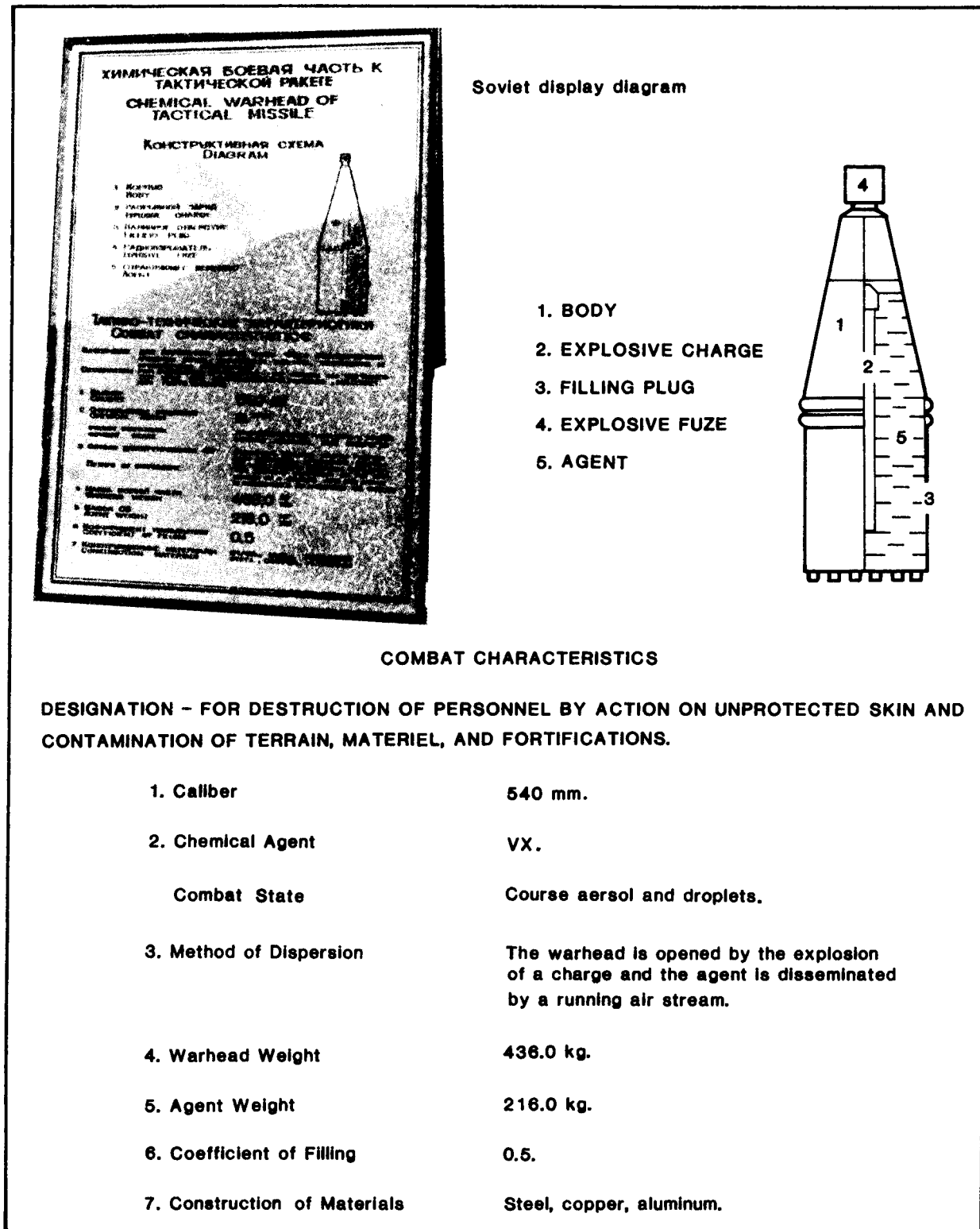


Figure 1-3. Chemical warhead of tactical missile.

