Field Manual
No. 3-19
Fleet Marine Force Manual
No. 11-20

FM 3-19
FMFM 11-20

Headquarters
Department of the Army
U.S. Marine Corps
Washington, DC, 19 November 1993

FM 3-19

NBC Reconnaissance

MEMORANDUM, SUBJECT: Request to Change Chemical Proponent Field Manual Distribution Restriction Statements, 6 October 2000, with 12 October 2000 e-mail endorsement.

Table of Contents

Preface

Introduction

Part I - General Concepts

Chapter 1 - Environment

Chapter 2 - Unit Organizations

Chapter 3 - Principles

Chapter 4 - Planning

Chapter 5 - Combat Area

Chapter 6 - Rear Area

Part II - Tactics, Techniques, and Procedures

Chapter 7 - Movement Techniques and Formations

Chapter 8 - Techniques

Chapter 9 - Sampling Operations

Appendix A - Operations in Special Environments

Appendix B - Sampling Techniques and Procedures

Appendix C - SOP Outline

Appendix D - Operations Checklist

Appendix E - Planning Guide

Appendix F - Specimen Documentation

Appendix G - Chemical and Biological Incident Interview Report

Appendix H - Sample Shipment Report

Appendix I - CB Sample Collection Equipment List

Glossary

References

Authorization Letter

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

Preface

This publication is the doctrinal guide for NBC reconnaissance. It provides guidance on the planning and execution of NBC reconnaissance missions and chemical/biological (CB) sampling operations. This manual applies to any unit that has the primary or implied mission of performing NBC reconnaissance.

NBC recon is the active contamination avoidance measure that provides commanders with information on NBC hazards in the area of operations as a component of battlefield management. With knowledge of where NBC contamination hazards are and, just as important, where they are not, commanders can make better decisions. Commanders may modify their plans or protective postures with the information from NBC recon.

NBC recon provides early warning, determines the concentration and type of agent, and locates the boundaries of contamination. The information derived from the intelligence preparation of the battlefield (IPB) and the conduct of effective NBC recon operations are key factors for battlefield management. The avoidance of NBC contamination facilitates freedom of movement and maneuver for our forces. Contamination avoidance procedures are discussed in greater detail in FM 3-3 and FM 3-3-1.

NBC recon performs five critical tasks on the battlefield-- detect, identify, mark, report, and sample. Early detection of NBC hazards is required for timely warning of units and personnel in affected areas. Detection of contamination is the cornerstone of contamination avoidance. Rapid identification is needed to adequately protect soldiers against NBC hazards. Identification dictates preventive measures and treatment of casualties. Contaminated areas are marked to allow friendly forces to avoid them. Data concerning contamination is useless unless it reaches decision makers. Timely, accurate reporting is essential for decision making and hazard warning. Samples are taken to aid in the identification of unknown agents. Sampling and subsequent laboratory analysis are the primary means of identifying biological agents.

This manual also provides the principles and techniques used by NBC recon units. It defines the capabilities and limitations of these organizations.

Commanders and staff officers at all echelons will find guidance on the employment of NBC recon units. These units are located in chemical companies assigned to armored and light cavalry regiments and heavy divisions. NBC recon companies are assigned to corps and theater armies. The doctrine contained in this manual applies for commanders, staffs (chemical officers/S2s/G2s/S3s/G3s), trainers, and unit leaders responsible for NBC recon units and NBC recon operations.

The employment of M93 NBC reconnaissance system (NBCRS) (Fox)-equipped units is

integrated throughout the manual. The M93 NBCRS is designed to improve the capability and increase efficiency for conducting NBC recon operations. The M93 NBCRS provides a faster response time, quicker detection, and identification rates, and quicker marking capability, while using basically the same NBC recon tactics, techniques, and procedures.

Although this manual does not implement any particular international agreement, material presented herein complies with related international agreements. A list of related international agreements and other references can be found in the references section.

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

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

Introduction

On the modern battlefield, victory will come to those leaders who employ their assets effectively and who thoroughly understand the capabilities and vulnerabilities of the enemy. This manual provides leaders the information to employ NBC recon units and to conduct NBC recon.

The use of weapons of mass destruction can radically alter the flow of battle, restrict terrain, limit mobility, degrade military efficiency, and even shift the balance of power, placing a superior force at risk. NBC reconnaissance is a crucial element of combat operations that enables us to limit risk and avoid NBC contamination hazards. The degree of success in conducting NBC reconnaissance operations depends on three critical components: integrated planning, effective employment, and operational proficiency. This manual addresses these three areas.

Nature of the problem

The challenges posed for military operations conducted under NBC conditions will be many and varied. There may be times when our forces will have to operate in complete individual or collective protection equipment. A significant problem will surface once the initial shock of first use of weapons of mass destruction has worn off. Areas targeted with these weapons may remain hazardous for days, even weeks, after the attack. We will know some of these hazardous areas with certainty and clarity. There will be other hazardous areas we may not know exist. If we must operate over this terrain, then we will need to know with certainty which areas and routes are passable and habitable, as well as those that are not.

Leadership

Unit leaders must also seek every opportunity to influence the conditions under which the enemy is engaged. Success depends on effectively orchestrating the battlefield operating systems to execute operations. The integration of all assets that influence the battle is essential to defeating an enemy and preserving combat potential. The enemy's use of weapons of mass destruction may be the key factor for influencing the outcome of any battle. Leaders must not only be knowledgeable of the effects from weapons of mass destruction, but also the enemy's capabilities and intentions for these weapons. The NBC recon capability organic to the chemical companies in the heavy divisions, armored cavalry regiments, and the chemical company (recon) at corps and above is an invaluable asset available to the commander. NBC recon provides valuable and timely information that will aid the commander in contamination avoidance and mission accomplishment.

Chapter 1

Environment

NBC Conditions and the Battlefield

Operations involving weapons of mass destruction must be dealt with as any other battlefield condition, such as cold, night, desert, and so forth. Unit leaders must consider NBC in assessing their mission essential task list (METL). Employment of NBC recon assets to negate or offset enemy employment of NBC weapons is a critical component of warfighting preparation and operations.

The purpose of NBC reconnaissance is to detect and identify NBC contamination. With equipment currently in the field, we can only detect and identify chemical and radiological contamination.

It is much easier to detect radiological contamination than it is to detect chemical contamination. Radiological contamination is normally found over large areas. The behavior of radiological contamination is more easily predicted. Chemical contamination, however, is typically limited to small areas of terrain. Chemical agents are influenced by a number of environmental conditions that make it difficult to predict their behavior. Biological contamination is the most difficult to detect and predict.

The primary environmental factors that affect the ability to detect chemical agents for NBC recon purposes are the surface and soil type, contamination footprint, concentration, and meteorological conditions.

Contamination hazards depend on ground conditions encountered on the battlefield. The surface and soil type will affect how readily the chemical agent is absorbed into the soil. The type of surface also affects the persistency of chemical agents. Even though the actual battlefield is a combination of conditions, looking at four general conditions separately will give an indication of what to expect.

Sand--Any surface that has a large amount of sand (such as a beach). This generally, has good drainage. When chemical agents are applied to this surface, they tend to be drawn into the subsurface, lowering the quantity of contamination available for liquid detection.

Soil--Any surface that contains quantities of clay and loam. Depending on the relative amount of each soil component, chemical agents react differently. Generally, some percentage of the agent is absorbed into the subsurface (until saturation).

Grass--Any surface covered with a layer of grass, from a few centimeters to half a meter in height. A portion of the chemical agent remains on the grass, while the rest is absorbed into the underlying soil. The chemical agent on the grass is available for liquid detection.

Mud--Any surface saturated with water resulting in muddy conditions. The amount of persistent agent that can be absorbed by wet soil is inversely related to the water content of the soil (such as the more water, the less chemical agent absorbed). Under this condition, chemical agents will remain on the surface longer. This increases the probability of detection.

The more absorbent the soil, the less liquid remains on the surface. This decreases the probability of detection by detector paper (M8 and M9). For the M93 NBC recon system (NBCRS) (Fox), the smoother and harder the surface is, the higher the probability of detection. When NBCRS is detecting on rough surfaces, the sampling wheel tends to bounce, decreasing the probability of detection. On soft or porous surfaces, the ability of NBCRS to detect contamination can be improved by stopping to lower the probe near the surface. The heated probe will cause absorbed chemical agent to vaporize. The vaporized agent can then be analyzed by the NBCRS.

Planners and executers of NBC recon operations must understand that chemical attacks will not cover extensive areas with liquid contamination. Depending on the type of munition and delivery system, contaminated areas may be relatively small in comparison to the operational area. The contamination footprint is the actual dimensions of the liquid hazard area formed by the detonation of chemical weapons.

Chemical munitions are typically fuzed to burst over the target, to get the best spread of agent on the target. When a munition detonates at ground level, it deposits most of the agent in the shell crater, minimizing the contaminated area. When munitions burst above the target, wind speed and direction directly influence the spread of the agent. As a munition bursts, the heavier droplets fall faster, and the, smaller ones drift downwind. The most heavily contaminated area is near the attack area. The chemical agent radiates in a bell shape in the direction of the wind. This creates the contamination footprint. Figures 1-1 to 1-4 show typical contamination footprints for persistent chemical agents delivered by artillery, multiple rockets, missiles, and aircraft bombs. A unit conducting NBC recon has a higher probability of detecting contamination when traveling crosswind to the footprint.

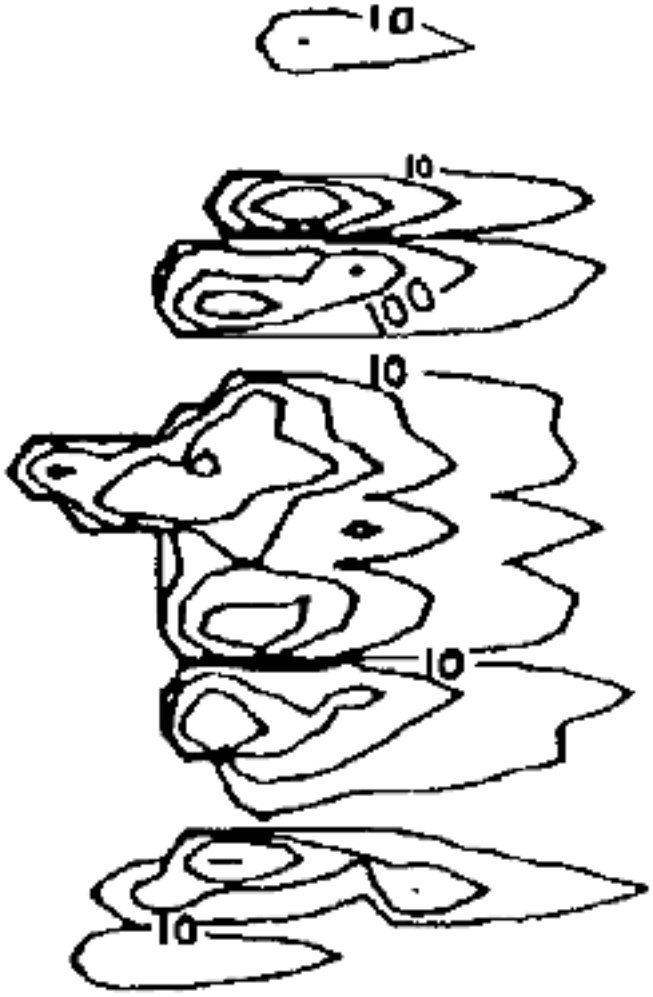


Figure 1-1. Contamination footprint for a multiple rocket launcher (MRL) liquid agent attack (contours are mg/m^2). Area is about 600 by 1,000 meters.

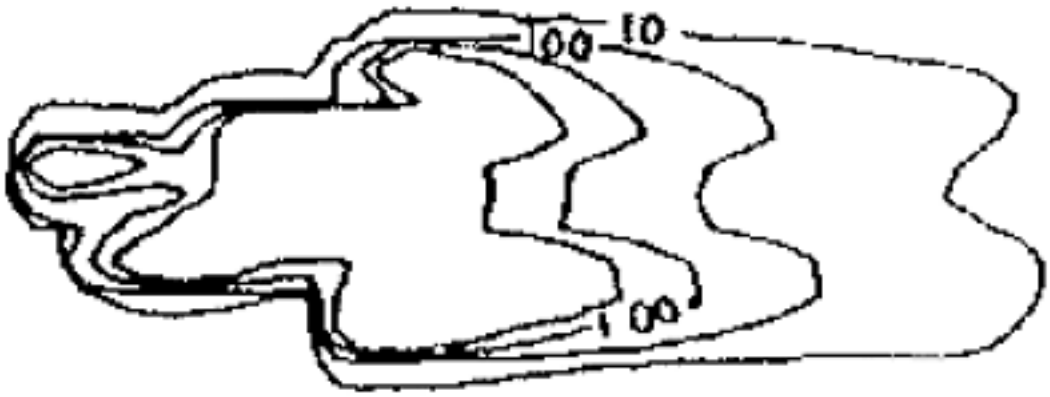


Figure 1-2. Contamination footprint for a liquid agent artillery attack (contours are mg/m^2). Area covered is about 100 by 800 meters.

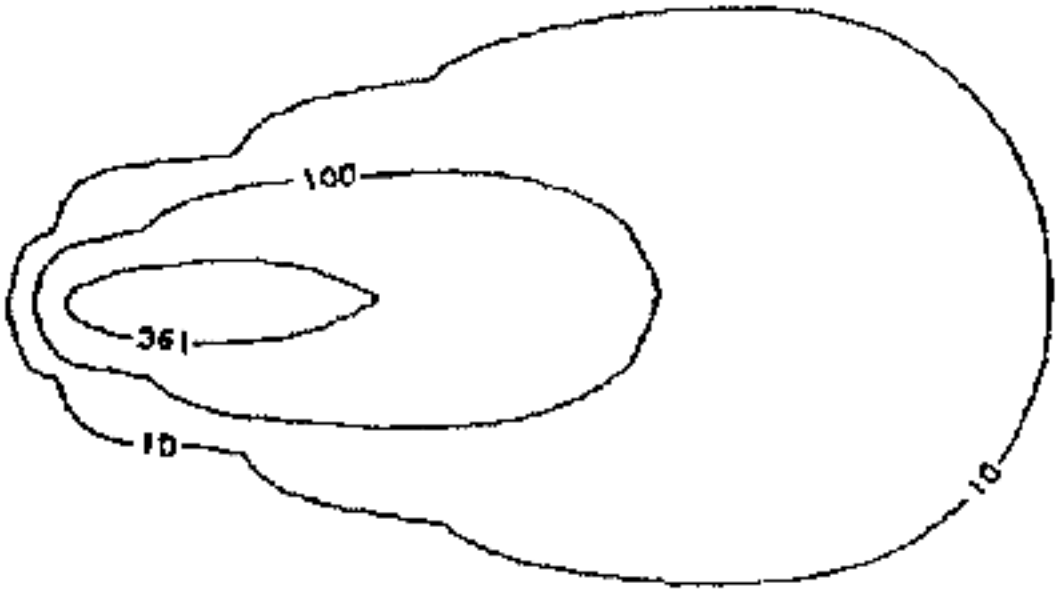


Figure 1-3. Contamination footprint for a liquid agent missile attack (contours are mg/m^2). Aproximate area covered is 600 by 4,000 meters.

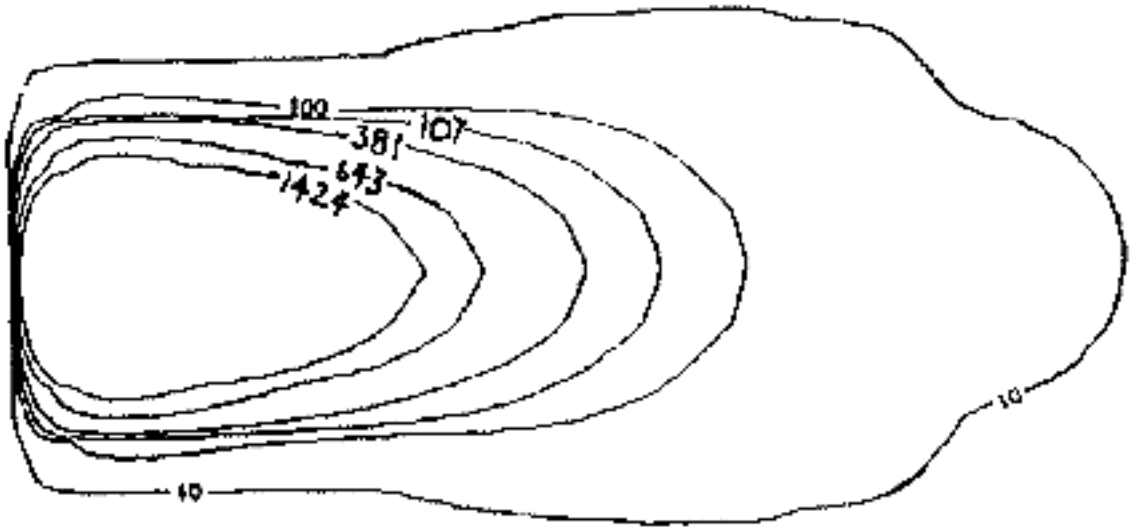


Figure 1-4. Contamination footprint for a liquid agent aircraft-delivered bomb (contours are mg/m^2). Area covered is about 130 by 1,000 meters.

The higher the concentration of the agent, the higher the probability of detection. The M93 NBCRS can detect extremely low concentration levels about .001 miligrams per cubic meter (mg/m^3). CAM and M256 detectors are not as sensitive. The concentration of agent on the ground depends on the type of agent, time since delivery, and the delivery method.

Meteorological conditions influence the persistency of liquid contamination. Such

contamination is detected in two ways: as a vapor as it evaporates, or by physical contact. As wind speed and temperature increase, evaporation of liquid contamination increases. This means there is more vapor present to detect, thus increasing the probability of detection. The evaporation rate of chemical agent can be predicted using tables in FM 3-6.

The Threat

Potential enemy forces have the capability of employing weapons of mass destruction against US forces. Nuclear weapons are used to maintain the momentum of advance during the offense and to seize the initiative from the attacker in the defense. Enemy nuclear weapons will be targeted against troop concentrations; nuclear delivery means; airfields; air defense systems; command, control, and communications centers; logistical facilities; port, and to create obstacles.

Biological agents produce either immediate or delayed casualties. These weapons can be used against military or civilian targets. Biological attacks can range from attacks against a specific target or can cover vast areas of terrain. Detection and identification of biological agents are extremely difficult. FM 3-3 provides additional information on biological attacks.

Chemical weapons are used to restrict our mobility to maneuver and concentrate forces, to contaminate combat support and combat service support systems, to cause immediate and delayed casualties, and to force an increase in protective measures. Persistent chemical agents are typically used against deeper targets or those areas not expected to be immediately occupied. Persistent agents will be used against reinforcements, deep targets, and units along the flanks of attacking enemy forces to produce casualties, create a decontamination burden, and restrict mobility. Enemy forces in the defense can be expected to employ persistent agents against attacking forces.

Chemical agents also are used to produce casualties (immediate or delayed). The threat's primary delivery systems will either be artillery or rocket. When the delivery means is via artillery, the persistent chemical agents are a mixture of droplets, micro-particles, and vapors. Chemical agent droplets are readily detectable, while micro-particle contamination is not as detectable, using standard NBC detection equipment. Dissemination via rocket will result in gross contamination, leaving small puddles of chemical agent in addition to droplets and micro-particles. Detection is easier when rockets are used; however, the areas of contamination are significantly larger.

As with any other combat support asset, NBC recon units must be effectively employed to achieve optimum results. Commanders must know capabilities and limitations of the units. Staff planners, including the NBC battle staff must fully integrate NBC recon into the tactical planning process. Warfighting exercises must incorporate these capabilities to enhance employment proficiency. Field training exercises will reinforce tactical employment skills--support the maneuver plan, battle command, battlefield management, and so forth. Mission assignment to the NBC recon unit or element should be on "What?" not "How?" of NBC recon. Basic provisions for employment are--

- Integrate into planning process and develop detailed plans.
- Rehearse, rehearse, rehearse.
- Never place in reserve.
- Always have follow-on missions.
- Never fragment capability.

NBC Technology

The technology to produce and deliver chemical/biological (CB) weapons is proliferating at an alarming pace. Nations in some of the world's most unstable regions perceive CB weapons as an effective deterrent against other more technically advanced nations. Some leaders view the mere possession of these weapons as an international military status symbol. Further, the technology used in CB weapons is readily available for the determined buyer.

Arguments that certain types of US forces will not encounter a CB or even a radiological threat are no longer valid. These weapons are possessed by potential hostile nations where the United States maintains a strategic interest. These same nations either have or are acquiring ballistic missiles thus extending their targeting capability.

Even at the lowest end of the operational continuum (peace time competition), our Army has a need to assess, contain, and limit NBC hazards. Some corporations find the cheap labor pool and relaxed safety and environmental restrictions in developing nations to be attractive options for industrial and chemical production facilities. These facilities, either through accident or sabotage, may release chemical hazards that equal those found in open chemical warfare. Accidents or sabotage in nations that possess a nuclear industry can create radiological hazards like those of the 1986 Chernobyl reactor fire.

Chapter 2

Unit Organizations

There are several organizations that have the primary mission of performing NBC reconnaissance. This chapter provides an overview of the organization and capabilities of NBC recon units.

Heavy Division NBC Recon Platoon

The heavy division NBC recon platoon consists of an officer and 19 enlisted soldiers. It is organized with a platoon headquarters and three recon squads (Figure 2-I). The platoon is equipped with six M93 NBCRS (Foxes) or M113A2 APCs.

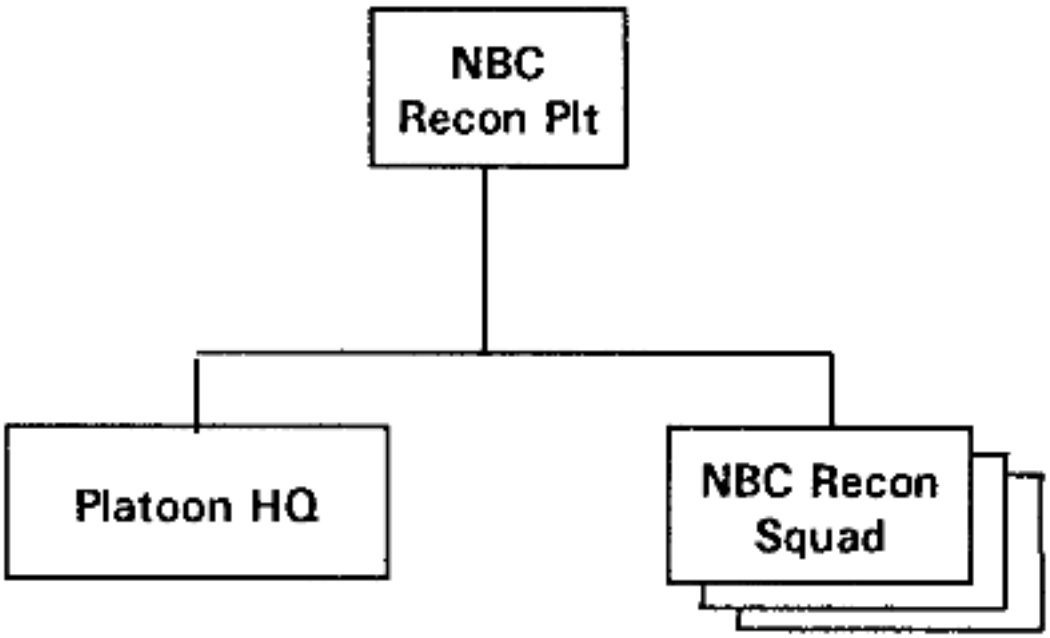


Figure 2-1. Heavy division NBC recon platoon organization.

The platoon headquarters provides command and control for the platoon. It consists of the platoon leader and the platoon sergeant (PSG). During operations, the platoon leader and PSG ride in two of the squad's vehicles. Each squad is composed of a squad leader, an assistant squad leader, and the crews, which man two M93 NBCRSs or M113 APCs. Each vehicle and crew comprise a team.

Armored Cavalry Regiment NBC Recon Platoon

Each chemical company assigned to an armored cavalry regiment has an organic NBC recon platoon. These platoons are organized identically to the heavy division NBC recon platoon. Each platoon may be equipped with either M93 NBCRSs (Foxes) or M113 APCs.

Light Armored Cavalry Regiment NBC Recon Plt

The light armored cavalry regiment's chemical company has two NBC recon platoons. Each platoon is organized with a platoon headquarters and two recon squads. The platoons are equipped with four M93 NBCRS.

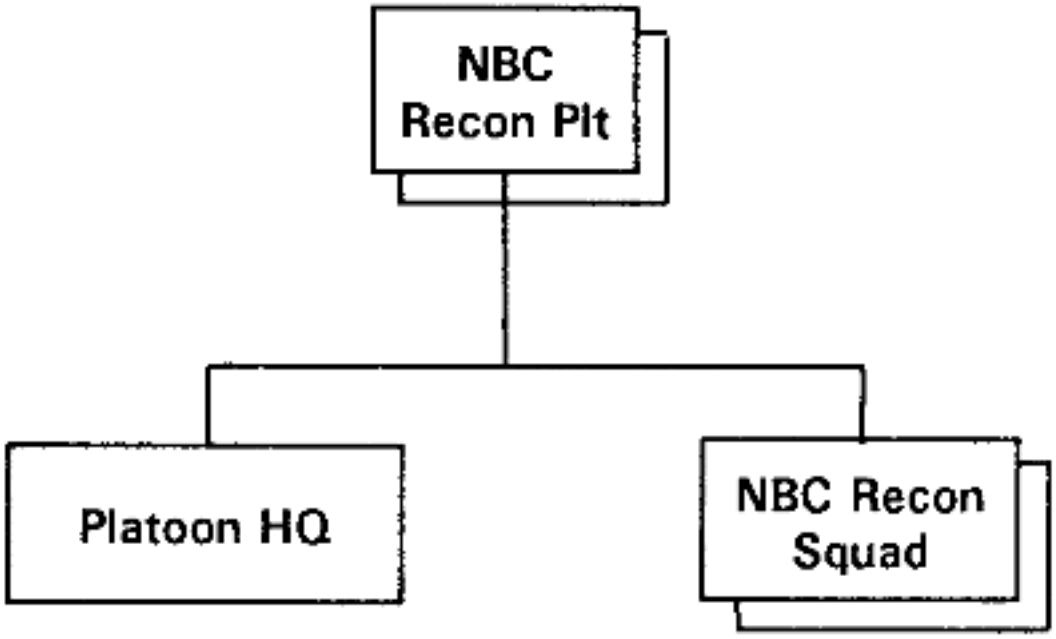


Figure 2-2. Light armored cavalry regiment NBC recon platoon organization.