CB weapons are spreading to a number of nations outside the Warsaw Pact. This CB weapon proliferation presents a significant threat to US forces in all hemispheres. Other countries developing an offensive chemical weapon capability are concurrently improving their NBC defensive posture. The proliferation of CB weapons in other countries increases the opportunity for dissident forces and terrorists to obtain these weapons; this means US forces in low-intensity conflict missions are at an increased risk from CB weapons.

The basic Soviet principle of chemical warfare is to achieve surprise. They would use massive quantities of chemical agents against unprotected troops or equipment. Chemical agents also may be used to restrict the use of terrain.

Initially, the use of chemical weapons may be subject to the same level of decision as nuclear weapons, but they are likely to be used more freely once the initial authority for employment has been given. In a nuclear war, chemical weapons are used to complement nuclear weapons. However, they may be used in a nonnuclear environment against an enemy whose chemical defenses are weak or where their use would be particularly advantageous.

Airfields, nuclear storage sites, and nuclear delivery systems are targets for chemical attacks since such targets can be neutralized without the necessity of pinpoint strikes. Also, contamination of key points along rear area lines of communication can seriously disrupt rear area resupply and reinforcement, while simultaneously keeping those points intact for subsequent use by attacking Soviet forces. See FM 100-2-1, Soviet Operations and Tactics, and FM 100-2-3, Soviet Army Troops, Organization, and Equipment, for further details.

#### TARGETING PRIORITIES

The Soviets do not perceive clear delineations between conventional, chemical, and nuclear warfare. If biological weapons are employed, they would be targeted against rear area objectives as well as front-line troops. Therefore, there is an overlap of priority targets for these particular weapons. They include --

- Nuclear delivery systems and storage sites.
- Command, control, communications, and intelligence (C<sup>3</sup>I) facilities.
- Reserve and large troop concentrations.
- Supply installations.

The first targets for spetsnaz and other Soviet agents may be radar and communication sites to prevent early warning. All of these sites should expect persistent chemical attacks in which the persistency could last from days to weeks. Nuclear delivery systems will receive the highest priority for targeting by nuclear weapons. The suitability of targets for nuclear weapons is determined by their priority category, missions, the current tactical situations, and weapons available for use.

Priority targets for biological weapons will be food supplies, water sources, convoys, and urban and rural population centers.

Priority targets for chemical weapons include airfields, naval bases, seaports, storage depots, and supply routes.

The targeting priority is assessed as follows to help fixed site commanders accurately determine their site's potential target value to the enemy. The result of this assessment is entered into the vulnerability analysis matrix on page 9. For some fixed sites the target priority may change as the war progresses. For example, the pre-positioned material configured to unit sets (POMCUS) sites in the European theater are extremely important to US forces in the early stages of hostilities, but after the equipment is issued to incoming units their value decreases.

Low (L) -- This site is in a lower section of enemy target priorities; it would be a secondary target for air-delivered systems. This priority indicates that the enemy is reluctant to commit valuable resources to a target with a low payback value to their primary objectives. The mission that the site performs is redundant and can be duplicated by another site within the theater of operations.

Mid (M) -- This site is higher on enemy target lists; it may not be of sufficiently high priority to use scarce, expensive weapon systems (for example, missiles) on the target. This priority indicates that there exists a need to assess the replacement value the site might possess.

High (H) -- This site is very high on enemy target lists; it would receive priority consideration for all means of attacking the target. This priority assumes that there is an imminent NBC threat. This target value could also result from a site being located in the vicinity of a known high priority target; hence, there is the prospect of becoming a collateral hazard.

#### VULNERABILITY ANALYSIS

Rear area operations involving the flow of personnel, equipment, and supplies will be faced with the task of sustaining these operations during hostilities under all types of conditions. The employment of NBC munitions will in most cases disrupt these rear area operations.