NBC Recon Company

There are two types of NBC recon companies. One is equipped with armored carrier versions of the HMMWV; the other is equipped with twenty-four M93 NBCRS vehicles. The authorized personnel strengths of the two types of companies vary slightly.

NBC recon companies operate in corps, division, and TAACOM areas. Normally, the company is deployed as a separate company in the corps under control of the chemical brigade. However, the company may be attached to a corps chemical battalion.

Each NBC recon company has a headquarters and three NBC recon platoons. Each platoon has four NBC recon squads equipped with HMMWV or M93 NBCRS.

The mission of the company is to provide NBC recon support for elements of a corps or theater army. Each corps is allocated one of these companies. Figure 2-3 shows the structure of the company.

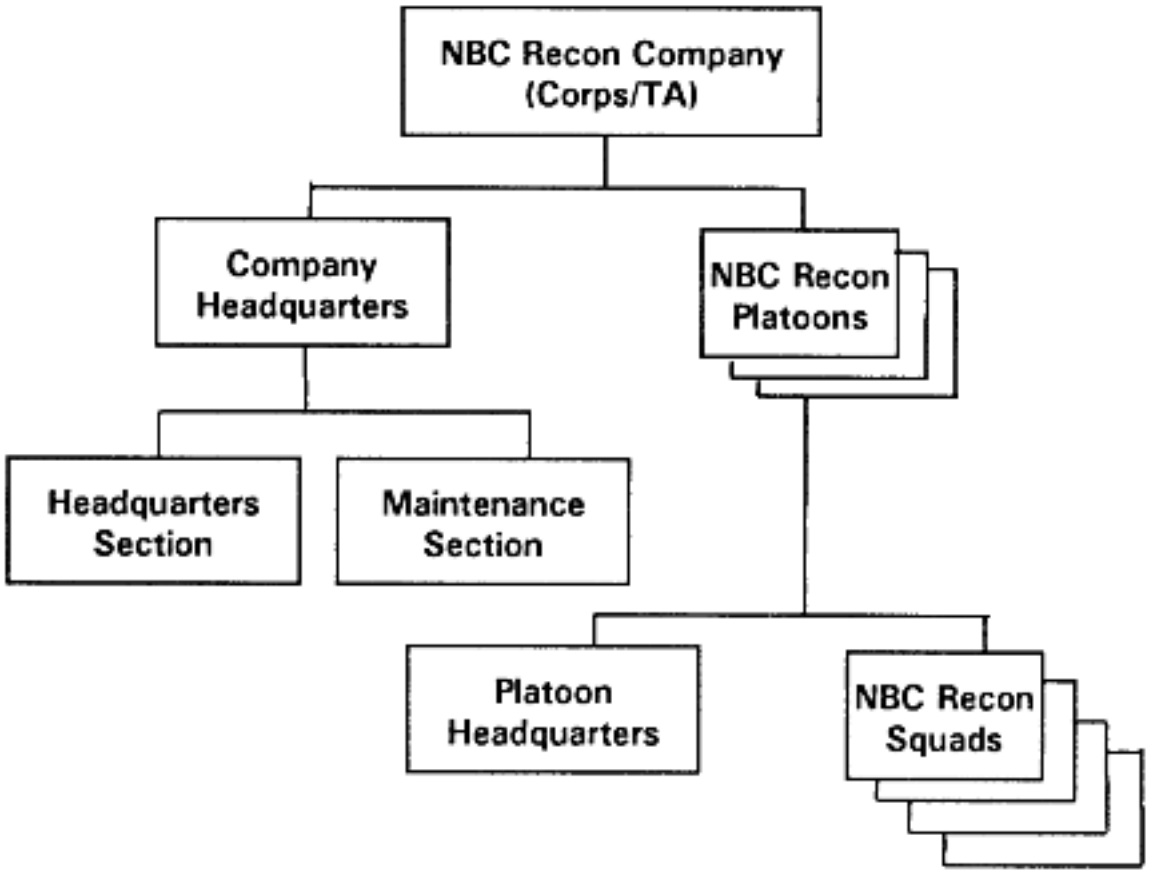


Figure 2-3. Chemical company (reconnaissance) organization.

NBC Recon Teams (LA/LB)

The NBC recon team (LA) provides NBC recon support to a unit or to augment the NBC recon efforts of a specific unit. LA teams are allocated to separate brigades. An LA team also may perform NBC recon at the site of a nuclear, biological, or chemical strike, and provide NBC data to the NBC center (NBCC) or supported unit commander. It collects, examines, and identifies NBC contamination and has limited capability to evaluate NBC data. Each LA team has two HMMWVS and is 100 percent air mobile. This NBC recon team depends on the supported unit for all logistical and administrative support.

The NBC recon team (LB) provides NBC recon support to a special forces unit. LB teams are allocated on the basis of one per special forces group. These units are assigned or attached to units organized into composite chemical combat support (CS) units. These CS units provide NBC recon support under diverse circumstances. The LB team performs NBC recon in a very similar manner as the LA team.

The LB team also can provide NBC technical knowledge about the enemy's NBC personnel, materiel, techniques, and tactics. It can analyze and assist in the disposition of captured NBC intelligence and materiel. The LB team performs strategic NBC recon operations of theater requirements, using unconventional warfare techniques. It collects NBC intelligence and provides technical knowledge pertaining to the enemy's weapon

capabilities, techniques, and disposition. The LB team is parachute qualified. It depends on captured vehicles or the supported unit for transportation and for a great deal of its communication requirements. For further information concerning this team see FM 3-18.

NBC Recon Unit Organization for Combat

The NBC recon platoon leader organizes his or her platoon to accomplish the mission based on mission, enemy, troops, terrain, and time (METT-T). The platoon normally operates in one of four organizations: team, squad, section, or platoon.

Team

Each vehicle in the platoon can operate independently on the battlefield to accomplish very specific tasks. These tasks include point surveys, sampling, and limited surveys to find bypass routes. This organization should only be employed for short periods during rear area operations.

Squad

Squad is the basic organization for the NBC recon platoon (see Figure 2-4). The platoon leader and platoon sergeant split the platoon headquarters section, and each operates with a squad. This organization provides for the most flexibility in assigning missions to the platoon. The squad is incapable of supporting themselves. When they are operating independently, logistical support must be carefully coordinated.

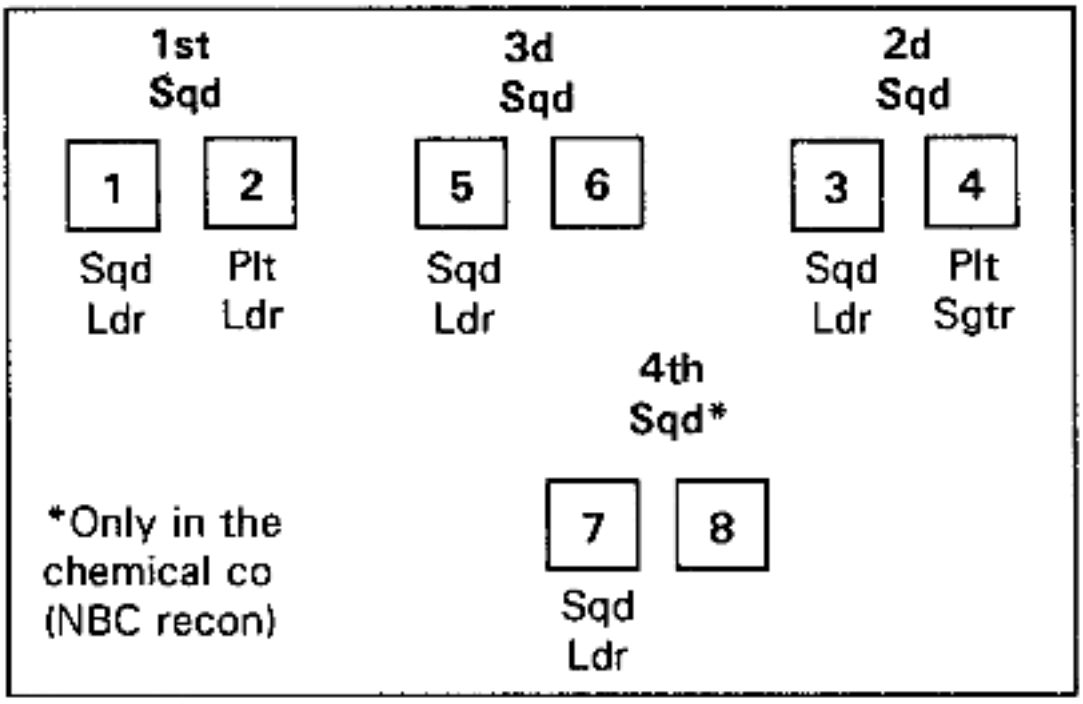


Figure 2-4. Typical squad organization of recon unit.

Section

Section organization is used when the platoon leadership is needed to supervise the execution of a mission. It is formed by splitting the third squad and adding one vehicle each to the first and second squads to form Alfa and Bravo sections. These sections are under the command and control of the platoon leader and PSG, respectively (see Figure 2-5). Platoons in the chemical recon company rarely form this organization because of the four-squad configuration. However, it is possible to form a two-section organization by merging two squads together. This is the least preferred organization because it does not provide for maximum use of the specialized platoon.

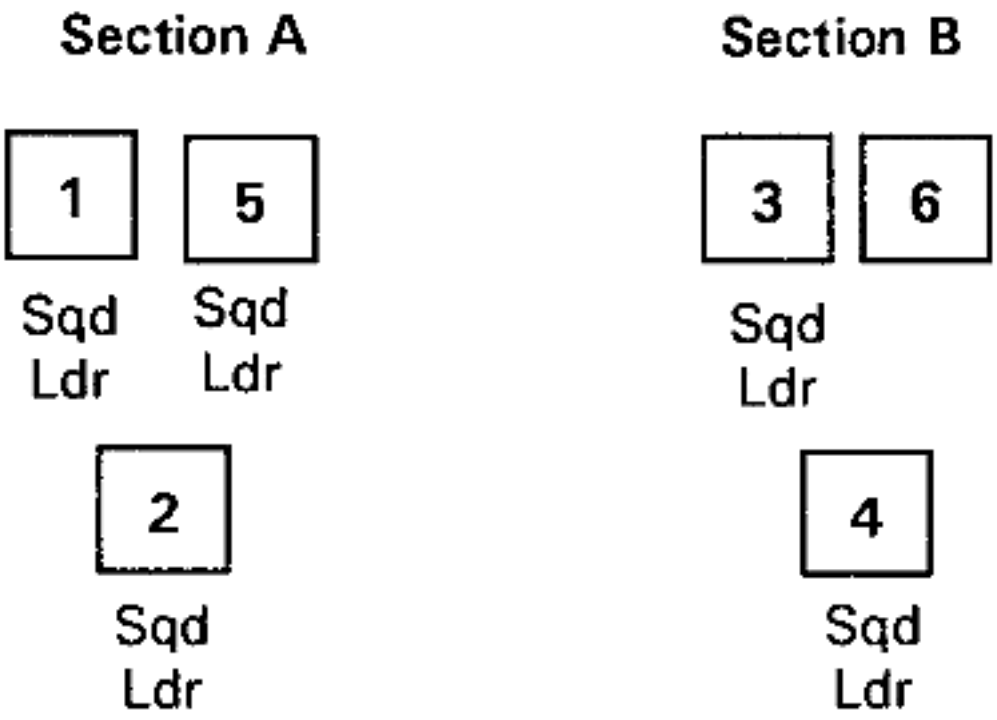


Figure 2-5. Section organization.

Platoon

The platoon organization is the most difficult to control (see Figure 2-6). The platoon is employed in this fashion when it is necessary to conduct a large zone reconnaissance. This organization provides little flexibility to the supported commander.

Figure 2-6. Platoon organization.

Table 2-1. Organization summary.

Organization	Number of Vehicles
Team	1
Squad	2
Section	3
LACR Platoon	4
Platoon	6
Corps Platoon	8
LA Team	2
LB Team	0

Unit Capabilities

In determining how, when, where, and what size element to employ, commanders, staffs, and NBC recon leaders at all levels must consider METT-T. The leaders must also consider the advantages and disadvantages of employing a specific size element and how it relates to mission accomplishment. The following paragraphs highlight the advantages and disadvantages of M93-NBCRS- and M113/HMMWV-equipped units.

Advantages and Disadvantages of M93-NBCRS-Equipped Units

Advantages:

- Conduct NBC recon and survey on the move.
- Vehicle capable of keeping up with maneuver forces.

- Built-in vehicle orientation system for navigation.
- Greater mobility allows greater area coverage.
- Conduct NBC recon mission without exiting the vehicle.
- Detect and identify all known chemical warfare agents.
- Overpressure system allows crews to operate in contaminated environment without masking.
- Provide location data to better delineate contamination.
- Vehicle swims readily with little preparation.
- Vehicle air conditioner allows the vehicle's identification and detection equipment to operate under extreme conditions.
- Vehicle marking system allows contamination to be marked without exposing the crew.
- Ability to store data on unknown suspected chemical agents.

Disadvantages:

- Vehicle is not readily recognizable as friendly.
- Specialized maintenance support requirements.
- Requires 15 to 20 minutes to initially prepare on-board chemical detection equipment (MM1) for operation.
- Vehicle is restricted by rough terrain; maintains greatest mobility over level terrain.

Advantages and Disadvantages of M113/HMMWV-Equipped Units

Advantages:

- Capable of obtaining large samples of suspected Chemical/Biological contamination.
- Has larger caliber (.50 CAL) weapon system.
- Vehicles are more recognizable as friendly.
- Maintenance/repair parts are easily obtainable.
- Can keep up with maneuver forces over rough terrain.

Disadvantages:

- Crew must conduct operations in MOPP 4 while in contamination.
- Vehicle must stop to conduct survey and detection.
- Vehicle has difficulty keeping up with maneuver force over flat terrain.
- Readings obtained using M256A1, detector paper, and CAM are not as reliable as MM1 readings.

Chapter 3

Principles

Reconnaissance is a mission undertaken to obtain information by visual observation, or other detection methods, about the activities and resources of an enemy, or about the meteorologic, hydrographic, or geographic characteristics of a particular area. NBC recon is a specific type of reconnaissance. The purpose of NBC recon is the detection and identification of NBC hazards. This includes finding gaps and detours around NBC contaminated areas.

Purpose

The goal of NBC reconnaissance is to produce combat information to allow friendly forces to avoid contaminated areas. NBC reconnaissance also can produce technical intelligence concerning the enemy's offensive NBC capability. NBC recon is part of the overall intelligence collection effort. It is performed in advance of other combat operations, as well as during them, to provide information used by the commander to confirm or modify his concept. NBC recon also is conducted throughout the framework of the battlefield from the forward combat area to deep in the theater's rear area. NBC recon missions are conducted wherever the enemy has the capability of employing NBC weapons.

Fundamentals

NBC recon operations are planned and performed with six fundamentals in mind:

- Retain freedom of maneuver.
- Orient on the threat.
- Report all information rapidly and accurately.
- Develop the situation rapidly.
- Avoid contact with enemy forces.
- Maximize the capability of NBC recon units.

Retain Freedom of Maneuver

By avoiding contaminated areas, the commander maintains freedom of maneuver. Knowing the location of contaminated areas allows all units to practice the first principle of NBC defense--contamination avoidance. This limits the effects of degradation on soldiers operating in high MOPP levels.

Orient on the Threat

NBC recon operations are limited to those areas where the enemy can employ NBC weapons. The use of persistent chemical agents is the major threat that the majority of NBC operations will be directed against. The intelligence preparation of the battlefield (IPB) will identify where, when, how, and why the enemy will employ his NBC weapons. It is impossible to conduct NBC recon continuously at all points on the battlefield. The IPB assists in focusing the NBC recon effort at the most critical places and times on the battlefield.

Report All Information Rapidly and Accurately

NBC recon is performed to obtain information. Higher commanders need this information to confirm or make decisions. Combat information loses value quickly. Negative reports tell as much as positive reports. Accurate reporting of locations is essential to avoiding NBC hazards.

Develop the Situation Rapidly

Once contamination is encountered, the unit performing the mission must rapidly identify the type and intensity. Possible bypass routes or gaps must be quickly identified.

Avoid Contact with Enemy Forces

Detecting and identifying NBC agents is extremely difficult on the battlefield. Many of the detection procedures are time consuming. Contact with enemy forces has a degrading effect on NBC recon operations. It is seldom possible to accurately detect and identify NBC agents while in close combat. The loss of a single M93 NBCRS to enemy direct fire severely degrades the ability of the entire force to conduct future NBC recon operations.

Maximize the Capability of NBC Recon Units

When selecting an NBC recon unit to perform a task, the commander must consider the various capabilities and limitations of the unit. The mobility, survivability, and detection capabilities of each type of unit is considered when assigning tasks and missions.

Actions on NBC Contact

When the unit performing NBC recon encounters NBC contamination, the unit uses a series of actions to develop the situation:

- Stop and report.
- Determine agent type and intensity.
- Choose a course of action for the recon unit.
- Recommend a course of action to the supported unit.
- Commander's decisions.

Stop and Report

Upon encountering contamination, the recon unit halts and reports the presence of contamination. A simple contact or spot report can be used or an NBC 4 report. If enemy contact is likely or expected, the unit must not remain in an area of limited cover and concealment. Also, the unit must minimize its exposure to the contamination.

Determine Agent Type and Intensity

The unit develops the situation by determining the exact type and intensity of the contamination if possible. Depending on the unit's detection and identification capability, the time required can be rather short, or take up to 20 minutes. If the unit has limited detection and identification capability, one element should remain at the contaminated area to determine the agent type. Other elements should move to covered and concealed positions to provide overwatch.

Choose a Course of Action

Once the leader has gathered enough information to make a decision, he selects a course of action. The course of action should adhere to the intent of the commander, be within the capability of the unit, and allow the unit to resume its mission as soon as possible. Courses of action include--

- Survey. An NBC survey determines the exact boundaries of the contaminated area. This provides the maximum information concerning the contaminated area.
- Bypass. Routes around the contaminated area are located and marked. This allows follow-on forces to avoid the contaminated area.
- Cross. Bypassing the contaminated area may not be possible. The shortest, safest route across the contaminated area is located. This allows follow-on forces to minimize their exposure while crossing the contaminated area.

Recommend a Course of Action

Once the recon leader has selected a course of action, he reports it to his commander. The commander approves or disapproves the course of action based upon its impact on the overall mission. The SOP or OPORD may provide automatic approval of certain actions to avoid unnecessary delay.

Once the recon unit has reported the presence of NBC contamination, the commander acts on this information. The impact of the reported contamination must be analyzed against current and future operations. The commander may decide to alter the scheme of maneuver to avoid the contamination area or to increase the protective posture.

Recon Techniques

Units performing NBC recon use NBC recon techniques to accomplish their missions. These techniques fall into the two categories of search and survey. Search techniques are used initially to find the contamination. Once contamination is detected, survey techniques determine the size of the contamination. These techniques can be used

while mounted or dismounted or in combination to meet the needs of the situation. Various NBC recon techniques are discussed in detail in Chapter 8 and apply to any unit needing to perform an NBC recon mission.

It may be necessary to dismount to conduct a detailed survey of an area or to obtain readings in areas not accessible to vehicles. The majority of dismounted operations will be performed by units not equipped with the M93 NBCRS.

Aerial radiological survey techniques are discussed in FM 3-3-1. Aerial operations normally are conducted to locate radiologically contaminated areas because of the large area typically contaminated after nuclear events.

NBC Route Recon

An NBC route reconnaissance is a directed effort to obtain information of a specific route. (A route is the prescribed course to be traveled from a specific point of origin to a specific destination). A route may encompass a single road or could be an axis of advance. Units performing a route recon typically conduct an NBC route recon as part of the overall operation.

A unit, particularly an NBC recon unit, could be given the specific mission of conducting an NBC route reconnaissance. This mission is appropriate when the commander feels there is a high likelihood of contamination along the route. An NBC route recon proceeds faster than an NBC zone recon. The size of the route and the time available dictate the size of the recon element. Once contamination is detected, the recon element has the following options:

- Conduct an NBC survey to define the boundaries of the contamination.
- Locate and mark clear bypass routes.
- Terminate the mission and move to the coordinated decon point.
- Continue the mission.

Critical Tasks

Certain tasks must be accomplished during a route recon. The IPB will indicate possible locations for contamination along with previous NBC reports. The critical tasks are--

- Reconnoiter the route, and determine the location of any contamination.
- Locate and mark bypass routes if contamination is encountered.
- Report and mark all NBC hazards along the route.

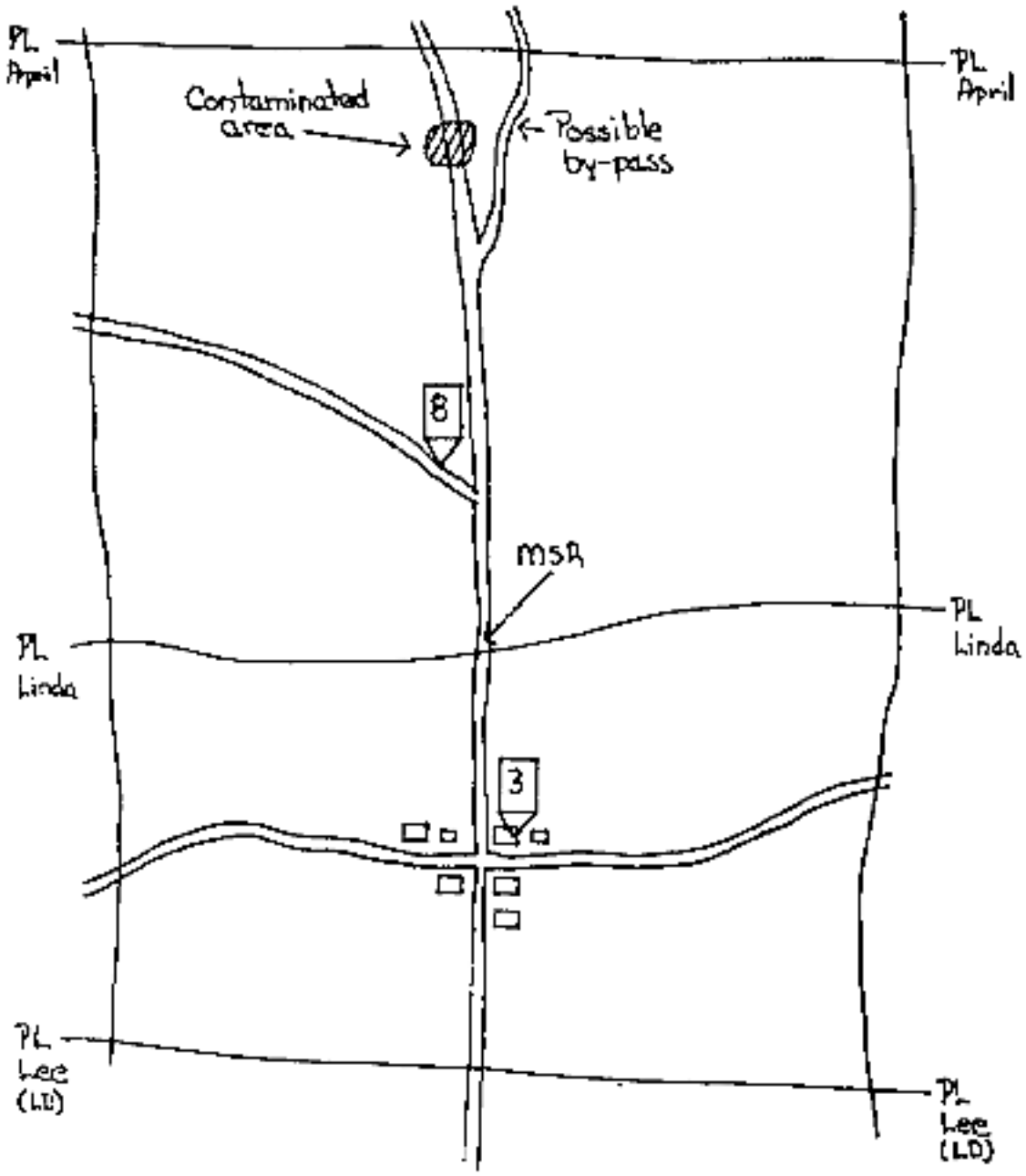


Figure 3-1. Diagram of typical NBC route reconnaissance.