After reading and understanding the doctrine and capabilities for a particular theater and opposing force (geographical location), the installation commander must look at his site's day-to-day functions and any unique capability provided to the force structure. The installation's vulnerability will be based on the Threat capability and the target's (installation) priority. A vulnerability analysis of the installation should be done to help the commander decide what survivability actions are needed. The following areas will be assessed: target priority (importance of site to enemy), replacement value (importance of site to US allied forces), and NBC threat. However, vulnerability can be lessened by using alternative operating locations. Sites that possess the following replaceability characteristics exhibit greater mission redundancy:

- Quantity of sites available to perform a certain mission.
- Mission substitution through outside sources. Medical and maintenance missions are two examples where suitable facilities and expertise may exist within the civilian economy and be available for substitution of the primary facility.



REPLACEMENT VALUE TO FRIENDLY FORCES

A fixed site commander must be able to determine whether his site provides any unique functional/mission areas that are necessary to support a mission area. The fixed site commander can also assess this value internally (analyzing one function versus another).

Low (L) -- Site destruction has little immediate or delayed impact on force effectiveness. Redundant capabilities exist at other sites. This value indicates that friendly operations would not be degraded by the loss of this site.

Mid (M) -- Site destruction has significant indirect or delayed impact on force effectiveness. Redundant capabilities exist, although destruction of this site may result in a reduced mission capability.

High (H) -- Site destruction has significant direct impact on force effectiveness or significant delayed and/or indirect impact. No redundant capability exists.

The mid and high values indicate a need to invest in a site's survivability. The enemy may view the site as a high value target even though it is not at the top of their target priority list.

NBC THREAT

At this stage of the analysis, a fixed site commander must assume that an NBC threat exists. Therefore, this threat is best analyzed as either an on-target or off-target threat.

Low (L) -- NBC threat is from probable off-target attack (adjacent site with probable on-target attack).

Mid (M) -- NBC threat is from probable off-target, possible on-target attack.

High (H) -- NBC threat is from probable on-target attack.

VULNERABILITY ANALYSIS MATRIX

The following matrix (see Figure 1-4) takes you through the thought process for vulnerability analysis:

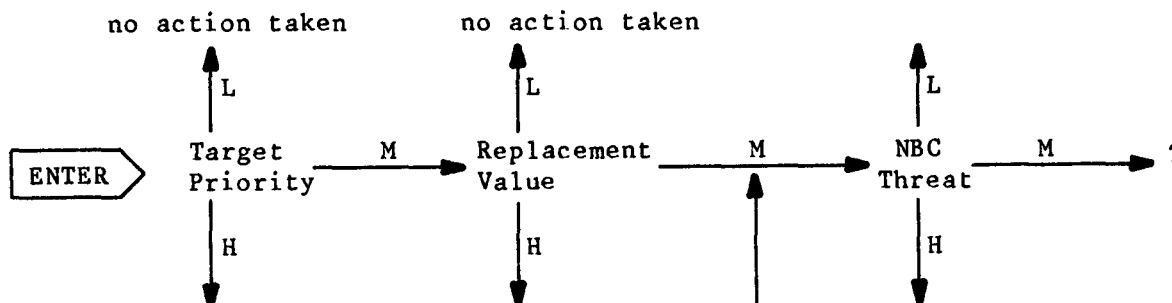


Figure 1-4. Vulnerability analysis matrix.

If you exit the matrix, then NBC survivability measures are probably a low priority and can be provided cost effectively by individual protection and curtailment or major reduction of operations in an NBC environment.

The matrix at Figure 1-4 on page 9 purposely leads you to a dead end. You have only established that survivability measures are necessary. As you read through this FM, each chapter will take you further into the matrix so you will be able to determine what survivability measures are necessary.

## APPENDIX

## NATO STANDARDIZATION AGREEMENT (STANAG) 2047, ANNEX A

## EMERGENCY ALARM AND WARNING SIGNALS

## Related documents:

STANAG 2002 NBC -- Warning signs for the marking of contaminated or dangerous land areas, complete equipments, supplies and stores.

STANAG 2104 NBC -- Friendly nuclear strike warning.

STANAG 2889 ENGR -- Marking of hazardous areas and routes through them.