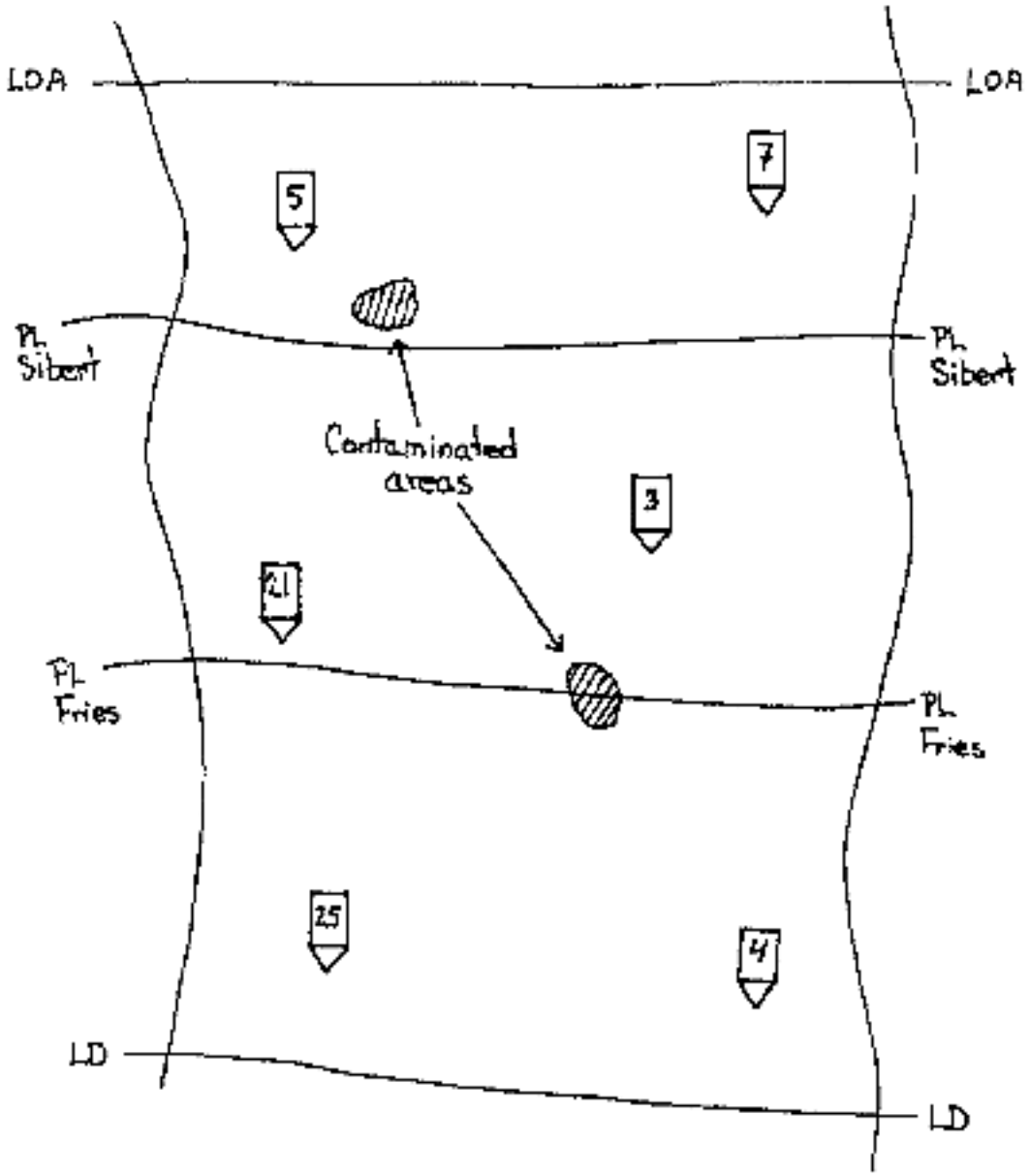


Figure 3-2. Diagram of typical NBC zone reconnaissance.

NBC Zone Recon

An NBC zone reconnaissance is a directed effort to obtain detailed information on NBC hazards within a specified zone. An NBC zone recon is appropriate when previous knowledge of the area is limited and there are indications or reports of NBC hazards. Typically, a zone NBC recon is performed to determine the suitability for large unit (brigade or higher) assembly areas or logistic bases (such as BSAs, DSAs, and CSAs). Previous reports or intelligence indicate a high probability of past NBC attacks within the zone. A zone recon is a deliberate, time-consuming process that requires a large expenditure of resources. Once contamination is detected, the recon element has the following options:

- Conduct an NBC survey to define the boundaries of the contamination.
- Terminate the mission and move to the coordinated decon point.
- Continue the mission.

Critical Tasks

Certain tasks must be accomplished during a zone recon unless specifically directed otherwise by the commander. Based on time and the commander's intent, the commander may direct the reconnaissance towards specific information only. The critical tasks are--

- Reconnoiter all terrain within the zone for contamination.
- Locate all previously reported NBC attack areas and determine if there is still a hazard.
- Locate all possible contamination within the zone.
- Check all water sources for contamination.
- Locate all commercial chemical or nuclear facilities.
- Report all information.
- Mark contaminated areas.
- Locate routes to bypass contamination.

NBC Area Recon

An NBC area reconnaissance is a directed effort to obtain detailed information concerning a specific area. An area recon is a specialized form of zone recon which proceeds faster since the effort is focused on a specific piece of terrain. This mission typically is assigned when employing a unit to reconnoiter a reported NBC attack area. Once contamination is detected, the recon element usually performs a survey to define the boundaries of the contamination.

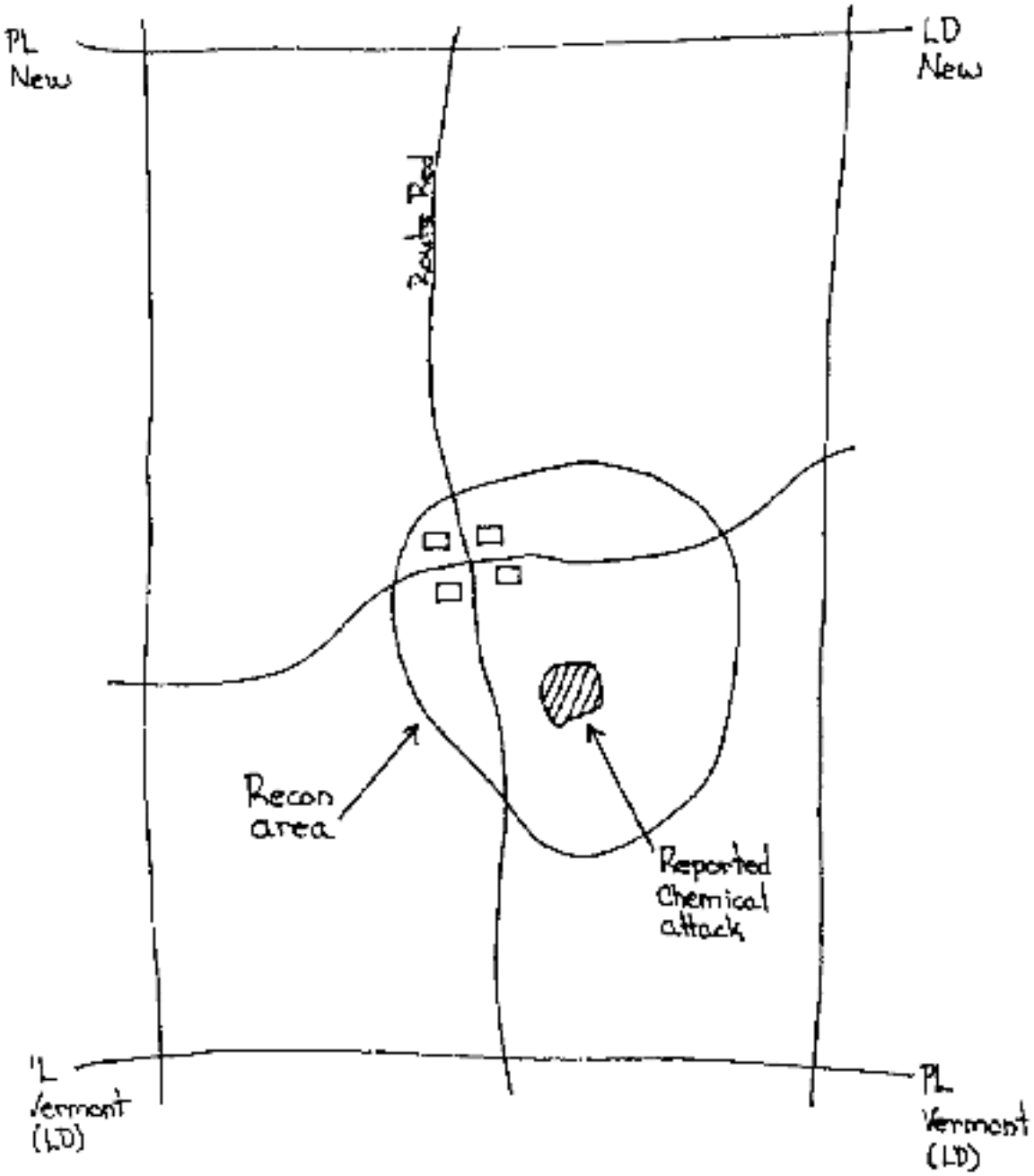


Figure 3-3. Diagram of a typical NBC area recon.

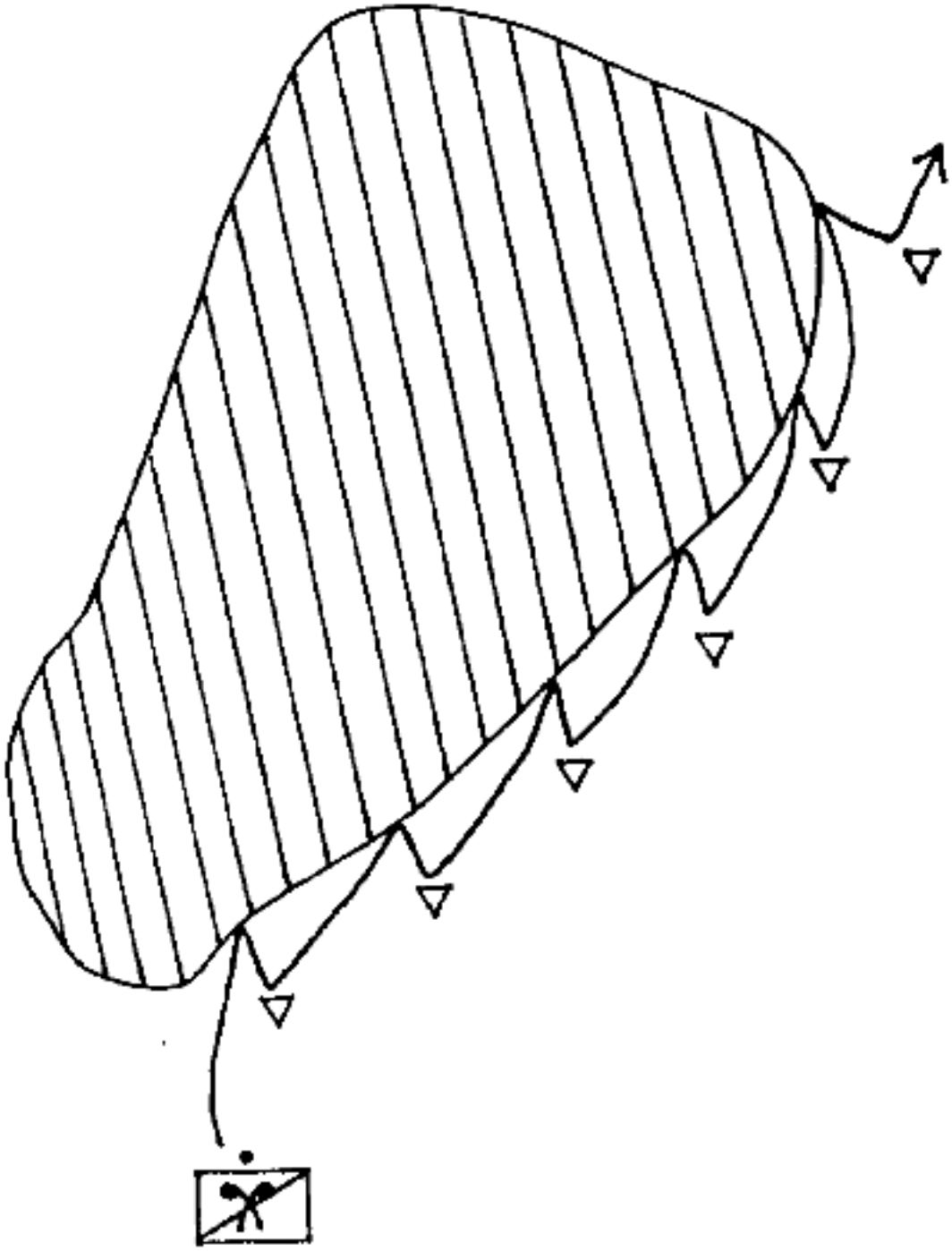


Figure 3-4. Diagram for a typical NBC survey.

Critical Tasks

During an NBC area reconnaissance, the critical tasks are--

- Reconnoiter all terrain within the area.
- Locate and mark all NBC hazards within the hazard.
- Locate bypass routes around identified contaminated areas.
- Report all information.

NBC Survey

An NBC survey is a directed effort to obtain detailed information concerning a contaminated area. The extent of the contamination is determined and marked. This is a resource intensive operation typically conducted in rear areas to prevent units from unknowingly entering the contaminated area.

Critical Tasks

During an NBC survey, the critical tasks are--

- Locate the general boundaries of the contaminated area.
- Place warning markers at specified intervals around the contaminated area and at all entry points.
- Determine the intensity of the contamination.
- Report information via NBC5 report.

NBC Surveillance

NBC surveillance is the systematic observation of surface areas to detect NBC attacks and hazards. All units perform a type of NBC surveillance-monitoring. Units monitor their areas to provide early warning by using the automatic chemical agent alarm. Units can be given the mission to perform NBC surveillance by observing specified areas for indications of a chemical attack. After observing the indications of an NBC attack, the recon element has the following options--

- Conduct an NBC survey to define the boundaries of the contamination.
- Locate and mark clear bypass routes.
- Terminate the mission and move to the coordinated decon point.
- Continue the mission.

Critical Tasks

The critical tasks are--

- Occupy observation posts to overwatch the designated area.
- Report all indications of an NBC attack.

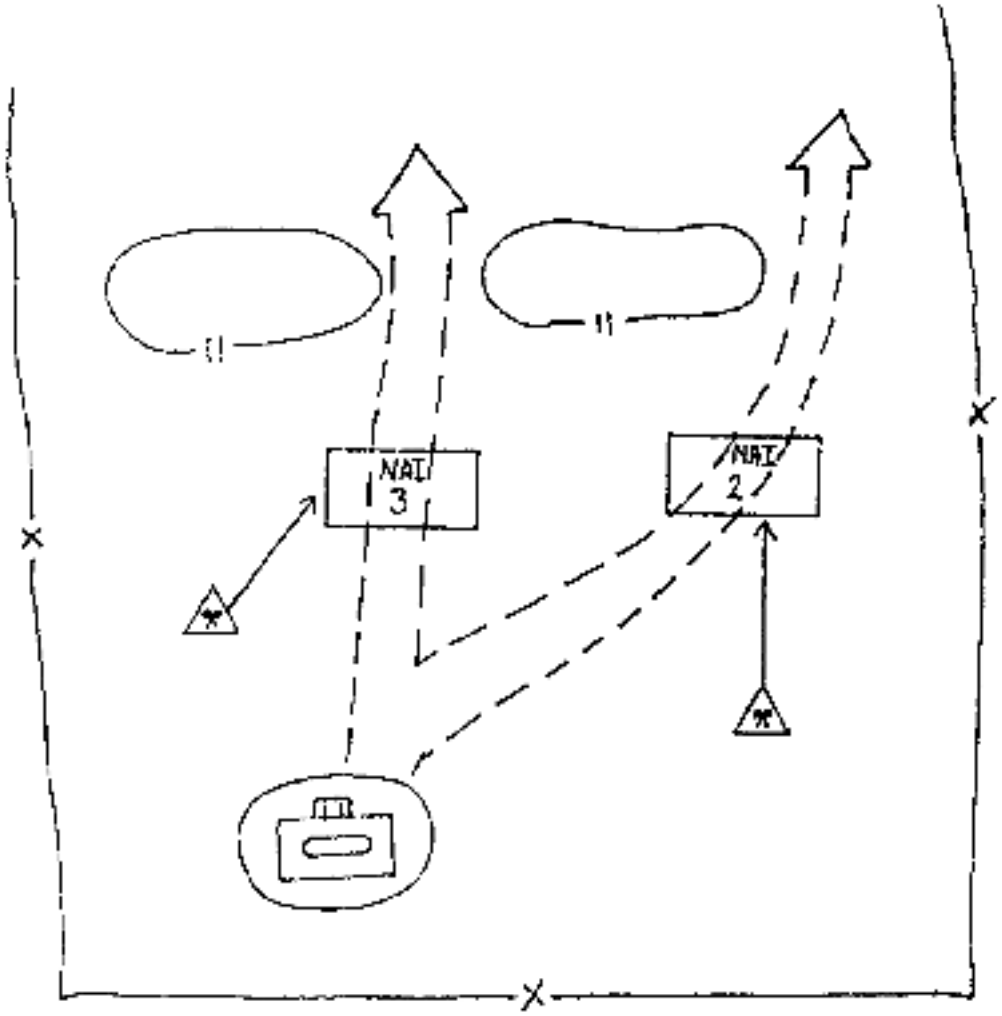


Figure 3-5. Diagram of a typical NBC surveillance.

Chapter 4

Planning

Considerations for planning and preparing for NBC reconnaissance are based on the mission as defined by the operations order prepared by the requesting unit. Missions, taskings, priorities, and command or support relationships are coordinated and established by commanders from recommendations by the chemical officer and the G3/S3.

The senior chemical officer at each level of command is a key player in the assignment, employment, and planning process for NBC recon assets. Subordinate chemical company commanders are also critical links in the overall planning process for NBC recon operations. The senior chemical staff officer is responsible for ensuring that subordinate chemical company commanders are kept informed of current and future NBC recon requirements. The planning process includes considerations for METT-T and troop leading procedures.

As a minimum, the following actions should be considered in planning and preparing for NBC reconnaissance operations--

- Use the IPB process (chemical officer, G2/S2) to identify areas of interest for NBC recon.
- Continuously coordinate with subordinate chemical unit commanders.
- Pre-position NBC recon assets to support requirements.
- Establish coremand or support relationships to ensure responsiveness and flexibility to the supported unit.
- Assess the time and distance factors for the conduct of NBC recon operations.
- Orient mission execution on providing timely notification of critical information to support tactical decisions.
- Orient NBC recon on the presence or absence of NBC contamination in areas of interest.
- Plan for resupply (logistics) activities to sustain NBC recon operations.
- Determine possible locations for after mission decontamination.
- Plan for fire support requirements.
- Plan for security to protect the NBC recon unit.
- Determine the rules of engagement to prevent fratricide.

Mission, Enemy, Troops, Terrain, and Time

The planning and preparation process must also include METT-T considerations. NBC

recon leaders at all levels use the METT-T process in response to mission request for NBC recon support. The following paragraphs reflect basic METT-T considerations for NBC recon operations.

Mission. The mission of the supported unit is considered first in planning for NBC recon. The key questions are--What type of mission is required (NBC recon, NBC survey, or a biological sampling operation)? What assets are required to perform the mission? The following situations illustrate METT-T considerations:

- Given a mission to conduct an NBC zone recon with multiple NBC recon elements available, the preferred method is to divide the zone into equal sectors and assign each NBC recon element a specific sector of responsibility. The NBC recon unit conducts this type of mission mounted.
- Given a mission to conduct an NBC survey of an area (small town) with limited recon elements available, the preferred method is to use dismounted techniques. A security force should protect the NBC recon element during this mission.
- Given a mission to conduct an NBC area recon of a bridge within a friendly area, the NBC recon team conducts the mission mounted using one squad.
- Given a mission to conduct an NBC route recon of the main supply route (MSR) with multiple points along the route, conduct the mission mounted, using the entire NBC recon platoon.

Enemy

The G2/S2 provides current information on the intelligence preparation of the battlefield (IPB). The IPB provides current information about the terrain, weather, enemy capabilities, and location of the enemy. Location of the enemy may restrict freedom of movement for the NBC recon elements, which may increase the time required to conduct NBC recon missions.

Troops

The number of recon assets available will influence the number of vehicles used for a specific recon mission. NBC recon leaders must determine the minimum requirements for a mission, because other priorities may compete for available NBC recon assets.

Terrain

Terrain may dictate which recon technique will be used (mounted or dismounted). Mounted operations are best suited for open trafficable areas. Dismounted operations are best suited for urban, jungle, or restricted terrain.

Time Available

The time available and the time required to complete a mission also dictate the extent and size of area that may be successful y reconnoitered, Available time also restricts the number of points and the number of samples taken during a recon, survey, or sampling mission. Time is also a key factor for planning movements.

The rationale used in planning for NBC recon operations is to facilitate NBC contamination avoidance, preserve combat power, and to orient on the enemy's NBC threat. The enemy's NBC threat includes those areas where the enemy will most likely employ NBC weapons against US forces. When planning for NBC recon operations, we need to answer the following questions:

- What do we want NBC reconnaissance to do? NBC recon must support NBC contamination avoidance. It also must provide freedom of movement for friendly forces, and it must preserve combat power by providing early warning, locating contamination, and identifying clear bypass routes around contaminated areas. NBC recon also must assist the commander in seeing the fill spectrum of the battlefield. NBC recon elements are never held in reserve. Each NBC recon element is positioned to be responsive to the supported unit.
- Where do we perform NBC reconnaissance? NBC recon is conducted within corps, division, and brigade areas. This includes NBC recon of main supply routes (MSRs) and NBC recon support for rear area operations. The primary goal of NBC recon is to provide freedom of maneuver by determining the presence or absence of NBC contamination within a supported unit's area of operation.
- When do we perform NBC reconnaissance? US Forces conduct NBC recon anytime the enemy employs NBC weapons within our area of operations, to includes suspected NBC attacks by the enemy. Information on the presence or absence of contamination is important to the commander for determining unit movement times and for making other tactical decisions.
- Why do we perform NBC reconnaissance? NBC recon is conducted to provide the commander and his staff with information on contaminated areas, to include the location and the type of agent. The commander uses NBC recon data to facilitate contamination avoidance for his troops. It also can reduce the attrition of combat power caused by NBC contamination.

Mission requirements are also considered during the planning process. The most critical component for ensuring mission success includes receipt and analysis of the mission, planning, and coordination.

The NBC recon element receives an order to support a specific unit. The information contained in the operation order includes the command relationship, logistics/ maintenance support, location of supported element, reporting chain, start/completion time (if critical), general guidance (such as decontamination instructions/support, operational exposure guidance, and sampling instructions), and coordinating instructions (such as radio nets, monitoring/reporting requirements, and security requirements).

Control Measures

The NBC recon platoon adheres to established control measures while supporting the mission and operations of the supported unit. The NBC recon unit uses the terrain to maximize its capability for mission accomplishment and to minimize vulnerability. Some examples of control measures are--

- Assembly areas.
- Boundaries.
- Checkpoints.
- Contact points.

- Rendezvous points.
- Objectives.
- Named areas of interest (NAI).
- Start points (SP).
- Release points (RP).
- Control points.
- Phase lines (PL).
- Line of departure (LD).
- Limit of advance (LOA).

Intelligence Preparation of the Battlefield (IPB)

The IPB process is the staff tool that helps identify and answer the commander's priority intelligence requirements (PIR). The IPB allows the commander to visualize the battlefield--where friendly and enemy forces will move, shoot, and communicate; where critical areas are located; and where and when enemy forces are the most vulnerable.

FM 3-101 provides a detailed explanation of the role of the chemical staff in the IPB process; and FM 34-140 provides a detailed explanation of the overall IPB process, For focusing the NBC recon effort, the IPB must--

- Identify the enemy's capability to employ weapons of mass destruction based on the type of units and weapons the enemy has available in the area of operations (AO) or area of influence (AI) during a selected time.
- Identify how the enemy would employ weapons of mass destruction to support his battle plan.
- Identify areas of likely employment based on threat employment doctrine.
- Provide a detailed analysis of terrain and weather in the unit's AO during each period of interest and how they could impact on NBC warfare.
- Template potential chemical targets or areas of contamination.
- Designate templated areas that affect the scheme of maneuver as NAIs.
- Identify previously reported NBC hazard areas.

The G2/S2, with assistance from the chemical staff, develops a collection plan to coordinate information gathering. They jointly develop possible indicators of the contaminated area at designated NAIs.

The G2/S2 coordinate with the G3/S3 to develop a recon and surveillance plan (R&S plan) based upon NAI identified through event templating. Each NAI is assigned to a unit for observation and information collection. The staff chemical officer advises the G3/S3 on which NBC-related NAI can be covered by NBC teams organic to the maneuver or support units in the area, and which NAI should be assigned to available NBC recon assets. The NBC-related NAI and the units responsible for them are incorporated into the R&S plan.

Recon assets are used to confirm or deny the presence of contamination at the designated NAIs. If NBC recon assets are not available, the unit can employ its organic scout platoons from the cavalry, armor, or mechanized infantry battalions. The scout platoons are also trained to determine if NBC contamination exists and its extent. They are also trained in locating a bypass around contaminated areas as part of their zone, area, and route recon operations.

The IPB process is labor intensive. During peacetime, the intelligence and chemical staffs must build an intensive data base for each potential area in which a unit will operate.

Chapter 5

NBC Recon in the Combat Area

During combat operations, NBC recon units operate throughout the framework of the battlefield. In the forward combat area, NBC recon elements are integrated into the overall recon and surveillance effort. NBC recon units generally are employed to either confirm or deny contaminated areas, or to confirm areas are clear of contamination.

Whatever the method used to employ NBC recon units, their efforts must be focused by the IPB and the supported commander's priority intelligence requirements (PIR) and intelligence requirements (IR).

The capabilities and limitations of the NBC recon systems found in the various units must be considered when developing the plan. M93 NBCRS NBC recon units are best employed by squads, but can operate in sections or teams. M113/HMMWV-equipped units are best employed by sections, but can operate in squads or teams. Both M93-NBCRS-and M113-equipped units can be used to support maneuver forces. Because HMMWV-equipped units are less survivable, they are best employed with light and motorized maneuver forces or in rear areas. The M93 NBCRS can rapidly detect and identify chemical contamination. M113/HMMWV-equipped units detect and identify chemical agents at a slower rate.

Confirm or deny contaminated areas. When the IPB identifies possible contaminated areas in the area of operations, NBC recon can confirm or deny the presence of contamination. Templated areas of possible contamination that could affect the scheme of maneuver are designated as named areas of interest (NAIs). These NAIs are included in the recon and surveillance (R&S) plan. Supporting NBC recon elements are tasked in the R&S plan to observe selected NAIs. The NBC recon element can observe the designated NAIs through physical recon or by observation. If the NBC recon element conducts a physical recon of the NAI, the supporting unit may have to provide security. Detailed coordination with other recon assets is required to prevent duplication of effort and fratricide.

Confirm the area is clear of contamination. NBC recon elements are integrated into the combat formation. They move behind or with the lead maneuver force. If the formation encounters contamination, the NBC recon elements can deploy to find clear routes around it. The lead maneuver force provides security as the NBC recon elements attempt to find a bypass route. Once the bypass route is located, the NBC recon elements are integrated back into the formation in case there are additional contaminated areas.

Offensive Operations

The offense is the commander's primary means for gaining the initiative against an enemy force. Offensive operations are characterized by momentum and the initiative of subordinate commanders. Commanders must be flexible in making rapid shifts in the main effort to take advantage of opportunities, and to make rapid penetrations in the enemy's defense. Certain types of operations and certain conditions of climate or terrain will dictate modification of tactical techniques.

The primary purpose for offensive operations is to destroy the enemy and his ability and will to resist. This can be accomplished by defeating the integrity of his defensive systems and by driving deep into his rear areas to destroy artillery, command and control systems, command posts, reserves, and logistics support. Offensive operations also may be conducted to secure key or decisive terrain, deceive or misdirect enemy forces, deprive the enemy of resources, fix or isolate units, gain information, or spoil an enemy's offensive preparation. To be successful, our forces must be able to maintain agility and get to the right place at the right time. Threat forces may use weapons of mass destruction to slow down or impede attacking friendly forces. Use of weapons of mass destruction can disrupt the tempo and momentum of the attack, allowing the enemy to regain the initiative.

The NBC recon platoon organic to the armored and light cavalry regiments supplements the organic recon capabilities of subordinate cavalry squadrons. The NBC recon platoon may be employed at the regimental level or by the cavalry squadrons. NBC recon elements relieve troop scouts of the requirement to identify and mark contaminated areas, which facilitates the advance of the main body.

Divisional NBC recon platoons are employed with NBC recon assets from corps to maintain freedom of maneuver for the division's combat forces on axes of advance, main supply routes (MSRS), and critical areas identified by the commander. The platoon should be oriented on the greatest threat of persistent chemical contamination as identified by the IPB. During offensive operations, the platoon can support the division's main effort with three squads.

The corps NBC recon company employs its three platoons in the corps sector and division rear areas, checking mobility corridors for follow-on forces, MSRS, and critical facilities that support regeneration and sustainment of combat power. NBC recon platoons also can be dedicated to supplement NBC recon requirements of the division with the main attack, exploitation forces, or critical areas established by the corps commander. This will contribute to maintaining the momentum at the critical time and place to take advantage of favorable situations. The NBC recon platoon's organization for combat is based on METT-T, depending on the commander's concept of the operation and priorities.

Commanders should employ NBC recon units to reconnoiter known or likely areas of NBC contamination identified by the IPB. Employ NBC recon assets in areas of interest and/or on critical axes of advance for supported units when NBC contamination hazards would prevent our forces from accomplishing their mission. NBC recon elements also can be integrated into the combat formations to provide a rapid response to nuclear and chemical contamination hazards.

Movement to Contact

Movement to contact is an operation to gain or re-establish enemy contact. Neither side may clearly have the initiative. Flexibility is key and contamination avoidance is critical to maintaining flexibility. Once units enter contaminated areas, the commander's freedom of action is degraded. NBC recon units will allow the commander to retain freedom of maneuver. Corps and divisions normally organize into a covering force, advance guard, and a main body for movement to contacts.

The covering force operates at extended distances from the main body and must be self-contained. The advanced guard is the security force provided by the main body which operates forward to protect from surprise attack. Additionally, the advance guard protects the main body when it is committed to action. The main body is the force task organized and prepared for immediate action upon enemy contact. Combat and combat support units are task organized as necessary to maintain momentum. The IPB will identify the areas of greatest threat from NBC contamination. The commander will task organize his or her supporting NBC recon units to meet the identified threat. If the commander has no supporting NBC recon units, he or she will assign the task of NBC recon to cavalry and scout units. These units will perform this task in addition to their primary missions.

Planning Considerations

The following planning considerations must be observed:

- Focus of NBC recon operations is to provide the commander flexibility.
- Task organize supporting NBC recon units based on the IPB and METT-T.
- Identify known or suspected areas of contamination.
- Priority of NBC recon support to lead maneuver forces.
- The advance guard force should be NBC recon heavy.
- Coordinate for (after mission) decontamination.

Employment Concepts

In Figure 5-1, an armored cavalry regiment (ACR) is performing a movement to contact. Because the IPB has identified the possibility of contamination in the zone, each squadron is supported by an NBC recon squad. The squadron attaches the NBC recon squad to the troop that will most likely come in contact with a contaminated area. The squadron and regiment's IPB indicates where the enemy would use or have used persistent chemical agents. Even though the squad is attached to a cavalry troop, the squadron commander task organizes as necessary. The NBC recon squad will react to any contamination located by ground and air scout recon patrols.

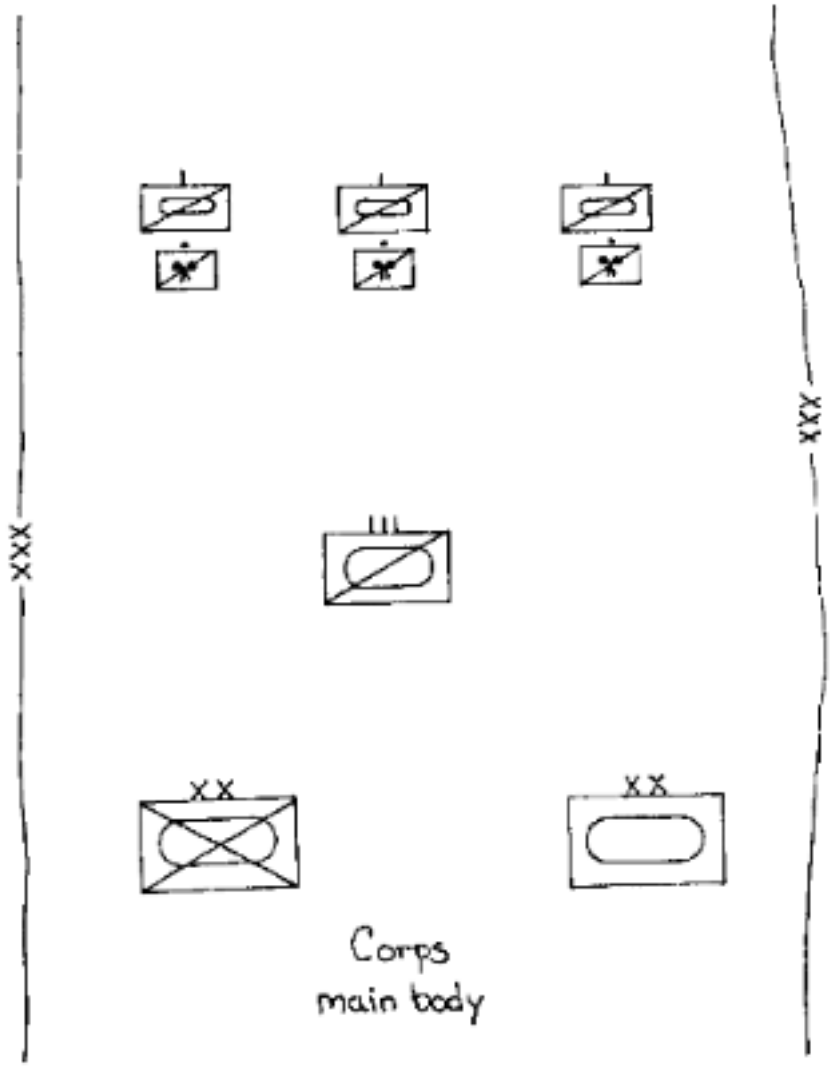


Figure 5-1. Diagram of a corps movement to contact with an ACR covering force.

Figure 5-2 shows an example of a division movement to contact with a brigade advance guard, followed by two brigades. The lead brigade receives the entire divisional NBC recon platoon. By weighing the advance guard with NBC recon assets, the division facilitates flexibility. When the advance guard encounters contamination, bypass routes can be quickly identified, and the division's main body can proceed forward at its planned speed. The platoon leader chooses to employ his or her platoon in a section organization. When the lead combat force encounters contamination, the section can quickly locate a by-pass route to facilitate the forward movement of the advance guard. One team will remain behind to survey the contaminated area to facilitate follow-on forces.

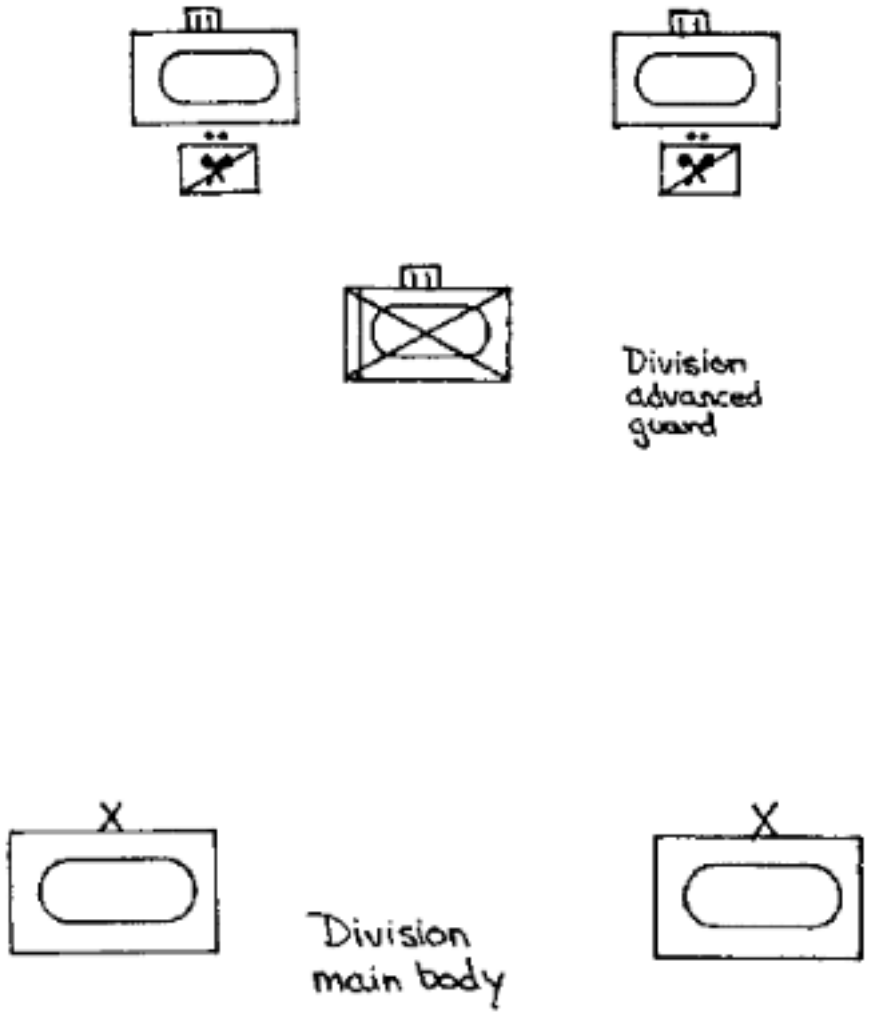


Figure 5-2. Example of a division movement to contact with a brigade advanced guard.

Hasty and Deliberate Attack

Attacks may be launched from a movement to contact, from a defensive posture, from behind a friendly defending force, or during exploitation or pursuit. There are two basic types--deliberate and hasty. The two are distinguished by the extent of preparation. NBC recon is employed to enhance maneuver and agility of the attacking force. NBC recon units allow the force to avoid contaminated areas.

Hasty attacks are not planned in detail. This type of attack is usually initiated by a fragmentary order. Forces deploy, rapidly maneuver, and attack quickly and violently to gain the initiative. NBC recon support must be responsive and flexible.

Planning Considerations

- Use NBC recon operations to provide the commander flexibility and facilitate synchronization.
- Identify known or suspected areas of contamination.
- Focus NBC recon assets to retain freedom of maneuver.
- Give priority of NBC recon support to lead maneuver forces.

- Identify possible contaminated areas and possible bypass routes.

Employment Concepts

Figure 5-3 depicts a division conducting a deliberate attack. Elements of the division's NBC recon platoon normally are employed behind the lead task force along the main axis of advance. This provides security for the NBC recon platoon and places it well forward to react to any contamination encountered by the lead task force. If contamination is encountered, the lead task force goes to MOPP4 status and continues to attack; the NBC recon platoon finds bypasses around the contamination for the follow-on forces.

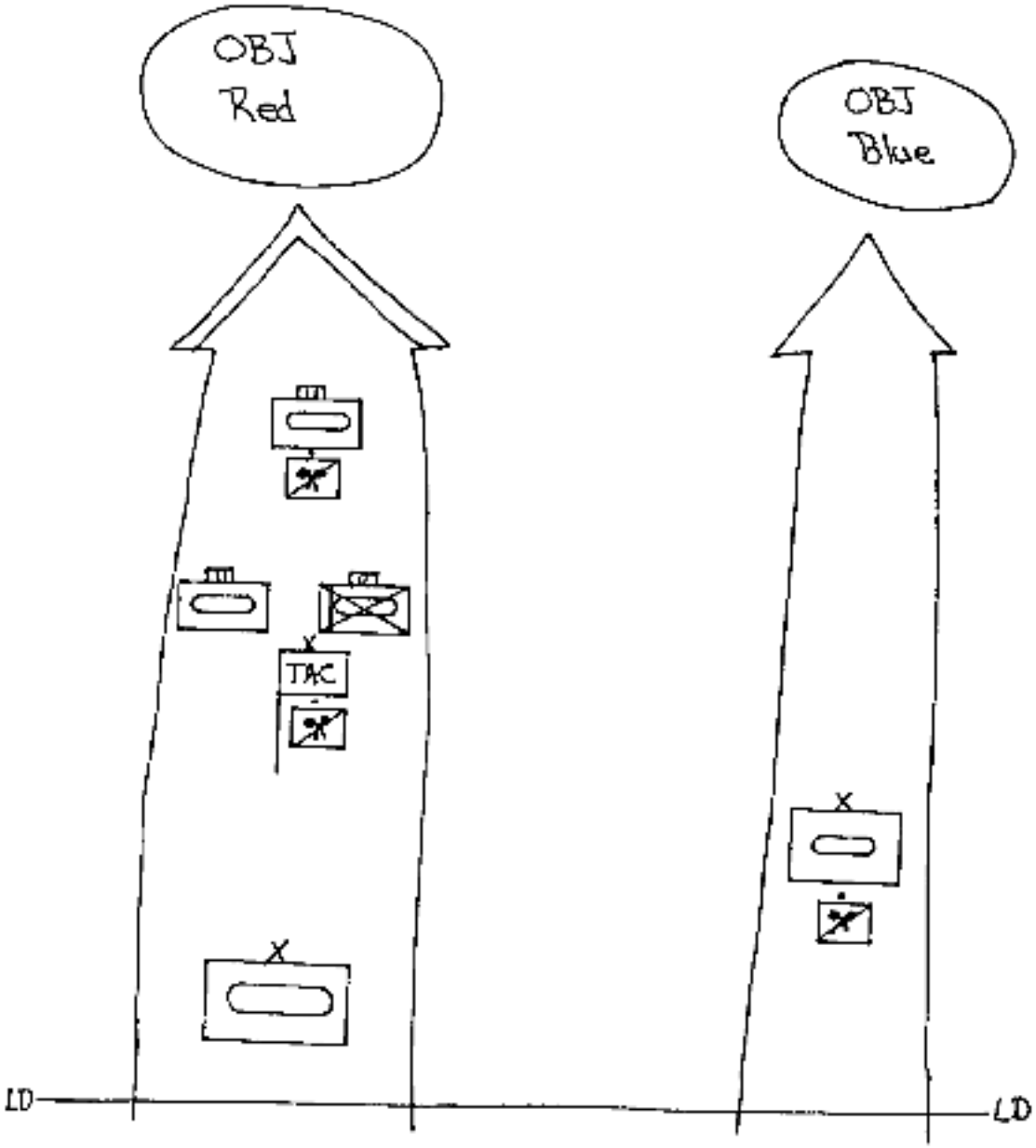


Figure 5-3. Deliberate attack with division as corps main attack.

A platoon from the corps NBC recon company reinforces the division conducting the corps main attack by providing NBC recon support on routes of reinforcement and on MSRs. The corps NBC recon company employs its remaining platoons in the same

manner but in support of the corps. The NBC recon platoon in the ACR responds to reports of contamination in its area of operation and in critical areas determined by the commander. The ACR should accompany the main attack force probably behind the lead division to act as an exploition force.

Figure 5-4 is an example of a battalion task force (TF) supported by an NBC recon squad. The NBC recon squad is attached to the TF's scout platoon. The S2 and chemical officer have templated a possible persistent chemical attack that could influence maneuver along the TF's planned axis of advance. The NBC recon squad has the mission of performing a route recon along the TF's planned axis to the designated NAI. The NBC recon squad will confirm or deny the presence of contamination at the NAI. The main body of the scout platoon will cross the line of departure three hours before the NBC recon squad. A tank platoon will be on standby to assist the NBC recon squad if the squad contacts enemy forces and cannot break contact. The scouts moving ahead of the NBC recon squad provide a minimum of security to the NBC recon squad.

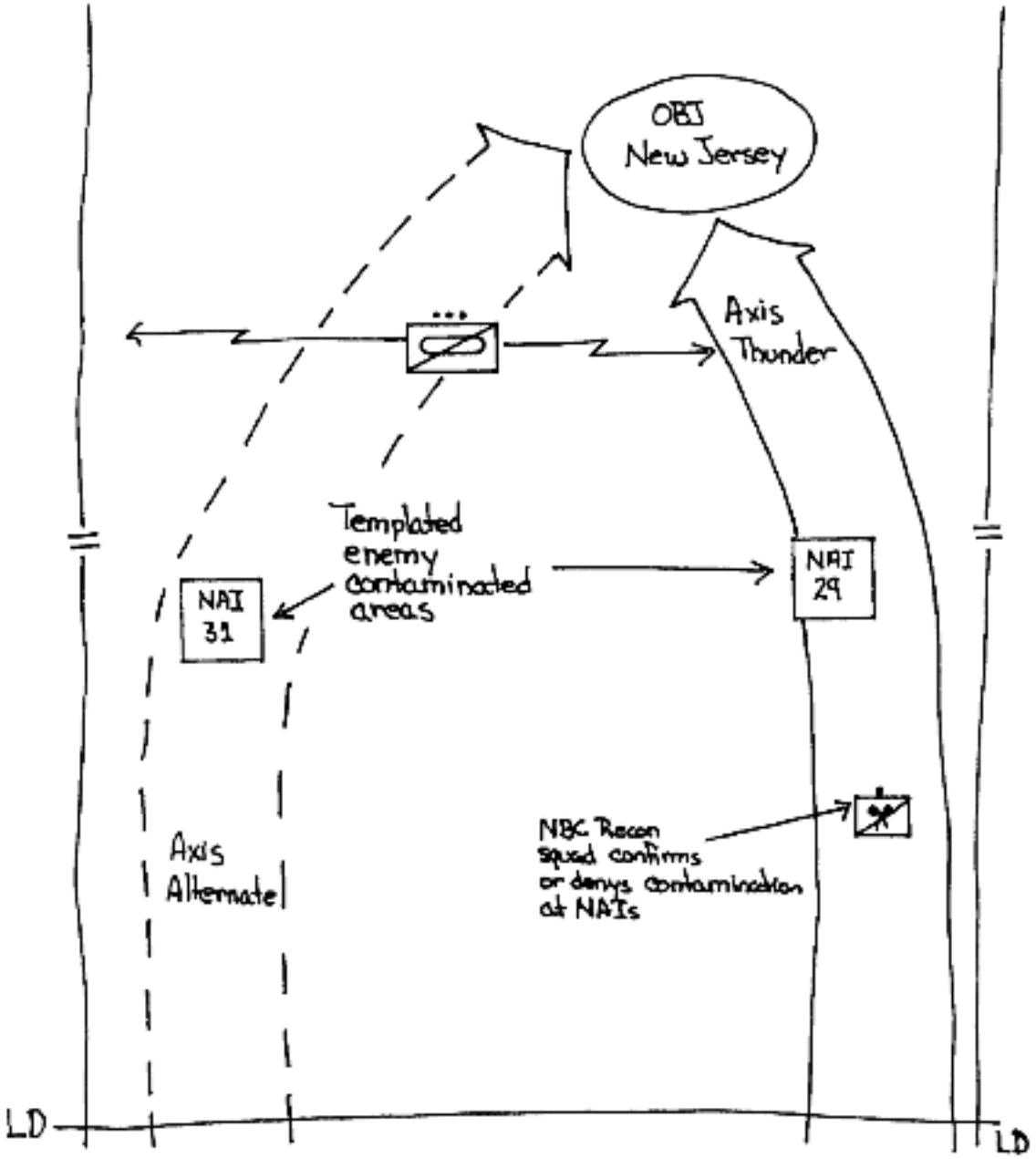


Figure 5-4. Battalion/task force supported by an NBC reconnaissance squad.

Figure 5-4. Battalion/task force supported by an NBC reconnaissance squad.

The division NBC recon elements play a vital role in maintaining freedom of maneuver for the enveloping force. The corps NBC recon elements may support units that are fixing the enemy or are in reserve. NBC recon elements should be positioned with the division cavalry or task force forward element behind the scouts when possible, and integrated into the overall recon effort. The integration of the recon assets will enhance local security and the capabilities of each recon unit. The NBC recon element is a critical specialized element and must be positioned and provided security by the supported unit when enemy contact is expected.

Exploitation and Pursuit Operations

Exploitation and pursuit operations begin immediately from the attack. Exploitation is the bold continuation of an attack following initial success. Pursuit is the relentless destruction of fleeing enemy forces that no longer have the capability to resist. Fleeing enemy forces may use chemical weapons more freely than an enemy executing a well-prepared defense. This will necessitate the employment of NBC recon units.

Planning Considerations

- Focus NBC recon operations to provide the commander flexibility and speed.
- Ensure NBC recon support is agile and flexible.
- Mark and report all identified areas of contamination and control access into these areas.

Be prepared to encounter enemy stockpiles of NBC weapons.

- Be prepared to encounter the effects of destroying enemy NBC weapons stockpiles, facilities, and commercial chemical /nuclear facilities.
- Focus NBC recon assets to retain freedom of maneuver.
- Give priority of NBC recon support to lead maneuver forces.

Employment Concepts

Pursuit normally follows a successful exploitation. The primary function of pursuit is to complete the destruction of the enemy force. As a successful exploitation develops and the enemy begins to lose the ability to influence the situation, the division or brigade may be ordered to execute the pursuit. During the pursuit, the attacking force may orient its advance toward a physical objective; however, the mission is the destruction of the enemy's main force. Threat forces can feel pressured into using NBC weapons to prevent an attacking force from destroying them. They may use NBC weapons to slow or impede the pursuit force so they can reorganize, reconstitute, and regain the initiative. For this reason, NBC recon assets should be placed just behind the lead task forces to react to any contamination the pursuit force may encounter.

River Crossing Operations

River crossings are conducted as part of division or corps schemes of maneuver. There are two types of river crossings: deliberate and hasty. The size of the river, as well as

the enemy and friendly situation, dictate the crossing technique. Deliberate river crossings require detailed planning and coordination, a buildup of firepower, and centralized command and control. Hasty river crossings use expedient means and are conducted with minimal planning.

River crossing operations present lucrative targets for enemy NBC weapons. NBC recon units are employed in a contamination avoidance role on the far side to allow the momentum of the operation to continue. Also, NBC recon units are prepared to respond to NBC attacks in the crossing areas. NBC recon elements need to be positioned to support the crossing sites and the routes to the crossing sites. The elements need to move with the lead maneuver force across the river to find clear routes around contaminated areas on the far side.

Planning Considerations

- Focus of NBC recon operations is to provide the commander flexibility and speed.
- The probability of enemy NBC attacks is high.
- Focus NBC recon assets to retain freedom of maneuver in the crossing area.
- Be prepared to shift NBC recon assets to the far side with the initial assault force.

Employment Concepts

A brigade is conducting a deliberate river crossing as in Figure 5-5. The brigade is being supported by an NBC recon squad. The IPB has identified the best time for the enemy to employ chemical weapons is once bridges are across the river. This will slow the tempo of the crossing effort and allow enemy forces to reposition and possibly counterattack. The NBC recon squad has the primary mission of providing surveillance on the bridging sites and the secondary mission of providing periodic route recon along the routes to the crossing sites, If chemical weapons are used on a crossing site, the squad will rapidly identify the agent and the extent of contamination. This information will allow the brigade commander to make a decision to continue to use the crossing site, shift all forces to the other crossing site, or to initiate another crossing operation.