ATP-45 -- Reporting nuclear detonations, biological and chemical attacks, and predicting and warning of associated hazards and hazard areas.

1. The aim of this agreement is to provide a standard method of giving emergency alarms within the NATO forces operating on land for --
  - a. Nuclear, biological, or chemical (NBC) hazards and strikes.
  - b. Air attack.
2. Participating nations agree that NATO forces, when operating on land, will use the alarm signals detailed herein to give emergency alarms of hazard or attack. Audible and visual alarm signals must be given in all cases as soon as an attack or the presence of a hazard is detected. The alarm signals will be repeated throughout the unit area by all who hear or see the original alarm signal since most available alarm signals are generally limited in range. Additionally, audible and visual alarm signals should normally be supplemented by the simultaneous use of radio, telephone, and public address systems.
3. It is unlikely that personnel can understand and react quickly and correctly to more than two alarm signals. The following hazards require fast and correct reaction: use or presence of chemical or biological agents, and an imminent air attack. Therefore, alarm signals for these two hazards are mandatory (see Note 1). In the case of radiological contamination, a delay in personnel taking cover may be acceptable.
4. The spoken word (vocal alarm signals) remains the most effective means of informing troops in an emergency.
5. Visual alarm signals are included to supplement the audible alarm signals under conditions when audible signals may be lost due to other noises or to replace audible signals when the tactical situation does not permit the use of sound.
  - a. Reliance should not be placed on visual alarm signals during the hours of darkness or in conditions of poor light.
  - b. Visual alarm signals should be used when purely audible signals may be lost due to other noise.

c. Visual signals should be used to warn those personnel arriving at a particular location of an imminent hazard.

d. Apart from the audiovisual signals detailed at paragraph 2, Note 2, of Annex A, normal signal flares are excluded from use as a color alarm signal for NBC and air attack.

e. Visual signals need not be displayed by mobile forces.

6. The actual form of a visual signal and method of display are left to the discretion of the local commander. Only the color at Annex A is mandatory. However, to aid recognition, it is recommended that the red signal preferably be square and the black signal preferably be triangular.

7. The alarm signals listed in this agreement are primarily intended to serve as alarms of enemy action. They may be used, however, in an emergency when friendly action could produce similar effects on own forces.

8. Conflict with civil regulations. Alarm signals for use by NATO forces operating on land are in Annex A. There are some differences between the alarm signals prescribed herein and some national civil defense alarm signals. These differences are considered minor for air attack. Reservations are indicated by each nation where nations or local regulations prohibit NATO Forces operating in their territory from sounding alarm signals in exercises and/or alarm signals incompatible with the public warning system in wartime.

Note: No reference is made to ground attack in order to reduce to a minimum the number of signals. Signals for ground attack, if deemed necessary, remain the prerogative of field commanders.

9. Practice alarm signals. In those cases where nations or local regulations preclude sounding alarm signals during exercises, local commanders should negotiate with local authorities to obtain authorization to sound alarm signals periodically. In the absence of agreement, small alarm devices emitting sounds similar to the prescribed audible alarm signals and having limited range should be used during exercises to keep personnel familiar with the audible alarm signals.

10. This STANAG is implemented when the necessary orders and/or instructions have been issued directing forces concerned to put the content of this agreement into effect.

11. Table A-1 shows the emergency alarm and warning signals for NATO forces operating on land. In respect to the audible alarm signal, one or more of the signals listed below should be used.

Table A-1. Emergency alarm and warning signals for NATO forces operating on land.

TYPE OF HAZARD	VISUAL WARNING SIGNAL	AUDIBLE ALARM SIGNAL
1a. Imminent air attack.	1b. Red -- preferably square in shape.	1c.(1) Unbroken warbling siren for one minute. (2) Succession of long blasts on vehicle horns, whistles, bugles or other wind instruments in a ratio of 3:1; approximately 3 seconds on and 1 second off. (3) Vocal "Air attack," or corresponding national term where only one nation is involved.
2a. Imminent arrival of chemical or biological agents, or radiological hazards.	2b.(1) Black -- preferably triangular in shape. (2) Donning respirators and taking protective action, followed by such hand signals as may be prescribed in local instructions (see Notes).	2c.(1) Interrupted warbling sound or presence of a siren. (2) Succession of short signals on vehicle or other horns or by beating metal or other objects in a ratio of 1:1; approximately 1 second on and 1 second off. (3) Vocal "Gas, gas, gas" or corresponding national term where only one nation is involved. (4) Vocal "Fallout, fallout, fallout" or corresponding national term where only one nation is involved.
3a. All clear.	3b. Removal of appropriate warning signal.	3c.(1) Vocal "all clear (specify type of attack)" or corresponding national term when only one nation is involved. (2) If used, a steady siren note for one minute or a sustained blast on a vehicle horn, whistle, bugle, or other wind instrument to indicate absence of all NBC and air attack hazards.

NOTES: 1. Automatic alarms for the early and rapid detection of biological and chemical agents and radiological hazards may complement the devices referred to previously.

2. A special audiovisual pyrotechnic signal producing a whistle sound and a yellow, red, yellow display of lights may be used. The combination of colours should be produced as near simultaneously as possible.

3. Wearing respiratory protection in the presence of radiological hazard is not mandatory but will be decided by the local commander.

GLOSSARY

ACADA -- advanced chemical agent detector and alarm.

accelerated weathering -- speeding up the normal weathering process through the use of mechanical or artificial means; for example, using heat or flushing with water to speed up the evaporation or hydrolyzation of chemical agents. Note: Only some chemical agents can be hydrolyzed.

ACCLASS -- Air Force demonstration test using camouflage with large area smoke screens.

ALAD -- advanced liquid agent detector.

ADC -- area damage control.

ammo -- shortened word form for ammunition.

ammunition depots -- ammunition depots, repair facilities, and theater storage areas considered in this class. Corps storage areas might be considered operationally fixed if they contained sufficient ammunition and remained stationary for a long enough period. Corps- and division-level ammunition supply points generally should not be considered fixed. The chokepoint of an ammunition depot is its transportation point, whether it is a railhead or the place where trucks load ammunition.

APODs -- airfields and aerial ports of debarkation. These can be US Air Force air bases, those of our allies, or commercial airports used primarily for airlifting troops and critical supplies into the theater.

ASP -- ammunition supply point.

basic skills decontamination -- the immediate neutralization or removal of contamination from exposed portions of the skin. Each individual must be able to perform this decontamination without supervision.

beta radiation -- a form of radiation referred to in skin burns called "beta burns" and sometimes called "beta." The primary hazard from this radiation is through prolonged contact with the skin.

biological agent -- a microorganism that causes disease in man, plants, or animals, or deterioration of materiel.

blast -- the brief and rapid movement of air vapor or fluid away from a center of outward pressure, as in an explosion; the pressure accompanying this movement.

blister agent -- a chemical agent that injures the eyes and lungs, and burns or blisters the skin.

blood agent -- a chemical compound, such as one of the cyanide group, that affects bodily functions by preventing the normal transfer of oxygen from the blood to body tissues; also called cyanogen agent.

BMNT -- before morning nautical twilight.

CAM -- chemical agent monitor.

CB -- chemical and biological.

chemical agent -- a chemical substance intended for use in military operations to kill, seriously injure, or incapacitate humans through its physiological effects.

C<sup>3</sup>I -- command, control, communication, and intelligence.

Class III -- petroleum, oils, and lubricants (POL).