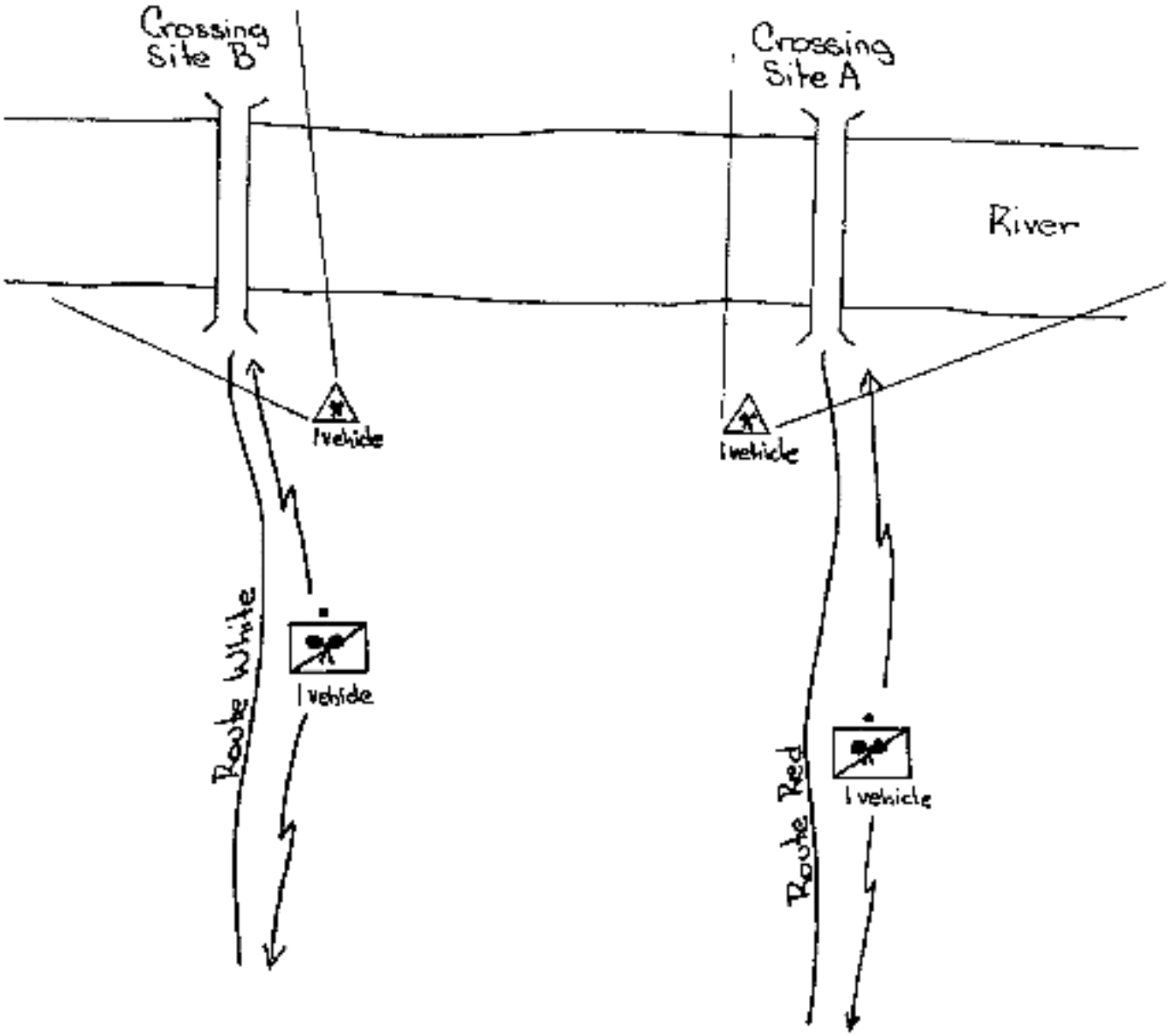


Figure 5-5. NBC recon supporting a river crossing operation.

Passage of Lines

A passage of lines is an operation in which one force moves through another force either to come into (forward) or to move out of (rearward) contact with the enemy.

A forward passage of lines is an operation in which a unit passes through another that is in contact with the enemy to continue the attack. On receipt of the warning order directing the passage of line, the incoming unit establishes liaison with the unit in contact to begin detailed planning of the operation. The incoming unit normally collocates its TAC or main CP with the TAC or main CP of the unit in contact. The vulnerability to enemy NBC attacks increases during the passage operation because of the large number of forces in the passage area. NBC recon elements need to be positioned by the unit in contact at the passage points to provide immediate assistance if the passage lanes become contaminated.

A rearward passage of lines is an operation in which a unit affecting a retrograde

movement (withdrawal) passes through the sector of a unit occupying a rearward defensive position. The planning and coordination of a rearward passage is identical with that of the forward passage. The withdrawing unit must have priority on an adequate number of roads and facilities to allow its rapid movement through the defended area, The vulnerability to enemy NBC attacks increases during the passage operation because of the large number of forces in the passage area. NBC recon elements need to be positioned by the defending unit at the passage points to provide immediate assistance if the passage lanes become contaminated.

Planning Considerations

- Focus of NBC recon operations is to provide the commander flexibility and synchronization.
- Position NBC recon assets to react to NBC attacks during the passage operation.
- Determine alternate routes in case the primary passage lanes become contaminated.
- The possibility of enemy NBC attacks increases during the passage of lines.

Defensive Operations

The main purpose of a defensive operation is to cause an attack to fail by destroying enemy forces. The defense is a temporary state that creates conditions that permit the unit to survive the initial shock of the attack, to halt the enemy, and then exploit the initiative and go on the offensive. Divisions perform multiple operations in support of a corps-level defense. NBC recon doctrine and operations apply to the operational tenets and are integrated into unit operations.

NBC recon units serve as a valuable asset for the commander in support of operations. When weapons of mass destruction are used on the battlefield, NBC recon provides critical information to the commander for making rapid and sound tactical decisions. The commander also uses this information to maintain freedom of maneuver for his forces. Applied to individual soldiers and leaders, it requires a willingness and ability to act independently within the framework of the higher commander's intent. Leaders are adept at determining their NBC defense needs and taking critical actions in a timely manner.

Operations under NBC conditions cause individual and unit degradation, requiring leaders to set appropriate protection levels. Effective use of NBC recon and NBC defense measures enable the task force to steal the initiative from the enemy or keep the enemy off balance.

Covering force units protect main battle area (MBA) units from surprise. They also allow MBA forces time to deploy and move to meet enemy attacks, prevent the delivery of enemy medium-range artillery fire against MBA units, and deceive the enemy as to the location of the main defensive positions. NBC recon units supporting either the ACR or other covering forces focus their effort toward rearward passage routes.

The overall battle matures in the main battle area. The main battle area usually represents the critical area for friendly ground forces to defeat the assaulting enemy forces. The enemy will attempt to use primarily persistent contamination in terrain denial for various intentions.

NBC recon units should dedicate their assets to ensuring freedom of movement along battalion and brigade routes of reinforcement, to forward and rearward mobility corridors, and other critical areas identified by the commander. The division NBC recon platoon should be employed in support of the counterattacking forces. However, during delay missions, the recon platoon may be used for checking rearward routes between battle positions and critical choke points where the enemy may employ persistent chemical contamination.

Figure 5-6 depicts the positioning of NBC recon elements in support of defensive operations. The NBC recon platoon is kept under division control. The division may place the NBC recon squad under operational control (OPCON) of the brigade as required to conduct the following type missions:

- Route recon.
- Confirm or deny NBC hazards in identified NAIs.
- Perform recon as part of a quartering party.
- Support the counterattack conducted by the division reserve force.

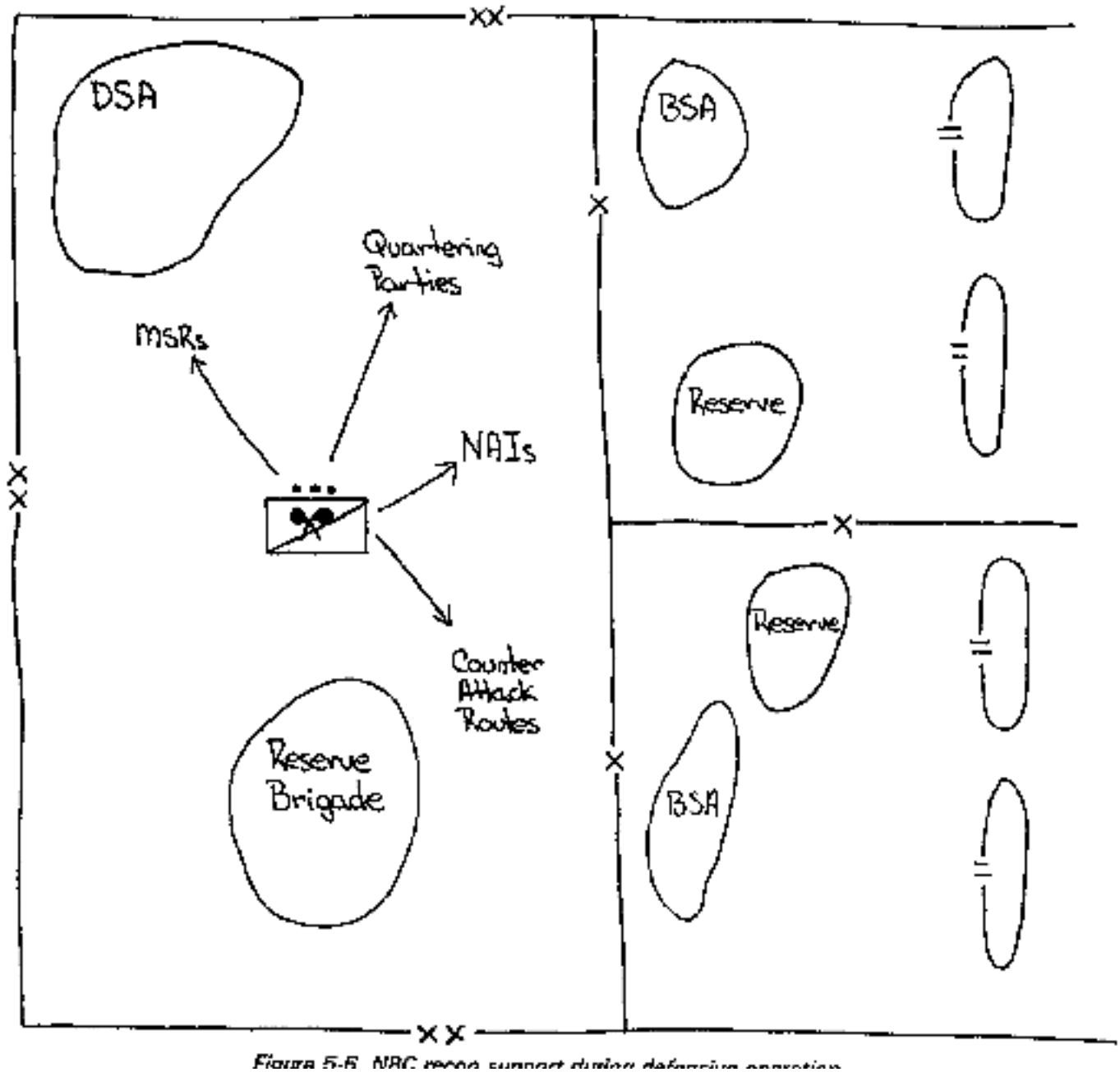


Figure 5-6. NBC recon support during defensive operation

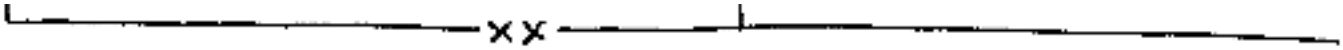


Figure 5-6. NBC recon support during defensive operation.

The corps NBC recon company should employ its platoons to identify critical contaminated areas that may affect operations, lateral routes of reinforcement, corps counterattack routes, and high speed routes of resupply. The ACR's NBC recon platoon is employed along mobility corridors, lateral routes of reinforcement and contaminated areas identified in the ACR's area of operation.

Reserve Operations

The reserve force is designed to provide the commander with flexibility for influencing the actions of his committed forces. The reserve force also reinforces the defense of committed forces, contains enemy forces that have penetrated the forward edge of the battle area (FEBA), reacts to rear area threats, relieves depleted units, and provides for continuous operations.

Division and corps NBC recon elements normally are employed in support of that unit's counterattacking force to ensure freedom of maneuver. In addition to the designated reserve forces, division and brigade commanders prepare to reorganize or redesignate a reserve once the initial reserve force is committed. Prior to committing the reserve force, the NBC recon elements, along with engineers, are assigned mobility tasks in support of the reserve commander's multiple routes of movement. It is essential that control of NBC reconnaissance elements, organized to support the reserve, passes to them in sufficient time to link up, resupply, reorganize, and rehearse to support the reserve mission.

Withdrawal Operations

NBC recon assets from corps are employed to conduct NBC recon of withdrawal routes, flank security, and passage points to check reports of possible contamination. Route recon is essential to ensure that bypasses are found around contamination to avoid congestion, and ensure the disengaging force can distance itself from the enemy as quickly as possible. NBC recon units must be highly responsive to enemy attempts to slow or redirect the withdrawal through the use of NBC weapons.

Chapter 6

NBC Recon in the Rear Area

Corps-level NBC recon units are mainly employed in rear areas along high-speed priority routes of resupply and at critical points to check reports of contamination. NBC recon units play a significant role in keeping main supply routes (MSRs) open by locating, marking, and finding bypasses around contaminated areas to ensure continuous support of combat operations.

Because of the vast areas normally involved in rear operations, the employment of NBC recon units here differs from that in combat area operations. M93 NBCRS-equipped units are normally employed in the squad organization, because of their high detection and identification rates. M113/HMMWV-equipped units are normally employed by squad organization. Lower detection and identification rates require more vehicles to accomplish the same task. Crew fatigue in the M113/HMMWV-equipped units must be considered, since lack of a collective protection system forces them to operate in MOPP4 during recon missions.

In the rear areas, NBC recon units are employed to allow the supported commander to retain freedom of maneuver. NBC recon efforts are again focused by the IPB and the R&S plan. NBC recon elements can be positioned throughout the rear to conduct NBC surveillance missions. MSRs and other vital routes in the rear area can be monitored for contamination by conducting periodic patrols along the routes.

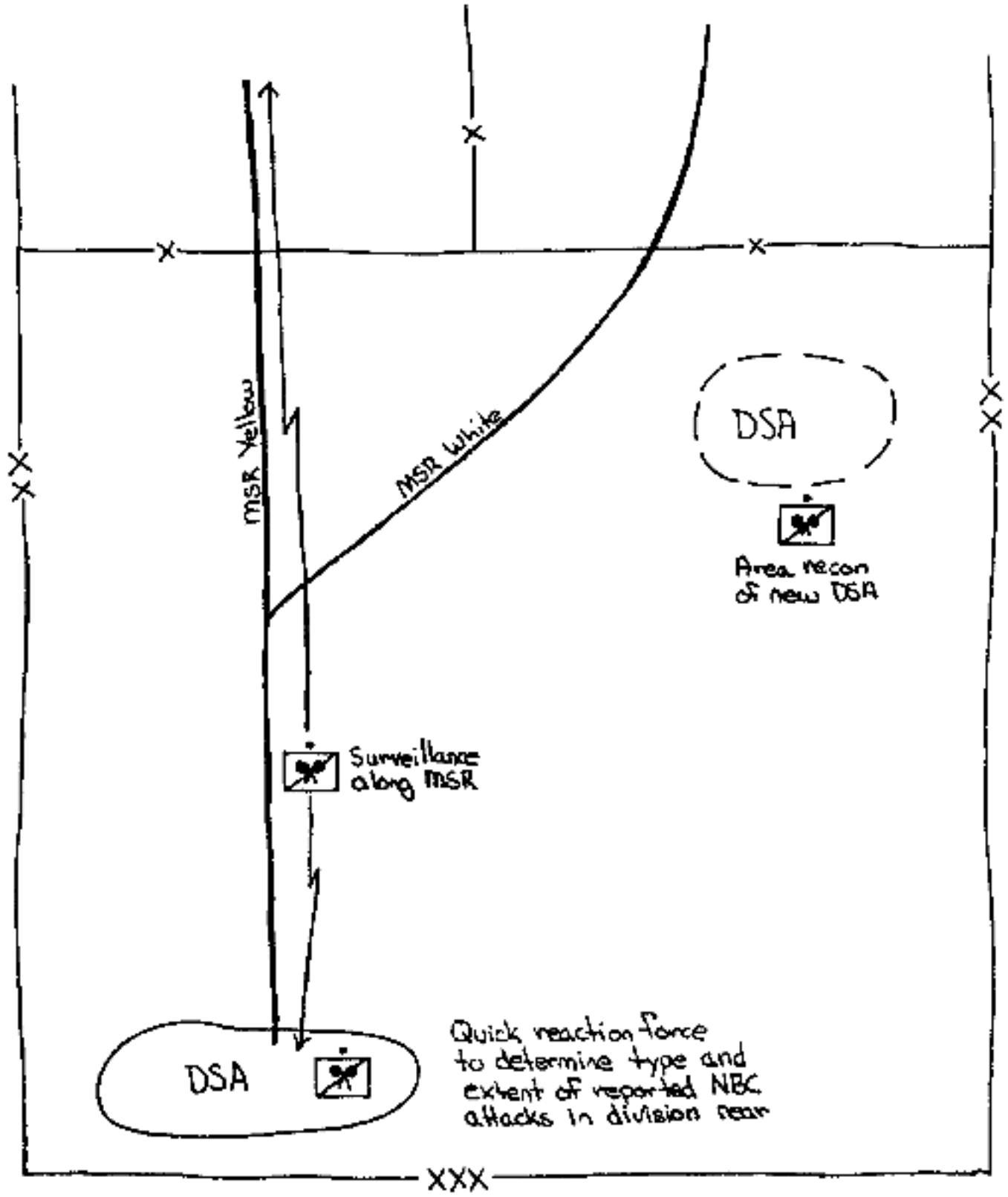


Figure 6-1. Example of NBC recon units supporting rear area operations.

In the corps and TA rear areas, NBC recon units conduct NBC recon operations along MSRs and at critical points. They also respond to reports of NBC attacks to determine the type and extent of contamination. NBC recon units also may be assigned NBC surveillance missions to observe designated areas for NBC attacks. Areas to be occupied by logistic and C^2 facilities can be checked for NBC hazards prior to their occupation.

NBC recon units can perform conventional recon missions when NBC warfare has not been initiated. When NBC warfare has been initiated, the employment of NBC recon units in conventional recon roles must be approved by supported commanders. M93 NBCRS-equipped elements also can be used to identify unknown chemical compounds found throughout the battlefield.

NBC recon units also support area damage control operations. Rear area operations centers (RAOCs) develop and coordinate missions for NBC recon units in the communications zone (COMMZ). The NBCC associated with the RAOC commits NBC recon assets based on priorities that the Theater Army Command (TAACOM) and Area Support Groups (ASGs) establish. After the enemy has attacked the COMMZ with a weapon of mass destruction, NBC recon units provide support to the affected bases and base clusters. NBC recon units providing support in the COMMZ must expect to operate with other services and the host nation.

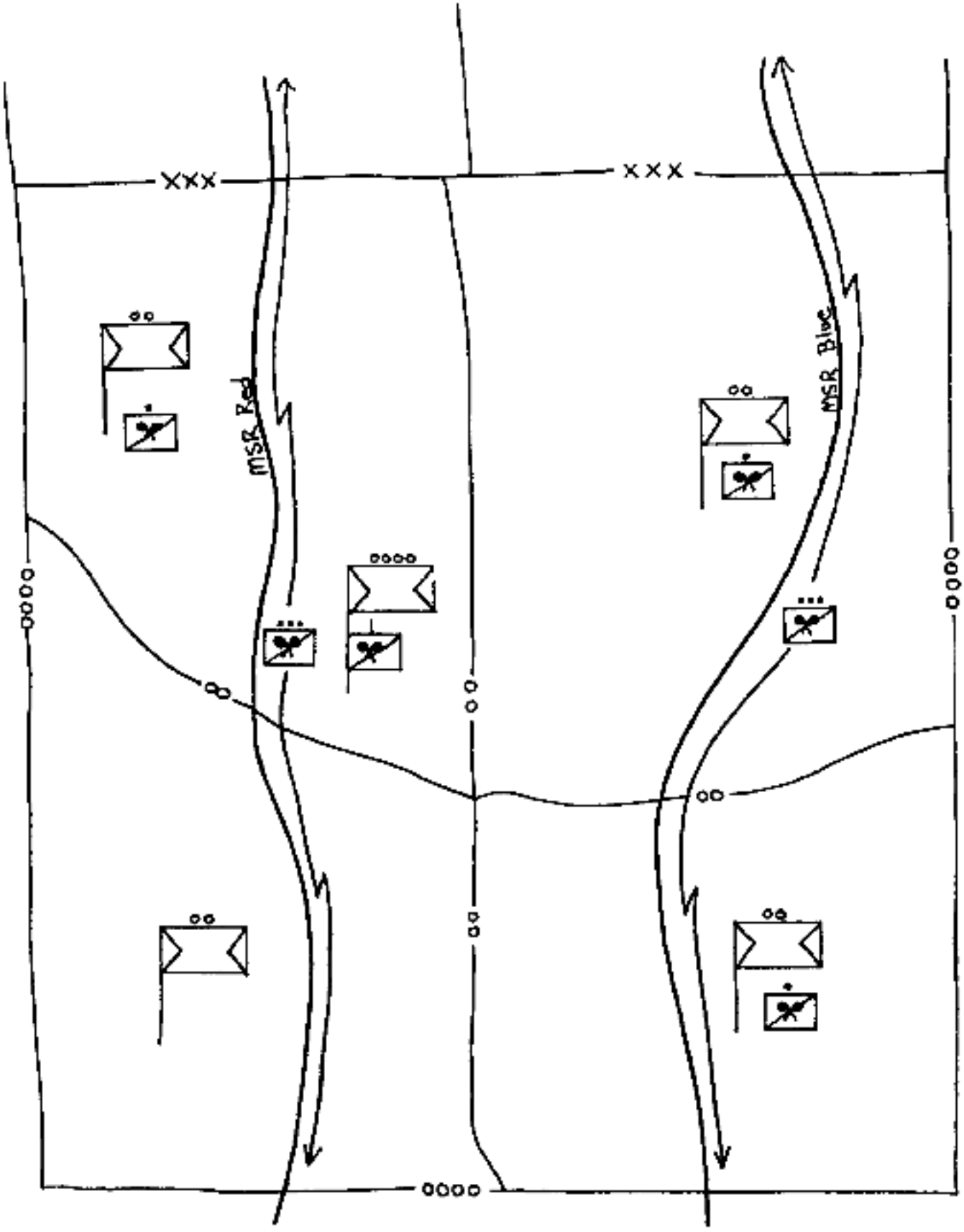


Figure 6-2. NBC reconnaissance operations in the corps TAACOM rear area.

Chapter 7

Movement Techniques and Formations

The tempo of operations demands that NBC recon units spend a lot of time moving. NBC recon units normally will spend more time moving than performing recon. Moving carelessly may cause a unit to make contact with the enemy and suffer needless casualties.

NBC recon units use standard formations and movement techniques to get to their assigned area. Once at the mission area, the NBC recon unit selects the appropriate NBC recon technique to perform its mission. The NBC recon techniques are described in detail in Chapter 8.

Fundamentals

To survive on the battlefield and provide NBC reconnaissance, leaders must exercise command and control, maximize the use of terrain, and apply the following fundamentals of movement:

- Move on covered and concealed routes.
- Do not move directly forward from covered and concealed positions.
- Avoid likely ambush sites and other danger areas.
- Enforce camouflage, noise, and light discipline.
- Maintain all-round security, including air guards.

NBC recon units must adhere to the following guidelines:

- Use terrain for protection. Terrain offers natural cover and concealment from enemy observation and cover against enemy fire. Using terrain to protect vehicles is difficult; so, terrain driving must become a habit. Use it when in contact with the enemy and when contact is possible or expected.
- Avoid possible kill zones. Platoons and squads must avoid wide open spaces, especially where high ground dominates, or where cover and concealment is available to the enemy.
- Maximize the vehicle's capabilities. Vehicle commanders and drivers should use any available depressions and trees to avoid enemy antitank guided-missile (ATGM) fire. When moving to a new position, the driver should make use of speed whenever possible.

Concepts

Leaders place themselves where they can best command and control. Their location is governed by the situation, movement formation, movement technique, and whether or not the unit is performing reconnaissance. Selection of the movement formation is based on the factors of METT-T. The distance between vehicles varies according to the terrain and enemy. Each vehicle crew is responsible for a different sector to provide all-round security while on the move. Leaders direct movement by using arm-and-hand signals. Radios should be used only as a backup means of communicating.

Movement Formations

There are five formations for platoon mounted movement: column, line, wedge, vee, and echelon.

Column

The column formation is used for road marches, for movement during limited visibility, and when passing through defiles or other restrictive terrain. The platoon can deploy rapidly from the column formation into other formations. The column simplifies control and provides good security.

The staggered column (Figure 7-1) is used for rapid movement across open terrain. It affords all-round observation and fields of fire. The platoon leader positions himself or herself to best control the platoon. The staggered column formation is used by squad- or platoon-sized units. Vehicles should maintain 25- to 100-meter intervals and lateral dispersion. Each vehicle commander maintains observation of his or her designated sector. The exact distance between vehicles depends on METT-T, weather conditions, and visibility.

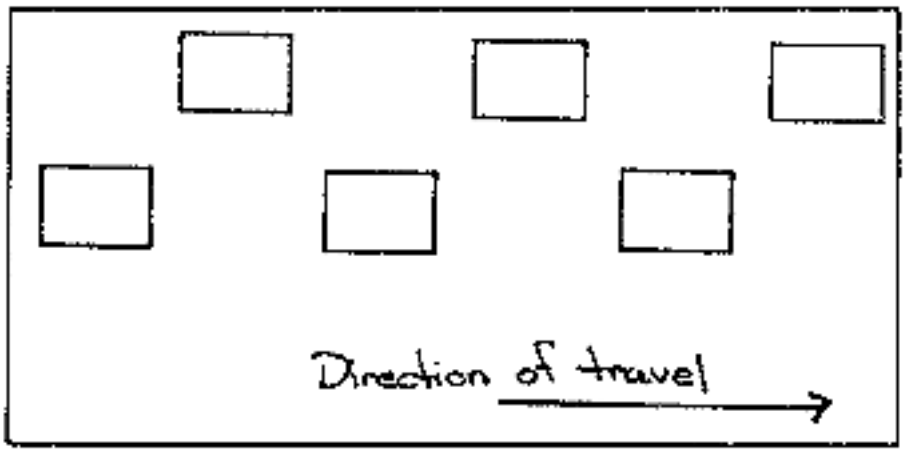


Figure 7-1. Staggered column formation.