Class IX -- repair parts.

collective protection -- a shelter, with filtered air, that provides a contamination-free working environment for selected personnel, and allows relief from continuous wear of MOPP gear.

command and control facilities -- a diverse class of sites usually associated with echelon above corps (EAC); for instance, the Theater Army Area Command (TAACOM) and functional organizations like the Engineer Command (ENCOM) and Medical Command (MEDCOM). These command and control missions are generally very specialized and difficult to replace quickly while maintaining comparable effectiveness.

communication and intelligence collecting facilities -- fixed communication centers often located near command and control sites, but located primarily because of geographic considerations.

complete decontamination -- the process of reducing the level of the contamination hazard of a surface so that it will pose no threat of transfer.

contaminate -- to introduce an impurity; for instance, a foreign microorganism placed in a culture or environment. Clothing containing microorganisms is said to be contaminated.

contamination -- 1. The deposit and/or absorption of radioactive material or biological or chemical agents on and by structures, areas, personnel, or objects. 2. Food and/or water made unfit for consumption by humans or animals because of the presence of environmental chemicals, radioactive elements, bacteria, or organisms. 3. The by-product of the growth of bacteria or organisms in decomposing material (including food substances) or waste in food or water.

continuous monitoring -- surveillance for radiation in the fixed site area or along critical routes within the fixed site area. It is initiated when a nuclear detonation is observed, heard, or reported, or when a dose rate of 1 centigray per hour is read.

CP -- collective protection.

CSS -- combat service support.

CTA -- common table of allowances.

decon -- shortened word form for decontamination.

decontaminant -- anything used to break down, neutralize, or remove a chemical, biological, or radioactive material posing a threat to equipment or personnel.

decontamination -- the process of making any person, object, or area safe by absorbing, destroying, neutralizing, making harmless, or removing chemical, biological, or radiological contamination.

DKIE -- decontaminating kit, individual equipment.

DS2 -- decontaminating solution number 2; available in 1-1/3-quart-sized cans and in 5-gallon-sized pails, used for filling portable decontaminating apparatuses .

ECU -- environmental control unit.

EENT -- early evening nautical twilight.

electromagnetic pulse (EMP) -- the high-energy, short duration pulse (similar in some respects to a bolt of lightning) generated by nuclear detonation. It can induce a current in any electrical conductor, and can temporarily disrupt or overload and damage components of improperly protected or unprotected electronic equipment.

EMI -- electromagnetic impulse.

EMP -- see electromagnetic pulse.

fallout -- the descent to earth of radioactive particulate matter from a nuclear cloud; also applied to the particulate matter itself.

FM -- field manual.

FSCDWS -- fixed site chemical detection and warning system.

gamma radiation -- primarily an internal hazard although it originates from an external source. Gamma rays are the primary radiation hazard for soldiers on the battlefield. Gamma rays are short wavelength electromagnetic radiation of nuclear origin emitted from the nucleus of the atom.

GPFU -- gas particulate filter unit.

GPM -- gallons per minute.

half-life -- the time required for the activity of a given radioactive species to decrease to half its initial value due to radioactive decay. The half-life is a characteristic property of each radioactive species and



is independent of its amount or condition. The effective half-life of a given isotope is time in which the quantity in the body will decrease to half as a result of both radioactive decay and biological elimination.

incapacitate -- disable.

initial radiation -- the radiation, essentially neutrons and gamma rays, resulting from a nuclear burst. It is emitted from the fireball within one minute after burst.

inversion -- a meteorological condition that exists when there is an increase of air temperature with a increase in height (the ground being colder than the surrounding air). This condition usually occurs on clear or partially clear nights and early mornings until about one hour after sunrise, but sometimes persists longer. When stable conditions exists, there are no convection currents and, with wind speeds below 5 knots, little mechanical turbulence. Therefore, stable conditions are the most favorable for ground-release smoke.

IPE -- individual protective equipment.

IR -- information requirements; infrared.

lapse -- a meteorological condition that exists when there is a marked decrease of air temperature with increasing altitude (the ground being warmer than the surrounding air). This condition is usually encountered between 1100 and 1500 hours when skies are clear. During unstable or lapse conditions, strong convection currents are found. This condition is normally the most unfavorable for the release of smoke.

lethal -- deadly; fatal.

maintenance sites (light and heavy) -- types of maintenance requiring either complex support facilities or very little maintenance support. They can be further segregated by the type of equipment maintained, or the echelon at which certain levels of maintenance are performed or both. Maintenance facilities at EAC are of primary consideration, but corps maintenance facilities that could be operationally fixed deserve attention as well.

medical facilities -- hospitals and clinics at corps level and above. Since medical facilities are so dependent on equipment and physical facilities to perform their function, they have very little mobility. Medical supply facilities, blood banks, and deployable medical facilities (DEPMEDS) at corps level and above are included in this class.

MET -- meteorology; the science that deals with the study of the atmosphere and its phenomena, especially weather and weather forecasting.

miosis -- excessive contraction of the pupils of the eyes caused by exposure to minute quantities of chemical agents. The pupil is unable to dilate and remains contracted. Thus, performance of tasks, navigating on foot, identifying or engaging targets, or driving vehicles is practically impossible. Miosis also is often accompanied by pain, headache, and pinpointing of the pupils.

MOGAS -- motor gasoline.

MOPP -- mission-oriented protective posture; a flexible system that provides maximum NBC protection for the individual with the lowest risk possible and still maintains for mission accomplishment.

MOPP gear -- combination of all individual protective equipment including suit, boots, gloves, mask with hood, first aid treatments, and decontamination kits.

NAEDS -- nonaqueous equipment decontamination system.

NBC -- nuclear, biological, and chemical.

NBC-PC -- NBC protective cover.

NCO -- noncommissioned officer.

NDI -- nondevelopmental items.

neutral -- a meteorological condition that exists when conditions are intermediate between lapse and inversion. Neutral conditions tending toward lapse favor production of smoke curtains; neutral conditions tending toward inversion favor smoke-blanket screens.

nonpersistent agent -- a chemical agent that, when released, dissipates and/or loses its ability to cause casualties after 10 to 15 minutes.

obscurant -- chemical agent that decreases the level of energy available for the functions of seekers, trackers, and vision enhancement devices.

obscuration smoke -- smoke placed on or near enemy positions to minimize enemy observation both within and beyond the position area.

OEG -- operational exposure guidance.

O&O -- operational and organizational.

partial decontamination -- the removal or neutralization of all visible or detectable contamination from individual clothing and equipment and from those surfaces of equipment that operators or crew members must contact to perform their mission (for example, building and vehicle entry and exit routes).

PF -- protection factor.

PIR -- priority intelligence requirement.

POMCUS -- pre-positioned material configured to unit sets. Located in the European theater only, these sites represent Army combat assets of such high value, and warrant specific consideration. Unlike other types of sites, POMCUS has no other echelons to substitute in case of loss or delay.

- ports and seaports of debarkation -- sites not operated by the military in peacetime and vulnerable because of the host nation civilian contract labor. This makes NBC protection and training at these port facilities particularly difficult. These sites are often limited in number.
- periodic monitoring -- the frequent check of the unit area for presence of beta or gamma radiation. It is done if intelligence indicates threat use of nuclear weapons; nuclear warfare has been initiated; when the dose rate falls below 1 centigray per hour; or when ordered by the site commander.
- persistency -- the ability of NBC weapons to continue in their lethality long after they have been released; includes both over the target where released and downwind for indefinite distances.
- psi -- pounds per square inch.
- radiac -- an acronym derived from the words "radioactivity, detection, indication, and computation." Radiac is used as an all-inclusive term to designate various types of radiological measuring instruments or equipment. Radiac is usually used as an adjective.
- radiacmeters -- portable, battery-operated radiation detectors and indicators used to detect and measure beta and gamma radiations.
- RSCAAL -- remote sensing chemical agent alarm.
- SCPE -- simplified collective-protection equipment.
- smoke control officer -- the officer designated by the smoke unit commander to coordinate and control the smoke operation.
- smoke control point -- the point from which the technical control of a smoke screen is exercised. It is the center of signal communications for the unit and is occupied by the smoke control officer and staff.
- smoke emplacement -- a fortified or prepared position for a mechanical smoke generator or smoke pot.
- smoke generator -- a mechanical device that vaporizes fog oil and releases it to condense in the air as a white smoke useful for large-area screening.
- smoke line -- a series of smoke positions or emplacements established to accomplish a mission. This line may be fixed or mobile, straight, or irregular.
- smoke position -- the location of a smoke pot or mechanical smoke generator.
- SOP -- standing operating procedure.
- special ammunition storage points and air defense artillery sites -- included in the fixed site classification because they represent high value targets that, if preemptively attacked or operationally fixed, would suffer crippling blows.