Line

The line formation is used for rapid movement when time is limited. However, it provides little flank security. This formation primarily is used when no enemy contact is expected and time is critical.

Wedge

The wedge formation (Figure 7-2) is used by platoon-sized elements. It allows for security and facilities positive command and control. Vehicle dispersion and intervals again depend on METT-T and visibility. When spreading out in open, flat terrain, as a minimum, each vehicle must maintain visibility of the vehicle to its front. When moving in platoon wedge, the platoon leader positions himself or herself for best control of movement of the entire platoon. Each vehicle commander maintains observation of a designated sector. This formation is used when enemy contact is possible.

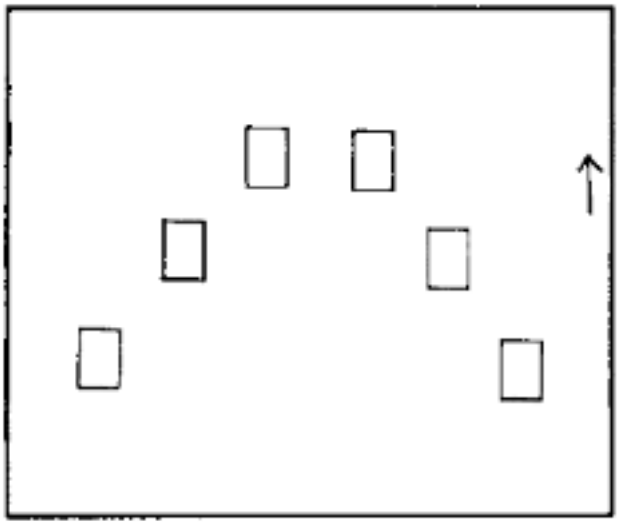


Figure 7-2. Wedge formation.

The column of wedges (Figure 7-3) is one of the most frequently used platoon movement formations. It allows for optimum flexibility, security, and good command and control. It is best employed when traveling or traveling overwatch conditions are warranted. Vehicle dispersion and intervals between squads are METT-T dependent, but the lead vehicle of the trail squad generally needs visual contact with the lead squad. This formation allows squads to deploy into other formations most rapidly should the tactical situation warrant.

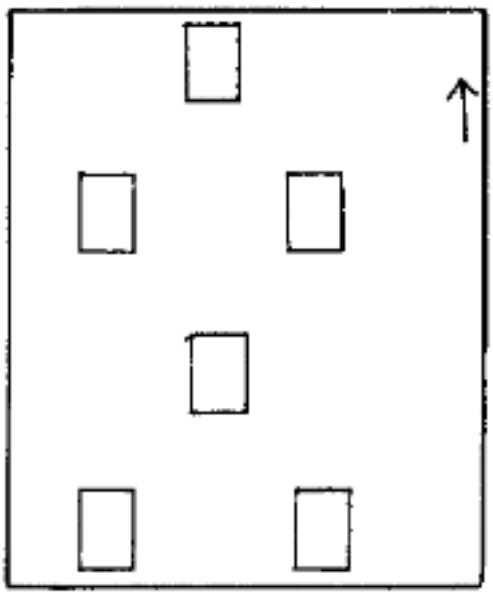


Figure 7-3. Column of wedges formation.

Vee

The vee formation (Figure 7-4) affords good security, speed, command, and control. The split vee (Figure 7-5) can be used when the two squads are operating on different routes. These formations are used when contact is possible but speed is desirable. The lead vee element moves along covered and concealed routes for protection. The trail element moves at variable speed, continually overmatching and providing security. The trail element must always maintain visual contact with the lead element and may stop periodically to observe.

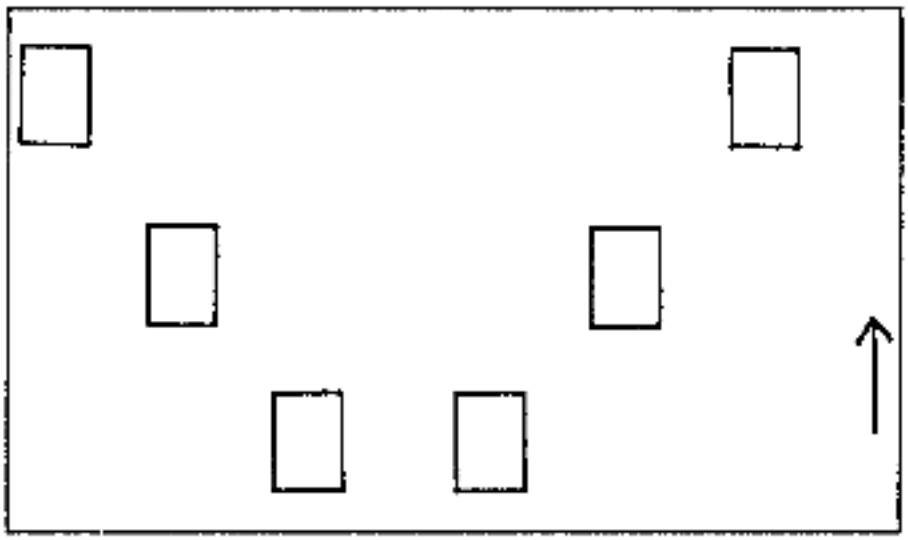


Figure 7-4. Vee formation.

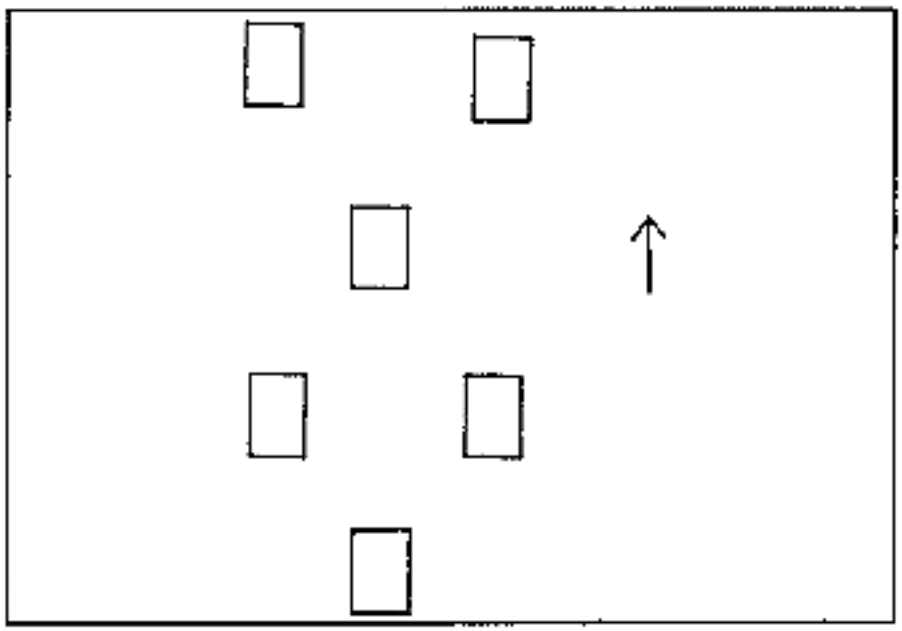


Figure 7-5. Split Vee formation.

Echelon Right (Left)

An echelon formation (Figure 7-6) provides good coverage of an area. It provides flexibility and sped. This formation does not provide sufficient security if enemy contact is possible or expected.

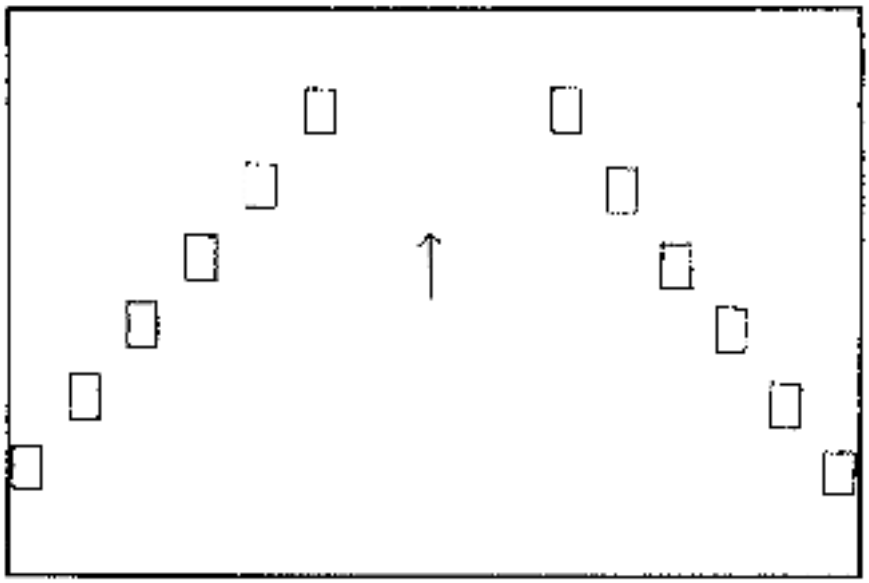


Figure 7-6. Echelon right and left formations.

Stationary Formations

There are two security formations used when the vehicles are not moving: herringbone and coil.

Herringbone

The herringbone (Figure 7-7) is used to disperse the platoon when traveling in the column formation. It maybe used during air attacks or when the platoon must stop during movement. It lets the platoon move to covered and concealed positions off a road or from an open area and establishes all-round security without detailed instructions being issued. The vehicles are repositioned as necessary to take advantage of the best cover, concealment, and fields of fire. Crew members dismount and establish security.

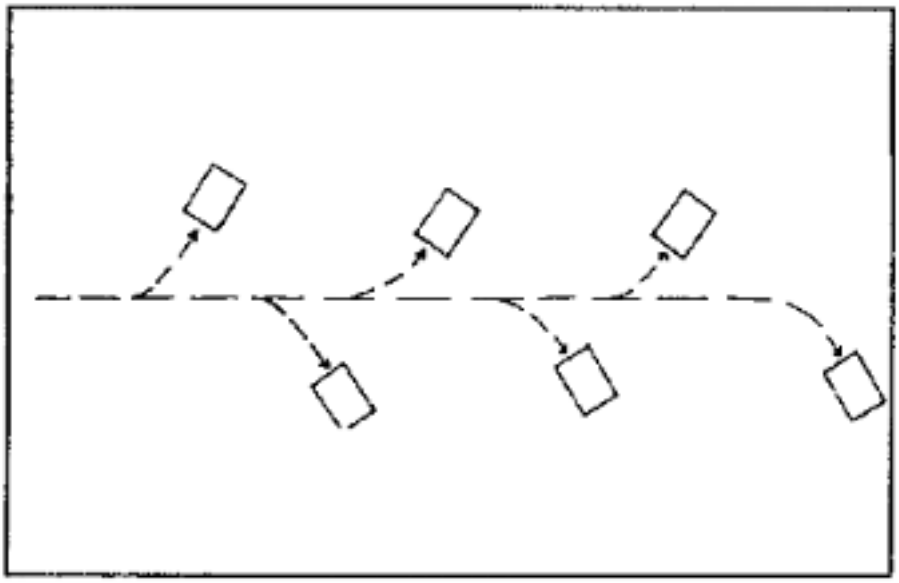


Figure 7-7. Herringbone formation.

Coil

The coil is used to provide all-round (360 degree) security and observation when the unit is stationary (Figure 7-8). It is useful for tactical refueling, resupply, and issuing platoon orders. Because it presents an easy target, it is not designed to be used for long periods during daylight. Security is posted to include air guards and dismounted personnel. There are two methods to forma coil.

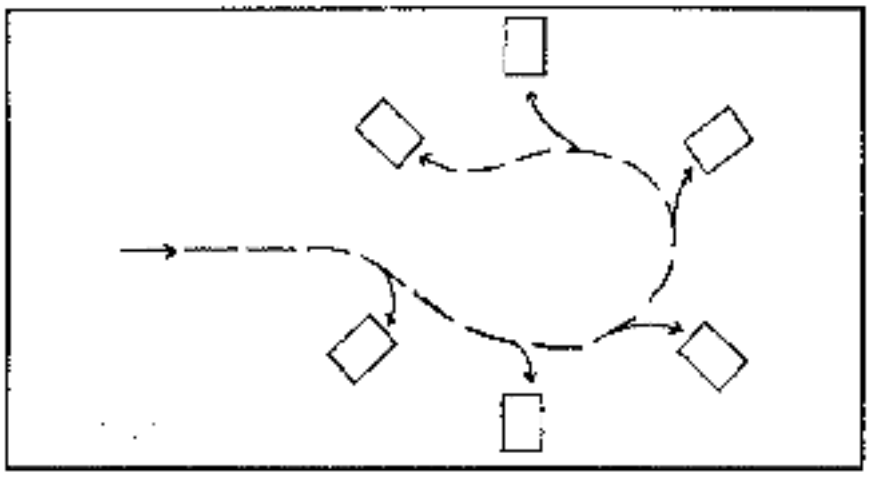


Figure 7-8. Coil formation.

The first method, when visibility is limited, requires the platoon leader to form the coil by leading his platoon in a circle, When the circle is complete, all vehicles stop, adjust for cover and concealment, turn 90 degrees outward, and post security.

The second method is done by the platoon leader, signaling, quickly moving his vehicle into position, and stopping. The other vehicles move directly to their assigned positions, as stated in the platoon SOP, seek cover and concealment, and post security. This technique is used during daylight or whenever speed is essential.

Movement Techniques

Movement techniques are methods used by units to traverse terrain . They are traveling, traveling overwatch, and bounding overwatch, The likelihood of enemy contact determines which technique to use, as shown in the following table:

Movement Techniques	
Enemy Contact	Recommended Movement
Not Likely	Traveling
Possible	Traveling Overwatch
Expected	Bounding Overwatch

Traveling

Traveling movement technique is employed when enemy contact is not likely and speed is necessary. The unit moves in column with 50-meter intervals. Vehicles move continuously, at a maximum safe speed. When the column stops all vehicles herringbone. The unit moves along covered and concealed routes automatically contracting and expanding, based on terrain and visibility. Local security is maintained according to its SOP. Each vehicle posts an airguard. The unit leader locates where he or she can best control.

Traveling Overwatch

Traveling overwatch movement technique is employed when enemy contact is likely (possible). Unit moves in column with a 50-meter interval with designated lead and trail elements. The trail element moves continuously, following covered and concealed routes. The lead element is approximately 50 to 100 meters ahead of the trail element, depending on terrain and vegetation. The trail element moves at varying speeds, stopping as required to overwatch the lead vehicle. Visual contact is maintained with the lead element at all times.

The trail element overmatches at such a distance that should the enemy engage the lead element, it will not prevent the trailing element from firing or moving to support the lead element. In wooded areas or restricted terrain, the units reduce speed and interval. In adverse weather conditions, the crew of the lead vehicle dismounts to verify the trafficability of the route. The following vehicle(s) provides overwatch. The unit maintains local security according to its SOP.

Bounding Overwatch

Bounding overwatch is employed when enemy contact is expected. The basic movement formation is the staggered column with 50-to 100-meter intervals between vehicles. Lead element bounds forward following a covered and concealed route. The bounding element may be a single vehicle for a section movement or an entire section for a

platoon movement. The overmatching element covers the progress of the bounding element from covered and concealed positions offering observation and fields of fire against suspected enemy positions. Visual contact is maintained at all times.

The length of a bound is based on terrain analysis and the ranges and fields of fire from the overmatching vehicles. When cresting a hill, entering an open area, exiting a defile, or moving through any other restrictive terrain, a crewman dismounts from the vehicle. He or she moves forward on foot to a point where he or she can observe all suspected or likely enemy firing positions. The unit maintains local security according to its SOP.

Chapter 8

Techniques

General types of NBC recon techniques include search, survey, and surveillance. Search techniques are used during route, area, and zone recon missions to find contaminated areas. Survey techniques are used during NBC surveys to define the boundaries of contaminated areas. All search and survey techniques require applied judgment based on METT-T. Terrain and the enemy will dictate which technique to use and the level of detail possible. Surveillance techniques are used to observe a specific area for indications of an NBC attack. More than one technique may be executed during a single mission.

Search

There are three search techniques that can be employed during recon operations to locate contaminated areas. They are the zig-zag, lane, and cloverleaf. Each technique can be performed mounted or dismounted.

Zig-Zag

This technique is useful for locating contaminated areas during route, zone, or area recon missions. The recon element begins its search at the deployment (start) line, maintaining 200 meter intervals between vehicles. Each vehicle moves forward along a line oriented 45 degrees from the start line. The vehicle crews monitor identification equipment for indications of contamination. After the vehicle has moved 500 meters along the first zig, the vehicle turns 90 degrees and zags (see Figure 8-1). After traveling 500 meters, the vehicle turns 90 degrees for a second zig. This process of zigging and zagging is repeated until the recon element has reached its limit of advance (LOA). If the entire mission area has been searched, the recon element reports negative contamination detected. If the recon element did not search the entire mission area, the element begins a new sweep of the mission area. This process is repeated until contamination is detected or the complete mission area is searched (see Figure 8-2).

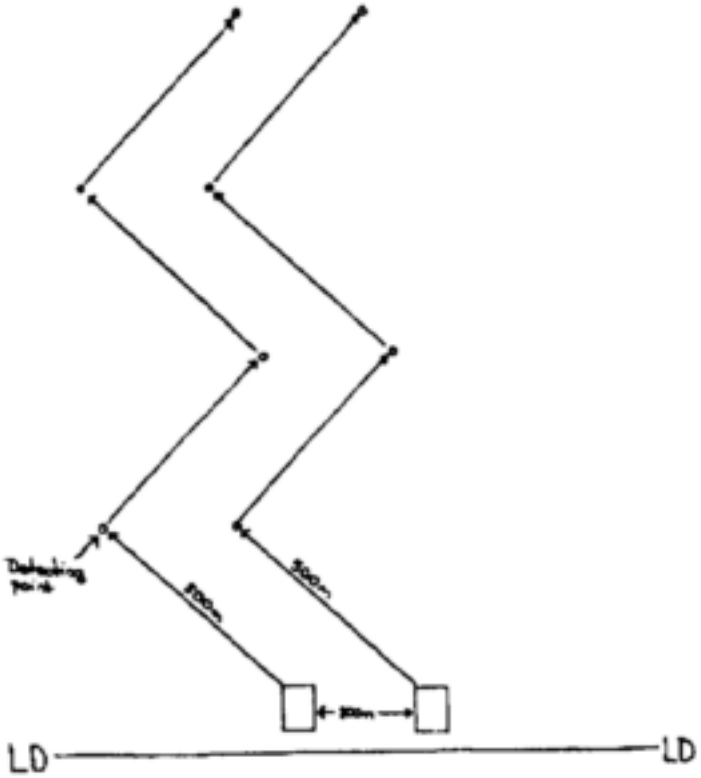


Figure 8-1. Details of zig-zag search technique.

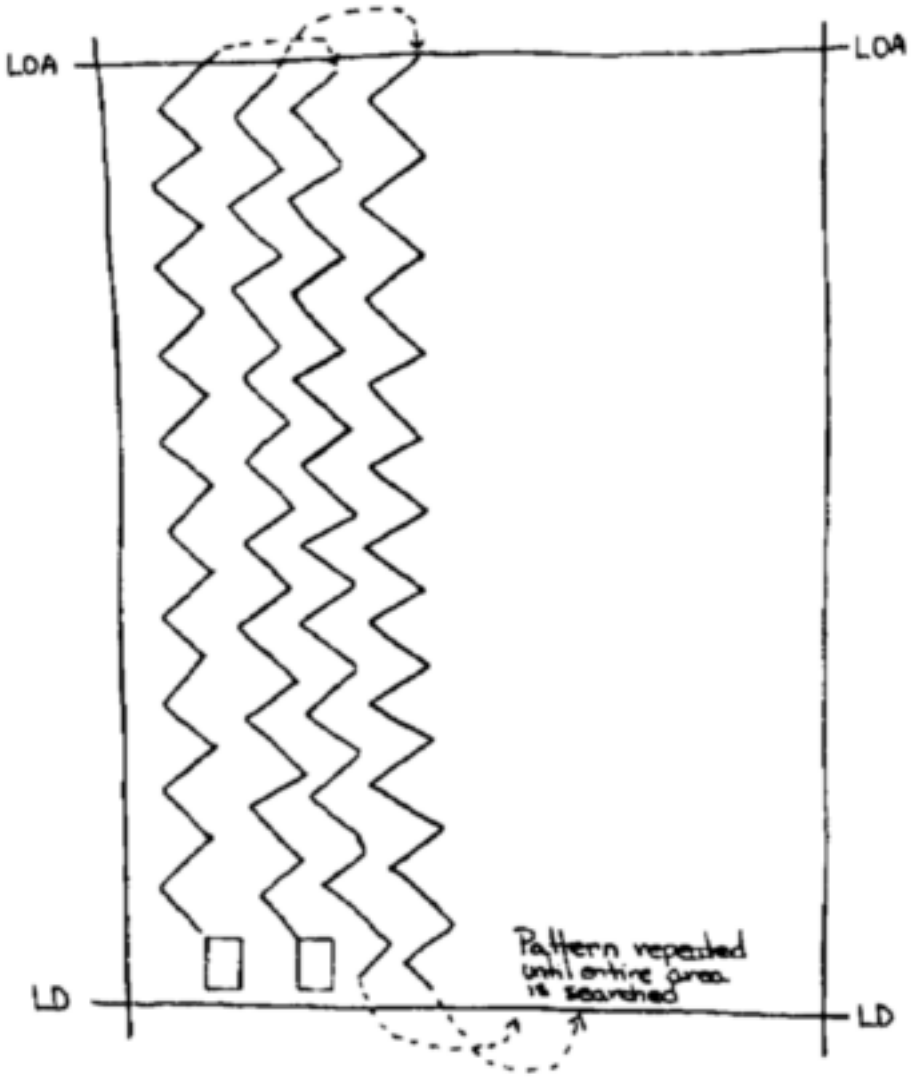


Figure 8-2. Example of multiple sweeps, using the zig-zag search technique.

The zig-zag technique has a higher probability of detecting contamination, because the surface area not traversed by the recon element is less than that of other search techniques. The length of each zig and zag is based on METT-T, VOS25 or global positioning system (GPS) devices provides navigation assistance.

Lane

The lane technique is very similar to the zig-zag method and is used to locate contaminated areas. While the zig-zag technique can be used during route, area, and zone recon missions, the lane technique is used primarily during route recon missions. It could also be used for area recon of long narrow pieces of terrain, such as defiles. The recon element begins its search at the line of departure (LD) with an interval not exceeding 200 meters between vehicles. For narrow routes, the recon element has to move in a staggered column. Each vehicle moves along a line until reaching the LOA (see Figure 8-3). The vehicle crews monitor identification equipment for indications of contamination. Readings for contamination are taken every 500 meters.

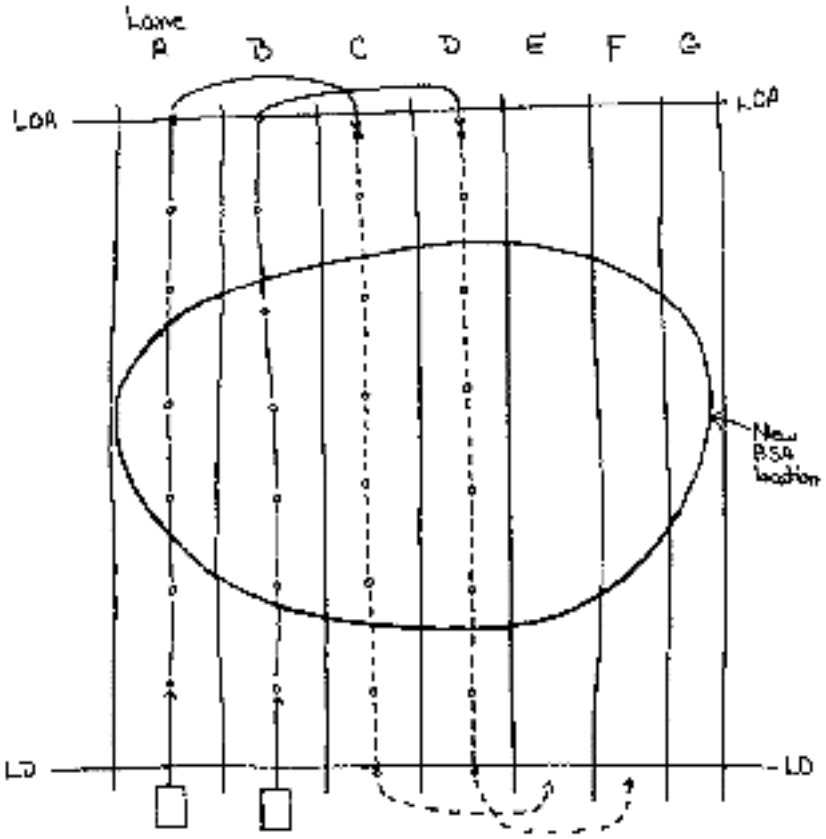


Figure 8-3. Lane search technique.

When the recon element reaches the LOA, if the entire mission area has been searched, the recon element reports negative contamination detected. If the recon element did not search the entire mission area, the element begins a new sweep of the mission area. This process is repeated until contamination is detected or the complete mission area is searched (see Figure 8-4).

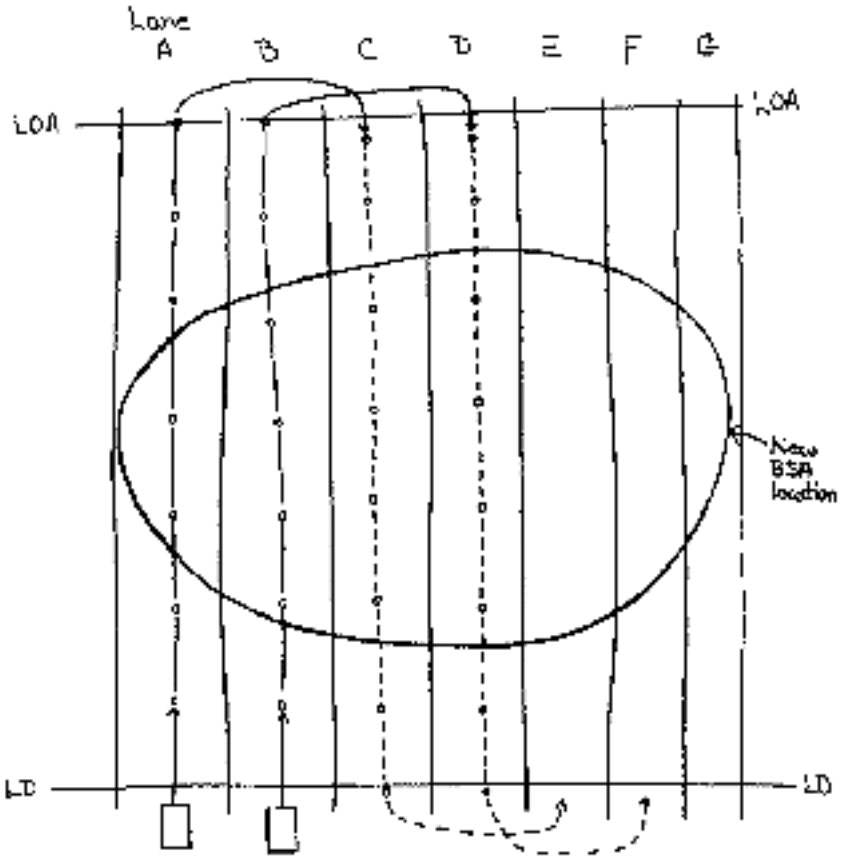


Figure 8-4. Multiple sweeps, using the lane search technique.

Clover-Leaf

This technique is used primarily during dismounted operations. A soldier dismounts from his vehicle and moves in a clover-leaf pattern. The vehicle is used as the center of the search (Figure 8-5), and each leaf extends between 50 to 200 meters from the vehicle. This technique should not be used in radiologically contaminated areas because of the lack of shielding. The CAM is the primary detection tool dismounted soldiers use to detect chemical contamination, followed by M8 and M9 detector paper. Detectors tickets from M256A1 chemical detector kit are used by the mounted vehicle crew to determine the presence of chemical agent vapors. This technique can be accomplished using a single recon vehicle, a two-section, or three-section reconnaissance element.

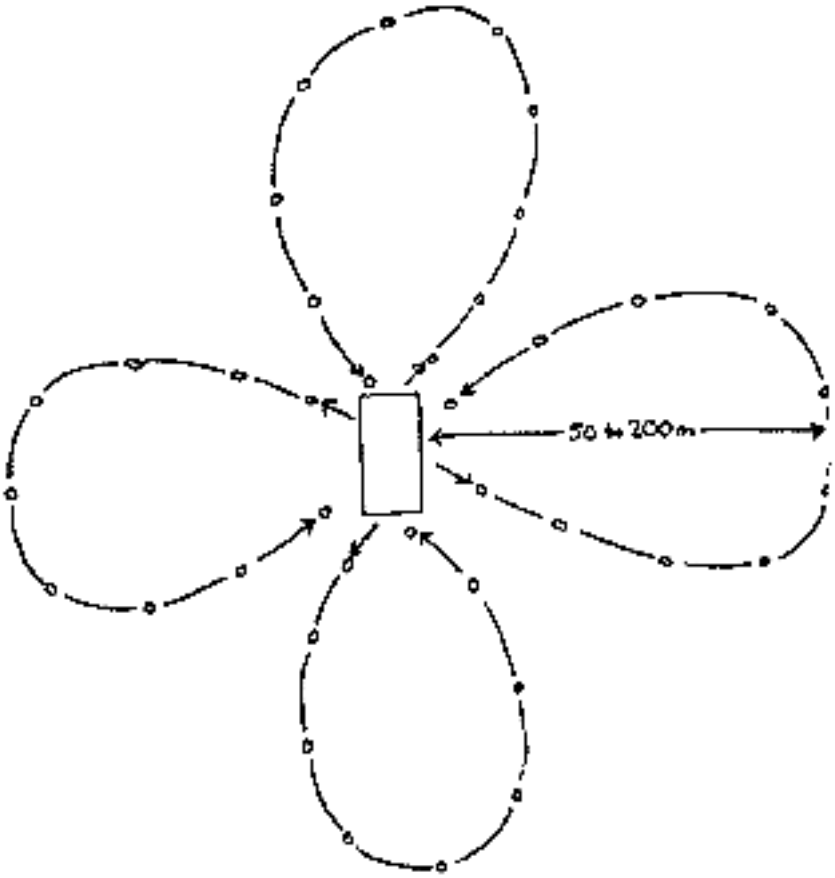


Figure 8-5. Clover-leaf search technique.

This technique is used primarily in restricted terrain or to ensure sites for high value facilities, such as command and control centers, are free of contamination. The clover-leaf technique is time-consuming; however, it provides detailed coverage and information about an area. This technique also exposes soldiers to chemical hazards and heat stress.

Survey Techniques

There are three survey techniques that can be employed once contamination is located. These techniques are near-side-far-side, box, and star. Radiological survey techniques are discussed in detail in FM 3-3-1. Each technique is usually performed while mounted to minimize exposure of soldiers performing the survey to CB hazards. There are two types of surveys-complete or incomplete. A complete survey is when the entire extent of the contamination has been identified. An incomplete survey occurs when the entire extent of contamination has not been identified. This can occur when an NBC recon unit has to conduct a survey to find a bypass route during combat operations.

Near-Side-Far-Side

This technique is used by the recon element once a vehicle enters the contaminated area. All vehicles in the recon element stop. Each vehicle crew determines if they are in the contaminated area. Vehicles in the contaminated area move back along their original path for 200 meters and again check for contamination (see Figure 8-6). If they are out of the contaminated area, emplace the appropriate warning markers. If they are

still in the contaminated area, they move back another 200 meters and test again. This process is repeated until they are clear of the contamination. Once the initial vehicle has found the near side boundary of contamination, it moves forward across the contaminated area, testing every 200 meters.

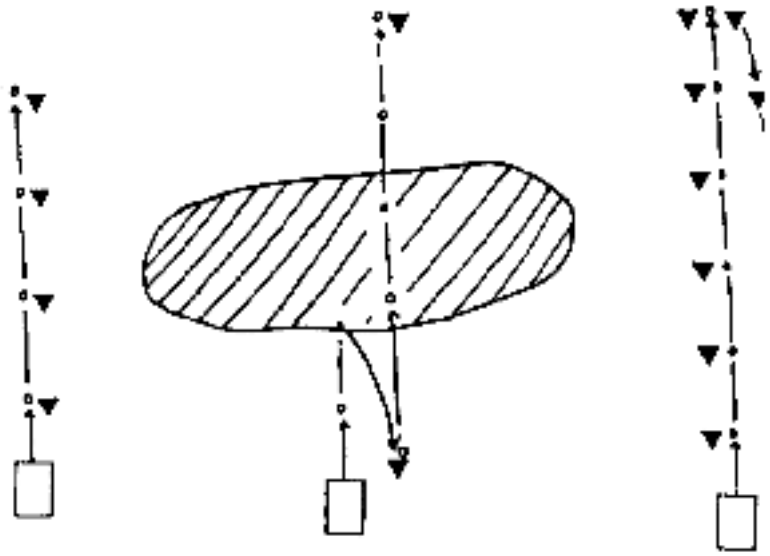


Figure 8-6. Near-side-far-side survey technique.

Once the crew no longer detects any contamination, the vehicle moves forward another 200 meters and tests again. If no contamination is detected, a warning marker is placed. Each vehicle in the element executes this process to determine the near and far side boundaries of the contamination (see Figure 8-6).

It is possible that the right and left limits of the contamination are not identified, even though the right and left reconnaissance vehicles determined a near and far side (see Figure 8-7). In this case, the recon element can shift vehicles to the right and left to attempt to find those boundaries or execute a box survey technique. The lateral spacing between vehicles is important to quickly locate all boundaries of the contaminated area. Once the boundaries are located, clear bypass routes can be easily located.

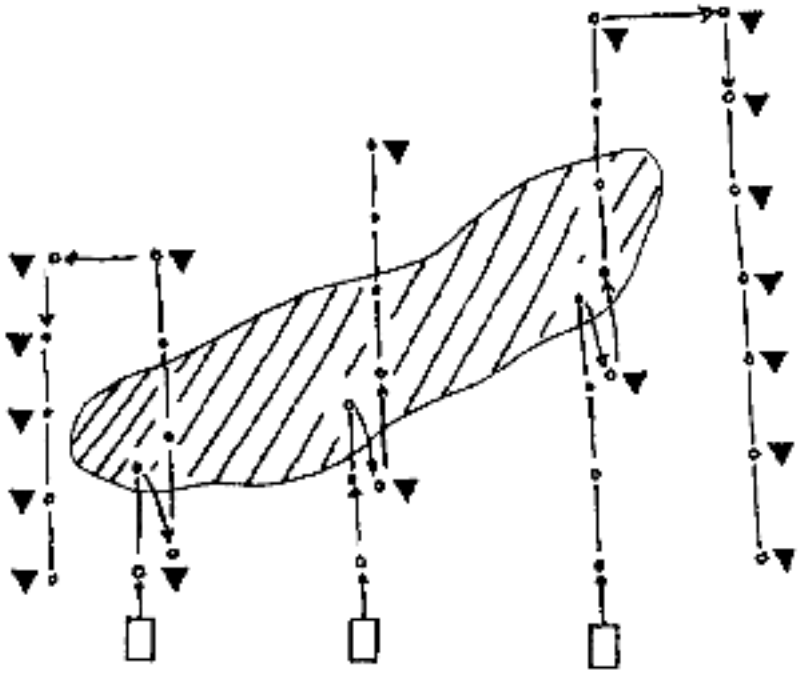


Figure 8-7. Contaminated area extends past initial right limit of the survey.

Box

The box technique is used to determine the general dimensions of the contaminated area (length and width). This technique is best employed by a section (three vehicles). The process starts once a vehicle enters the contaminated area. All vehicles in the recon element stop. All vehicles check for contamination in their immediate areas. The first vehicle to report contamination becomes the base vehicle. If any other vehicles in the element are located in the contaminated area, they must back out of the contamination. All vehicles in the element should orient on the base vehicle, at least one vehicle should be to the right and left of the base vehicle.

The base vehicle has the mission to move forward and find the far side of the contamination. The crew continues to check for contamination every 200 meters. When the crew fails to get a positive reading, they proceed another 200 meters and establish the initial farside line. The vehicle to the right of the base vehicle places a warning marker to indicate the initial near side. This vehicle then moves forward 200 meters and checks for contamination.

The crew can find two things at this point, contamination or no contamination. If contamination is detected, the vehicle turns 90 degrees to the right and moves 200 meters and checks again. If no contamination is found, the vehicle moves forward 200 meters and checks again. This process of going straight or turning will continue in a box-like movement until the vehicle has crossed the initial far side line, this is the initial right limit of the contamination. The movement of the vehicle depends on the orientation of the contaminated area. Figures 8-8 through 8-11 demonstrate the execution of a mission for various orientations.

Figure 8-8. Box survey technique on orientation A.

Editor's Note: This graphic is not viewable in HTML format. Check "Download Document" at the top of this file for an alternate format or obtain a printed copy of the document.

Figure 8-9. Box survey technique on orientation B.

Editor's Note: This graphic is not viewable in HTML format. Check "Download Document" at the top of this file for an alternate format or obtain a printed copy of the document.

Figure 8-10. Box survey technique on orientation C.

Editor's Note: This graphic is not viewable in HTML format. Check "Download Document" at the top of this file for an alternate format or obtain a printed copy of the document.

Figure 8-11. Box survey technique on orientation D.

Editor's Note: This graphic is not viewable in HTML format. Check "Download Document" at the top of this file for an alternate format or obtain a printed copy of the document.

Once the vehicle has reached the initial far side line, the vehicle moves toward the base vehicle while checking for contamination. The vehicle to the left of the base vehicle executes the same movement as the right vehicle, except its first turn will be to the left. While this may sound complicated, it is not difficult to execute. The section leader must receive continuous reports from the other vehicles on their findings, positive or negative. From these reports the section leader plots the findings to get a general idea of the layout of the contamination. Good navigational skills and aids (GPS, VOS25, Loran) are essential for this operation.

Once the section leader is satisfied that the limits of the contamination have been determined, the section locates the best route to bypass the contamination. Warning markers are erected around the contamination along any trails leading into the contaminated area. The bypass route is clearly marked.

Star

This is a very quick technique to determine the rough limits of a contaminated area. The vehicle that encounters the contamination, moves back from the contaminated area 200 meters from the last positive reading. This point is the base of the star. The vehicle posts a warning marker. The vehicle then proceeds forward, detecting every 200 meters to find the far side. Once the vehicle has detected no agent, it proceeds for another 200 meters and tests again. If no agent is detected, another warning marker is posted. This

ends the first leg of the star.

The vehicle turns about 135 degrees and travels in that direction detecting every 200 meters. If no contamination is detected on this leg, the vehicle should not travel any longer than the length of the initial leg. This process is repeated until the vehicle arrives at or near the base of the star (see Figure 8-12). This technique can be used by a squad or section to obtain more detecting points, increasing the accuracy of the survey (see Figure 8-13).

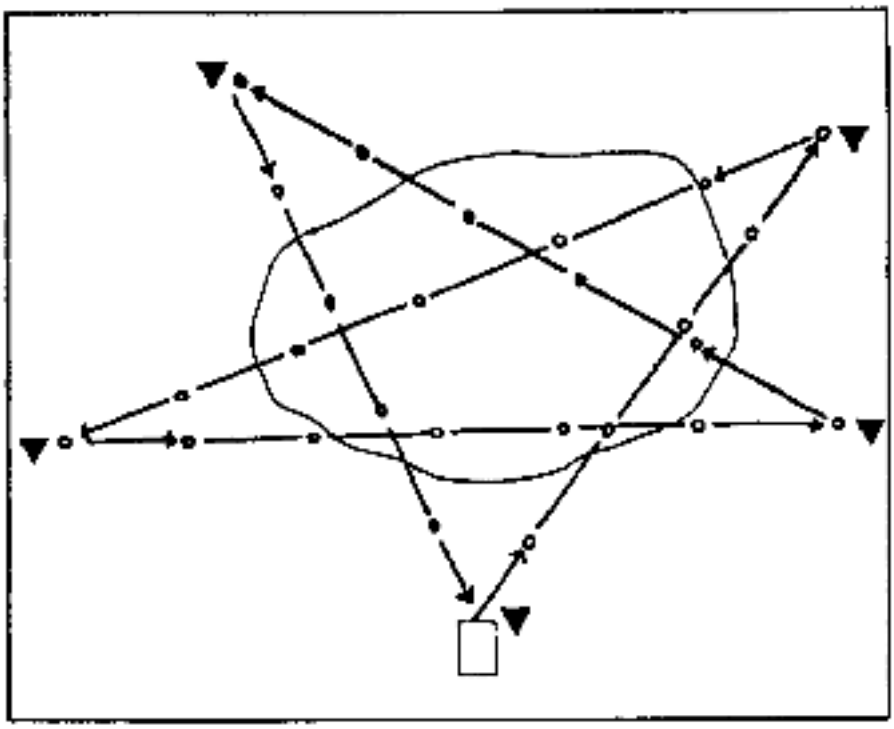


Figure 8-12. Star survey technique.

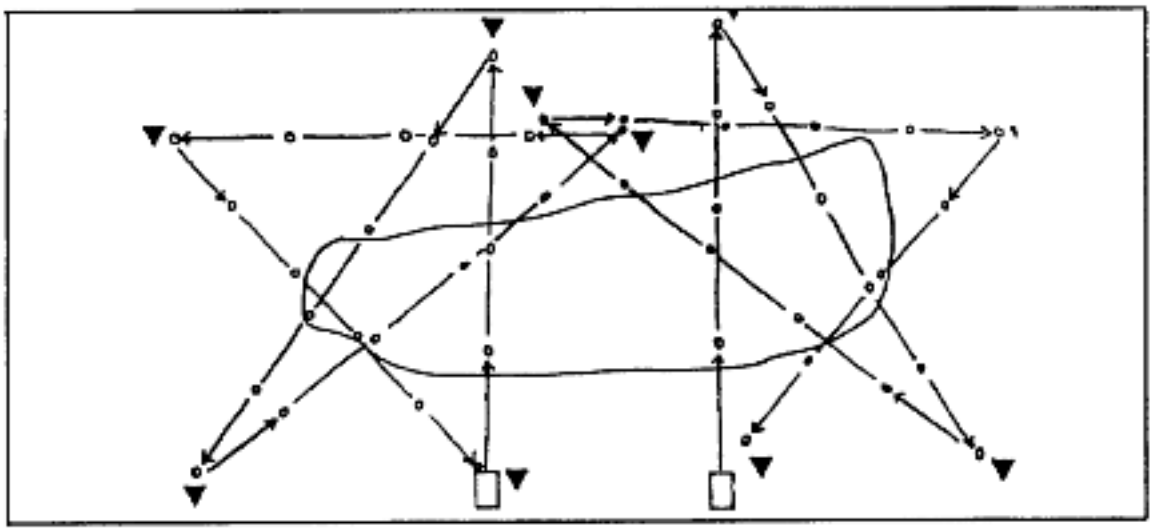


Figure 8-13. Pattern of an NBC recon squad performing star survey technique with two vehicles.

Surveillance Techniques

NBC surveillance is the systematic observation of a specific area for indications of an NBC attack, usually a chemical attack. These designated areas are typically named areas of interest (NAI), identified during the IPB. NBC recon units watch and listen to observe designated areas for any indications of a chemical attack. The primary means of surveillance are observation posts (OPs). Another means is conducting routine patrols through the area of operations. This technique of surveillance normally is conducted in rear areas, typically along main supply routes (MSRs) and road networks.

An OP is a position occupied to observe a designated area. From the OP(s), NBC recon units report any indication of NBC attack and enemy activity. An NBC recon platoon can occupy up to six OPs, one per team, for up to 12 hours. For extended periods, the platoon can occupy OPs by squad.

Selecting an OP Site

The supported unit or platoon leader selects the general location for the OPs. The factors of METT-T determine the general positioning as well as the intelligence collection plan and R&S plan. The squad and team leaders select the exact position for the OP when they are on the ground. An OP should have the following characteristics:

- Good observation of the assigned area.
- Good cover and concealment. Positions with cover and concealment reduce vulnerability and increase survivability on the battlefield. They may need to trade off a position with the best observation capability and no cover and concealment to get a position that provides better survivability.
- Does not attract attention. Select positions that do not attract enemy attention.
- Does not skyline observers. Avoid hilltops. Position OPs farther down the slope of a hill.

Manning the OP

A minimum of two personnel are alert at all times. One individual observes the area while the other provides local security. The individual providing local security records information and submits reports as necessary. The two individuals switch positions every 20 to 30 minutes.

Attack Indicators

Most chemical agents are disseminated by explosive delivery systems or by spray tanks. Artillery, rockets, and missiles detonating have a distinctive visual signature both in the daytime and at night. Aircraft spraying chemical agents also have distinctive flight patterns along with the signature of the liquid being released. While these indicators are not positive proof that a chemical attack has occurred, there is an increased probability it has. Depending on METT-T, the NBC recon element occupying the OP could conduct recon of the NAI to confirm or deny the presence of contamination.

Warning

> Exercise care, because the enemy could have delivered scatterable antipersonnel/antitank mines or other delay type explosive munitions.

Detection Procedures

NBC recon tactics and techniques are basically the same when using either the M113, HMMWV, or the M93 NBCRS, Detection procedures are different between the NBCRS- and M113/HMMWV-equipped units. Nonchemical units use the same detection procedures used by M113 or HMMWV-equipped NBC recon units.

With the M113 or HMMWV, there is a great deal of stopping and exiting the vehicle for detecting and identifying; and the rate of the NBC recon is much slower. With the M93 NBCRS, NBC recon is conducted on the move at a much faster rate with very few stops, and without the crew having to exit the vehicle.

M113/HMMWV-Equipped Units

Using the M113 or HMMWV as a prime mover and standard NBC detection, identification, and CB sampling equipment, the following procedures may be used to determine the presence of radiological or chemical hazards or to collect suspect samples for laboratory analysis.

The team leader (TL) provides overwatch for his or her area and orients the organic weapon on the sector of fire. The TL visually inspects the area for signs of contamination hazards. The chemical operations specialist (COS) opens the rear door of the M113 wide enough to take a reading with his NBC detection and identification equipment or to collect a suspect sample of CB contamination. The rear door of the M113 has a wire or bungee cord attached to prevent the door from swinging fully open.

With M8 paper attached to a long handle or stake, the COS extends the stake out of the rear door of the M113 or over the side of the HMMWV and touches the ground or vegetation with the M8 detector paper.

The TL also conducts periodic checks from the hatch position, using the M256A1 chemical detector kit. The TL places the expended M256A1 detector tickets in a waterproof bag after writing the check point number on the paper tab.

The COS inspects the M8 paper for signs of contamination and informs the TL of the results. Positive M8 paper is sealed in a plastic bag. A label showing the date-time group (DTG), location (grid) where the sample was taken, and the possible type of contamination is attached. The sample bag is placed inside a large waterproof bag which holds all samples collected during the mission.

The COS places the CAM outside the door approximately one meter above the ground and checks for contamination. If contamination vapors are detected and there is doubt as to the validity of the results, the COS uses the M256A1 chemical detector kit to verify results. All expended M256A1 tickets are bagged.

Note: If a positive reading for chemical contamination is obtained, move back 100 to 200 meters from the position where the initial positive reading was detected and repeat the procedure until a negative reading is obtained.

The COS can exit the vehicle, if necessary, and check the area around the vehicle for contamination using M8 paper and the CAM.

The COS collects samples of any small dead animals, discolored leaves, soils, and so forth, as stated in the OPORD or orders from higher headquarters and reports all findings to the TL.

The TL or driver records all findings on appropriate forms.

M93-NBCRS-(Fox)-Equipped Units

The M93 NBCRS is equipped with a mobile mass spectrometer (MM1), radiation detection unit (ASG1), vehicle orientation system (VOS25), and other detection and identification equipment giving users the capability to travel at optimum speeds while checking for NBC contamination. See FM 3-101-1 for a detailed discussion of M93 NBCRS tactics, techniques, and procedures.

The MM1 monitors organic substances in the air, in dust, in solution, or on surfaces.

There are basically three modes of operations for the M93 NBCRS:

- Double-wheeled sampling unit. This mode permits transporting liquid contamination to the probe bad of the MM1 for agent identification.
- Air. Air is drawn into the MM1; and vapor contamination is identified.
- Surface. This mode is used once the agent is detected to verify its presence, using the MM1.

Chapter 9

Sampling Operations

Commanders may order the collection of materiel and environmental samples for support of intelligence and operational requirements. These requirements include verification that an attack occurred; identification of agents used; delivery systems; and their nation of origin; or to determine the level of chemical/biological warfare (CBW) technology involved.

Sampling operations particularly are important if a previously unknown agent is used, or if it is the suspected first use of a CB agent by a threat force. Therefore, the collection of CB samples and the background information must be as detailed and comprehensive as possible to provide data for the intelligence analysts.

The processing of CB samples includes the collection, handling, transferring, chain of custody, and administrative procedures. After laboratory analysis of the sample, intelligence personnel analyze the data to support operational needs. The sample process is illustrated in Figure 9-1.

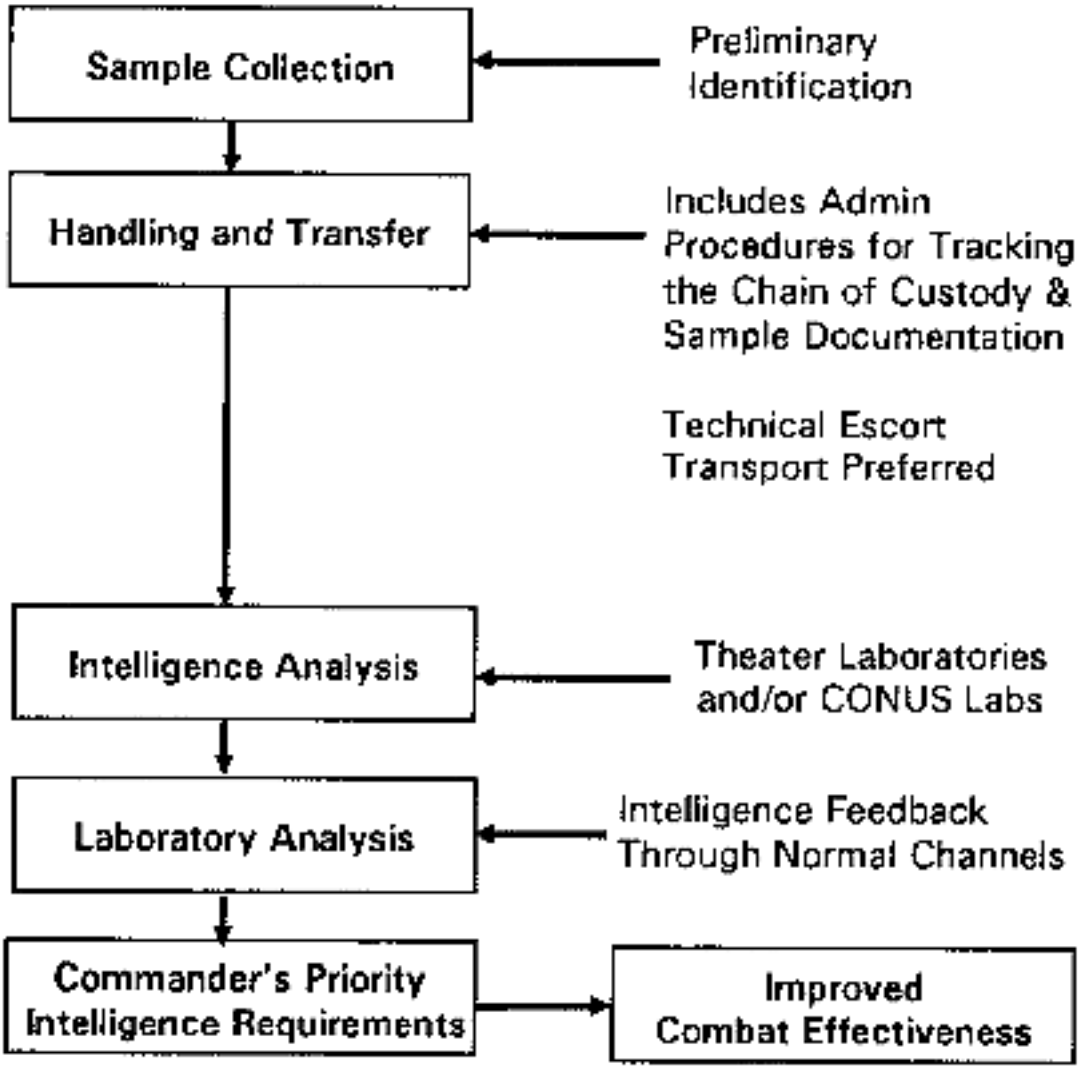


Figure 9-1. The sampling process.