STANAG -- North Atlantic Treaty Organization (NATO) standardization agreement.

STB -- super tropical bleach; a decontaminant.

supply depots -- includes all classes of supply except ammunition. Some corps-level supply facilities might be considered operationally fixed, but the primary focus is on EAC. POL (Class III) may represent a special case because they are located on existing pipelines. Certain supply facilities that handle exceptionally important items, because of cost or scarcity, would warrant special considerations.

TDA -- tables of distribution and allowances.

temperature gradient -- comparison of the air temperature at .5 meter above the ground with the air temperature at 4 meters. See also inversion, neutral, and lapse.

TFA -- toxic-free area.

TOE -- table(s) of organization and equipment.

toxins -- a class of poison. A toxin may be obtained naturally, that is, from secretions of various organisms, or synthesized.

TPU -- tank and pump unit.

TREE -- transient radiation effects on electronics.

unstable -- see lapse.

weathering -- gradual decontamination by evaporating or decomposing the chemical agent. It takes time for decontamination by weathering, although it is the easiest form of decontamination. Unfavorable weather such as low temperature, humidity or rain, and cloudy weather can slow the weathering process. High temperature, high wind, and bright sunlight can speed up the evaporation or decomposition of chemical agents.

## SYMBOLS

$\mu\text{m}$ -- a micro meter, one-millionth of a meter or one-thousandth of a millimeter.

## REFERENCES

## REQUIRED PUBLICATIONS

Required publications are sources that users must read to understand or to comply with this publication.

## FIELD MANUALS (FMs)

3-3, NBC Contamination Avoidance.

3-4, NBC Protection.

3-5, NBC Decontamination.

3-50, Deliberate Smoke Operations.

3-100, NBC Operations.

90-14, Rear Battle.

## TECHNICAL MANUAL (TM)

5-855-1, Fundamentals of Protective Design for Conventional Weapons.

## RELATED PUBLICATIONS

Related publications are sources of additional information. They are not required in order to understand this publication.

## ARMY REGULATIONS (ARs)

310-25, Dictionary of United States Army Terms.

310-50, Authorized Abbreviations and Brevity Codes.

500-3, Army Survival Measures.

## FIELD MANUALS (FMs)

3-6, Field Behavior of NBC Agents (Including Smoke and Incendiaries).

3-8, Chemical Reference Handbook.

5-20, Camouflage.

8-9, NATO Handbook on the Medical Aspects of NBC Defensive Operations (NAVMED P-5059; AFP 161-3).

FM 3-4-1

21-60, Visual Signals.

34-1, Intelligence and Electronic Warfare Operations.

34-3, Intelligence Analysis.

100-5, Operations.

100-2-1, Soviet Operations and Tactics.

100-2-3, The Soviet Army Troops, Organization, and Equipment.

101-5, Staff Organization and Operations.

SOLDIER TRAINING PUBLICATIONS (STPs)

3-54B1-SM, Soldier's Manual, MOS 54B, Chemical Operations Specialist, Skill Level 1.

3-54B2-SM, Soldier's Manual, MOS 54B, Chemical Operations Specialist, Skill Level 2.

3-54B34-SM-TG, Soldier's Manual, Skill Levels 3 and 4, and Trainer's Guide, MOS 54B, Chemical Operations Specialist.

3-74AII-MQS, Military Qualifications Standards II Manual BC74A, Chemical Corps.

21-1, Soldier's Manual of Common Tasks (Skill Level 1).

21-24, Soldier's Manual of Common Tasks (Skill Levels 2, 3, and 4).

21-11-MQS, Military Qualifications Standards II Manual of Common Tasks.

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