Chemical/biological sampling units (CBSUs) conduct missions throughout the operational continuum during peacetime and wartime operations. NBC recon units and other units trained in sampling techniques conduct overt sampling operations. LB teams assigned to the special operation forces (SOF) conduct covert NBC recon missions. See FM 3-18 for more information pertaining to LB team operations. NBC recon units conduct sampling as part of their normal operations. The collection, reporting, and administrative procedures pertaining to sampling operation are basically the same for all NBC recon units.

Peacetime Competition and Conflict

During peacekeeping operations, security assistance missions, or show of force operations, the first CB sampling (CBS) missions provide a baseline for normal levels of microbes (germs) in a given area. Later, if use is suspected, CBSUs may collect suspected CB samples, which after analysis, would provide technical intelligence data to commanders and their staffs. This information is important during peacetime competition and conflicts to help commanders and their staffs determine what NBC defense measures are needed for force protection, the scope of CB defense assistance to be provided, and the extent of threat capabilities and intentions.

War

CBSUs conduct CB sampling missions to provide technical intelligence that enhances commanders' and staffs' ability to assess the battlefield. Knowing the agent, delivery system, and so forth, helps the commander take appropriate offensive and defensive actions. Laboratory analysis provides identification of the suspected sample, agent characteristics, toxicity, persistency, hazards to personnel, possible decontamination procedures, and appropriate first aid procedures.

Samples collected by the special operations force during deep operations provide intelligence about threat capabilities, intentions, and the location of threat storage and production facilities.

Employment

The division or corp area uses its organic CB sampling assets within its operations area. The TA commanderc an direct NBC recon units to conduct CB sampling anywhere in the theater of operations. Planners for strategic or operational level missions also may direct CB sampling operations to support intelligence requirements.

Responsibilities

The NBC recon unit conducts chemical/biological (CB) sampling. Prior coordination, SOPs, OPLANS, intelligence, medical technical assistance, and specific guidance must be followed. NBC recon units are responsible for collection and initial packaging of environmental CB agent samples collected in the field. NBC recon units also are authorized to collect small animals (nonmigratory species only), either dead or dying, as a result of suspected contamination. NBC recon teams ensure uniformity, viability, safety, and accountability in sampling procedures, Trained personnel escort and evacuate the suspected samples to their designated destinations.

Technical intelligence teams also are responsible for collecting biological environmental samples. Medically trained sampling teams are responsible for collecting biomedical samples. NBC recon units are not trained to collect environmental and biomedical samples. NBC recon teams may be augmented by technical intelligence and medical personnel to collect biomedical samples. Appendix B provides detailed guidance on sampling techniques and procedures.

Control

The planning process and the completed analysis of the sample involve detailed coordination and careful execution. The most valuable and reliable intelligence data regarding chemically and biologically contaminated areas are obtained from well planned and coordinated NBC recon. Field commanders task NBC recon units and technical intelligence teams to conduct chemical and biological sampling operations to enhance the IPB process and to specifically identify CB threats.

Personnel who conduct the sampling operations are well trained and have specific equipment designed for sampling operations. Intelligence staffs and NBC recon units

plan and coordinate CB sampling operations to ensure units safety and high quality samples. Tasks include command and control, sampling, packaging, processing, transport, analysis, and interpretation of the data.

During peacetime, a chemical biological sampling control center (CBSCC) is established at the Chemical Biological Defense Agency (CBDA) at Aberdeen Proving Grounds, Maryland. The CBSCC determines which laboratory will receive the samples. The CBSCC is composed of appropriate personnel from CBDA and US Army Medical Research Institute for Infectious Diseases (USAMRIID). The following considerations are used by the CBSCC to determine the final destination of the sample:

- Is the sample chemical or biological in content?
- Is the sample content completely unknown?
- Is the sample a possible combination of chemical and biological material?

During peacetime, CB sampling operations may become so numerous that a special staff control element may deploy to the region of concern to centralize the administration and processing of samples. This control element is the chemical biological sampling control element (CBSCE). The CBSCE is a subelement of the CBSCC. The CBSCE is manned by Edgewood Research, Development, and Engineering Center (ERDEC) under the supervision of the technical director of ERDEC. The CBSCE determines the technical processing of CB samples. The CBSCE also tracks the results of sampling operations and keeps records of samples taken.

During war or operations short of war, the J2 is the primary staff responsible for control of CB sampling operations within the theater. The J2 coordinates with the J3, command surgeon, and the theater chemical officer to plan missions for CB sampling assets. The CBSCC can deploy one of its subelements, CBSCE, for use in the theater. Once deployed, the CBSCE is assigned to J2 staff operations. The CBSCE determines the technical processing requirements and procedures for CB samples. The CBSCE also tracks results of sampling operations and keeps records of all samples taken. The command surgeon and the preventive medicine detachment provide additional technical advice to the CBSCE and the technical escort unit designated to transport the samples within the theater.

The CBSCE determines whether to send the sample to the CONUS Chemical and Biological Agent Technical Evaluation Board (CBATEB) for further processing or to keep the sample in the theater and complete the sample analysis in country. The CBSCE uses the following considerations to determine whether or not to send the sample to CONUS:

- Is the sample to be used for verification for first use of toxic agents?
- Is the sample too dangerous to send to CONUS?
- Are the theater laboratories capable of doing the sample analysis?

If sample is kept in theater, it goes to the appropriate laboratory for analysis. However, the mobile mass spectrometer (MM1) on the M93 NBCRS is used initially to analyze chemical samples which are then sent to CONUS for analysis. The MM1 is capable of conducting mobile field laboratory analysis of chemical samples, but not suspected biological samples. All suspected biological samples are analyzed by a designated laboratory.

The chemical staff monitors the mission status of all NBC recon and CBS units. The chemical staff advises the commander on all CBS operations. In addition, the theater chemical officer provides mission guidance for CBS missions IAW the command guidance. Specific missions are given to subordinate chemical units for support of NBC recon operations. Detailed mission orders and plans are prepared by the supporting chemical unit headquarters.

The chemical staff coordinates closely with the tasked unit to provide needed information (such as, intelligence information, target descriptions).

Units

There are three type of units primarily designated to collect CB samples. Environmental samples are normally collected by--

- NBC recon units.
- Technical intelligence teams.
- Preventive medicine units (portable water sources only).

Biomedical samples taken from affected individuals or bodies normally are collected by--

- Battalion-level medical units.
- Division-level medical treatment facilities.
- Combat support hospitals.
- Evacuation hospitals.

NBC recon units (assisted by medical personnel).

- Medical-technical intelligence teams.

Designated sampling units receive additional training on packing and transporting samples. Only authorized and trained elements can collect biomedical samples.

Technical Intelligence Team

The technical intelligence team assigned to the Foreign Materiel Intelligence Battalion (FMIB) is a TAACOM asswt. The CBS technical intelligence team has an extremely limited ability to conduct CBS operations, and therefore, must be augmented by specialty teams. The specialty teams perform the following functions--

- Operate the XM2 bio-environmental sampler.
- Conduct biomedical sampling.
- Conduct witness interviews.

Special Operation Forces (LB Teams)

The LB team is assigned to the Special Operations Force (SOF) and may be available to the theater commander for CB sampling operations. The SOF may conduct special operations independently when conventional operations are inappropriate or not

feasible. The LB team may be involved in special operations directly controlled by higher echelons. In most cases, this will require minimal involvement with the LB team's intermediate headquarters. LB team operations generally differ from conventional recon and other NBC recon units in operational techniques, mode of employment, distance from friendly support, dependence upon detailed operational intelligence, and indigenous assets.

The LB team conducts special NBC recon in denied, sensitive, or hostile territory. The LB team collects high quality samples, which are used as key input for critical decisions, such as verification of first use of toxic materiels by a threat force. See FM 3-18 for more information on LB team operations.

Staff Support

The theater chemical officer provides advice to the J2 on the proper use and employment of recon units qualified to conduct chemical and biological sampling operations. The theater chemical officer also provides information and recommends missions for the CB sampling units. The J2 generates the mission requirement and the theater chemical officer determines the best method for completing the requirement. The theater chemical officer uses the following considerations to determine which sampling assets are tasked:

- Intent of the intelligence requirement.
- Location of the sampling target.
- Effect of sampling on current operations.
- Effect of sampling on future operations.
- Support requirements.
- Security requirements.

If the theater chemical officer determines the best method for completing a requirement within a division's area of concern, he or she may recommend the employment of the TAACOM NBC recon unit. If the theater chemical officer needs advice or technical staff support for actions relating to the CB sampling requirement, he or she coordinates directly with the relevant staff element.

For example, if a CB sampling mission requirement involves biomedical sampling, coordination with the command surgeon is necessary. If the requirement for the CB sampling mission involves the interview of native witnesses or casualties, coordination with the J5 is necessary because it involves the civilian government.

After samples are taken, they are packaged and transported to the sample transfer point (which maybe the decontamination point). Appendix B provides detailed instructions on packaging samples. A qualified escort must accompany the suspected sample during the entire evacuation process to ensure safety and to maintain chain of custody. Technical escort is preferred during the entire evacuation process, but may not always be practical because of the limited number of technical escort units. The sample goes to the theater chemical and biological sample collection point.

If the sample is to go to CONUS for analysis, an additional technical escort is required to accompany the sample to CONUS from the port of debarkation to its final hand off to the receiving laboratory.

After the laboratory completes the analysis, the data is turned over to military intelligence channels for further analysis and dissemination. The Technical Intelligence Agency provides feedback to field commanders through the normal intelligence channels.

Appendix A

Operations in Special Environments

Environments that have a major influence on the conduct of military operations are--

- Mountain areas.
- Jungle areas.
- Desert areas.
- Cold weather regions.
- Urban areas.

Each of these environments has a different influence on NBC recon operations.

Mountain Areas

Excluding the extremely high, alpine-type mountains, most mountain systems are characterized by--

- Heavy woods or jungle.
- Compartments and ridge systems.
- Limited lines of communication, usually of poor quality.
- Highly variable weather conditions.

NBC recon units operate with attached elements or in direct support of brigade-sized units. Since mountain operations are decentralized, NBC recon leaders usually operate independently or semi-independently of their parent units.

NBC recon units concentrate on low terrain for persistent chemicals and on prominent terrain features for radiological hot spots produced by fallout.

Jungle Areas

The jungles of Asia, Africa, and the Western Hemisphere are potential battlefields. Jungle terrain is characterized by--

- Heavy vegetation, varying from rain forest to savanna.
- Constant high temperatures.
- Heavy rainfall during certain seasons.
- Constant high humidity.

As in mountain operations, NBC jungle operations are decentralized as much as possible. Recon elements maybe placed in direct support.

Due to the hot, humid conditions prevalent in jungle environments, frequent work breaks and reduction of MOPP levels by recon personnel will become necessary. Unfortunately, the jungle environment tends to make chemical agents more persistent and more effective in producing casualties. These factors combine to complicate timely NBC recon operations.

Desert Areas

Deserts are semiarid and arid regions containing a variety of soils in varying relief. Desert regions are characterized by--

- Extreme temperature ranges, varying between 30 degrees Fahrenheit (-1 degree Celsius) and 130 degrees Fahrenheit (54 degrees Celsius) over a 24-hour period.
- Changing visibility conditions.
- Long periods of drought.
- Shortage of suitable ground water.
- Large areas of excellent trafficability interspersed by ravines, bogs, and sand seas.
- An absence of pronounced terrain features.

The principal problem NBC reconnaissance units face in desert operations is lack of water. For example, without an outside water source, a decontamination unit can operate a deliberate decon station for only a short period. While conducting recon, knowing the locations of water sources is extremely important. There are additional recon problems in desert environments. Contamination found in a desert may become covered up then suddenly reappear because of shifting sands. Once an area has been contaminated, it must be periodical y monitored.

Extreme temperature ranges and soil compositions found in the desert complicate recon operations. The high temperatures during the day inhibit movement of personnel in high MOPP levels, in addition to possibly causing malfunctions in equipment, and detectors being used outside of their usual operating ranges. The relative lack of cover and concealment in desert terrain make security a problem during any daylight operations. As a consequence, night probably becomes the usual time of operation, even though lack of light will complicate the reading use of chemical detection paper and kits. Soil composition will adversely effect the detection capabilities of the M93 NBCRS since liquid contamination will be absorbed by the soil.

Note: The M93 NBCRS must be operated with the air conditioner on in hot temperatures to prevent damage to onboard equipment. The system will operate effectively for one hour with the air conditioner turned off or the vehicle power source turned off.

Cold Weather Regions

Northern regions, including the arctic and subarctic, comprise about 45 percent of the North American continent and 65 percent of the Eurasian land mass. Northern regions

are characterized by--

- Extreme cold and deep snow during winter months.
- Spring breakup, resulting in poor trafficability.
- White out and greyout, which cause loss of depth perception, making flying and driving hazardous.
- Ice fog, in which clouds of ice crystals cover troops, vehicles, bivouac areas, and permanent facilities.

When temperatures go below 32 degrees F (0 degrees Celsius), decon and recon elements have difficulty operating and maintaining their equipment.

Toxic chemicals also react differently at extremely low temperatures. For example, blister agents such as distilled mustard, phosgene oxime, and mustard-Lewisite mixture-become solids well above the freezing point of water. As the temperature drops to -15 degrees F (-26° C), two blood agents (hydrogen cyanide and cyanogen chloride) and three blister agents (HN3, L, and PD) become solids. At -70 degrees F (-57° C), only four toxic chemicals remain in liquid form: CG, SA, HN2, and ED. All of the remaining agents become solids, including nerve agents.

Munitions containing persistent agents normally become more persistent at low temperatures, If a soldier gets a solid agent on his clothing, he will probably not detect it, since it has no effect in solid form.

NBC recon operations are adversely affected by extreme cold. Electronic instruments, such as radiacmeters and automatic chemical agent alarms, become less dependable and may even fail. Chemical detection and identification kits cannot detect solid agents. It may be necessary to take soil, snow, or vegetation samples from suspicious areas and warm them to detect and identify chemical agents.

Urban Areas

Urban areas have a significant influence on military operations. Today, it is difficult to avoid built-up areas, particularly in Western Europe. Urbanized terrain is characterized by--

- Villages (population of 1,000 or less).
- Towns and small cities that are not part of a large urban complex (population more than 1,000 but less than 100,000).
- Strip areas that connect villages and towns along roads and valleys.
- Large cities with associated urban sprawl (population more than 100,000 and covering 100 or more square miles).

Chemical agents tend to act differently in built-up areas. Low-lying areas tend to collect residual chemical contamination. In an urban environment, even nonpersistent agents may enter buildings or seep into piles of rubble, which may enhance their persistency.

Buildings also provide shelter for chemical hazards and make predictions extremely inaccurate. Shifting winds might contaminate buildings and the areas around them but leave an adjacent area relatively free of contamination. Units should check areas they

plan to occupy, even if only for a short term, including basements, wells, and sewers.

Appendix B

Sampling Techniques and Procedures

The collection of environmental, biomedical, and background (control) samples is an integral part of investigating allegations pertaining to the first use of chemical or biological agents. The types of samples taken and the collection methods primarily depend upon the circumstances encountered by the collector. During all chemical and biological sampling operations, the commander establishes the required protective equipment to fit the situation. This appendix ends with a recommended list of equipment for use during chemical and biological sampling operations.

NBC recon units collect samples under various circumstances. For example, a recon unit may collect samples in an area free of hostile forces. The LB team may collect samples within the enemy area of operations or deep into the enemy's rear area. Samples include toxic agent munitions, chemical products, air, water, soil, and vegetation. In addition, all expended equipment used to collect the samples should be turned in to the laboratory. This equipment includes items such as expended M256A1 kits, M8 and M9 paper. These items should be recovered, packaged, and shipped with the suspected samples for analysis. Different information may be derived from each type of sample. Table B-1 compares different types of samples.

Table B-1. Comparison of sample types.

Sample	Info	Sample Stability	Time Required to Collect	Analysis Reliability
Air	Good	Good	20 min	High
Water	Good	Good	5 min	High
Soil	Fair	Fair	5 min	Moderate
Vegetation	Fair	Poor	10 min	Low
Tissue	Excellent	Fair	30 min	High
Blood	Good	Fair	10 min	High
Urine	Good	Fair	10 min	High
Munition fragments	Fair	Fair	10 min	Fair
Packing materials	Fair	Fair	10 min	Fair

Environmental Samples

Control or background samples are collected from clean areas near the attack areas as baseline data. The control samples must be identical to the samples collected from the contaminated areas. The contaminated samples are compared to the baseline data (control samples). This is especially true if unknown or nonstandard chemical and/or suspected biological agents were employed. The analysis center uses the control samples to compare with a contaminated one. The recon unit collects control samples of soil, water, and vegetation from areas about 500 meters upwind of an alleged attack area. Control samples generically are the same as those collected in an alleged attack area. For example, if leaves from an apple tree in an attack area were collected as a suspected contaminated sample, the recon team should collect leaves (as a control sample) from an apple tree outside of the contaminated area. If water from a pond in the attack area is collected, the recon unit should collect control samples of water from a pond (not a moving stream) in a nearby clean area. The size of an environmental control sample should be about the same as the suspected contaminated sample collected from the attack area (see Table B-2).

Table B-2. Standard sizes of CB samples to be collected.

Type	Size	Notes
Chemical Warfare Samples		
Soil	(10cm x 5cm x 1cm)	Cigarette-pack size or larger area is more useful than greater depth
Dilute agent	10ml	
Water	500ml (max)	
C18 Sep-Pak	200mt	
Vegetation	(Equivalent to 3 leaves or 3 hands full of grass)	Depends on amount of contamination. Best samples will be found near the release point.
Biological Warfare Samples		
Soil	(10cm x 5cm x 1cm)	Cigarette-pack size or larger area is more useful than greater depth
Liquid	25-50ml	Do not use C18 Sep-Pak with bio samples.
Vegetation	Size of soft drink can	Best samples depend on the amount of contamination found near release point.
Biomedical Samples		
Urine	20-50ml x 3ml	1 sample to TAML. 2 samples to CONUS (samples only to be taken from US casualties).
Whole blood or serum	5ml x 3	1 sample to TAML. 2 samples to CONUS (samples only to be taken from US casualties).
Cerebral spinal fluid	2ml x 3	1 sample to TAML. 2 samples to CONUS (samples only to be taken from US casualties).
Organ tissue	30g (minimum)	

Organ tissue	30g (minimum)	
Mediastinal lymph nodes	2	Should be removed by a surgeon during an autopsy

Collection of Air and Vapor Samples

Air is a suitable sample, because it is well-mixed. A sample of air contains a freed amount of contaminants. The amount of contaminants is determined by several factors:

- Wind speed.
- Rate the contaminant flowed into the environment.
- Physical state of the contaminant.
- Contour of the terrain.

How to Collect Air Samples

Two general guidelines apply to collecting air samples:

1. The recon team collects samples of air, using devices that draw air through a filter material that selectively removes certain compounds from the air.

2. To avoid contamination, persons conducting air sampling should not use cologne, perfume, insect repellent, medical creams, or strong soaps before taking a sample. The fragrances from these products are volatile organic compounds that may be absorbed on the filter and skew analytical results. Smoke also severely interferes with air sampling--therefore, avoid cigarette and vehicle exhaust smoke.

Detailed Procedures for Collecting Air Samples. The primary method for collecting air samples is with the PAS 1000 automatic air sampler in conjunction with a Tenex tube for a total of three to four minutes when possible. Upon completion of sampling, place the Tenex tube in a 2¼-inch piglette. Seal the piglette around the cap with either pressure sensitive or Teflon® tape. Once sealed place the piglette into a Mylar easy-close or "ziplock" bag. Fold the bag around the piglette in a circular motion, then apply another bag and fold again. Once the bag is folded around the piglette, use any type tape to secure the bag around the piglette. Place the piglette into a refrigerator or cooler until the sample is transported to its destination.

Where to Collect Air Sample. When chemicals are permitted into the atmosphere from a facility, the best places to obtain samples are close to the emission source where the concentration of the chemical is not diluted. The further from the original point of release, the more diluted the sample becomes from mixing with air, water, or environmental pollutants.

Natural and man-made terrain features such as hills, valleys, and rows of buildings, sometimes aid the collector by channeling emissions. When these features are associated with a particular facility, their downwind side is a suitable place to collect a sample because the emission remains more concentrated further from the release point.

For collection in a possibly contaminated location, and if the situation permits, initially use a detection kit such as the M18A2/M256A1 to determine if a possible vapor hazard exists from known chemical agents. Also, use the kit when personnel are required to examine possible toxic agent munitions. In any case, collect air samples with the white band tubes and save for identification and analysis.

Small air samplers also enable the collector to obtain vapor samples from alleged toxic agent munitions at a safe distance while explosive ordnance disposal (EOD) operations are performed. If EOD personnel are not on the scene, the air sampler can be activated, and the collector can stand at a safe distance while the sampler is operating.

When to Sample. Perform sampling operations as soon as possible when directed by a higher headquarters or after suspected chemical or biological contamination is encountered.

Collection of Water Samples

Water sampling is a matter of collecting enough water to get acceptable information about the contaminants. The collector should provide the analysis center with one C18 and one silica cartridge when using the Sep-Pak technique.

How to Collect Water Sample. General guidelines: If it is believed that the threat has used standard chemical agents during an attack, use the M272 chemical agent water test kit for initial screening and sampling.

Detailed procedures for collecting water samples. The following items are required along with the Sep-Pak C18 cartridge:

- One 60cc syringe without needle.
- One 3-way sterile, plastic, stop cock with protective covers.
- One piece of plastic tubing (3/16" ID x 6" long minimum).
- Sterile water or methanol.
- One clean container, such as a Teflon® cup or glass jar.

Prior to collecting each sample, prime the system in the following manner:

Step 1. Attach Sep-Pak directly to 60cc syringe.

Step 2. Pour small amount of sterile water or methanol into container.

Step 3. Insert tip of Sep-Pak into container.

Step 4. Withdraw at least 40cc of solution.

Step 5. Detach Sep-Pak from syringe and discard solution from syringe.

Step 6. Repeat steps 3 through 5 using the same syringe.

After priming is complete, assemble components in the following configuration:
1. Attach 3-way stop cock to 60cc syringe.
2. Attach Sep-Pak to opposite end of stop cock.
3. Attach plastic tubing to open end of Sep-Pak.

Use the following procedures to collect samples with Sep-Pak:

Step 1. Assure lever on stop cock is turned sideways with off arrow pointed toward the large outlet port.

Step 2. Place the open end of the plastic tubing into the water near the bottom, without touching bottom or sides of the body of water.

Step 3. Draw 60cc of water into syringe.

Step 4. Turn stop cock lever to off position by positioning lever to point toward stop cock.

Step 5. Push plunger all the way in, discharging the water from the syringe through the outlet port.

Step 6. Repeat steps 1 through 5.

Step 7. Detach plastic tubing from Sep-Pak, and discard as contaminated waste.

Step 8. Detach Sep-Pak from 3-way stop cock; place into sample container; seal with pressure sensitive tape; and mark for identification.

Note: You should take a minimum of four (4) samples: three (3) of suspected contamination and one (1) control sample from a nearby unaffected (none contaminated) area for reference.

Step 9. Dispose of syringe and stop cock as contaminated waste.

Step 10. Insert sample container in cooler or refrigerator until the sample is transported to its destination.

Where To Collect Water Samples. Drains are ideal sites, since contamination and dilution from other sources are minimized.

The recon team collects water samples from the slow moving parts of the stream because the turbulence and speed of rapidly flowing water tend to dilute chemical concentration. If an oil-stain-like fan, globules of organic materials, or an unnatural appearing powder-like material is visible on the water's surface, collect a surface sample of the material. If not, collect the sample from near the bottom of the stream. The upper layers of water may have lesser amounts of contaminants, due to higher temperatures that promote decomposition. Since most chemicals of interest are more dense than water, contaminants usually sink to lower levels.

To collect a sample at a given depth, the collector simply immerses a capped or stoppered container to the desired depth, removes the cap or stopper, lets the container fill, and then caps the container. An alternate method for deeper water is to use a plastic, pump operated siphon to pump water from a specific depth.

The recon team may collect samples from stagnant pools of water if the pools of water are part of chemical waste areas, such as a landfill or chemical disposal area. Chemicals may percolate into stagnant pools or sumps close to the site.

When To Collect Water Samples. The best time to collect a sample of water from a facility is when intelligence or local reports indicate that a process of possible interest is ongoing. In the absence of reliable reporting, this may be indicated by increased activity, higher than normal amounts of security, or increased flow from facility chimneys or water discharge pipes.

In field areas where a toxic agent has been sprayed or disseminated over a land area, the best time to collect water samples is just after the start of a rainstorm when runoff is beginning.

Natural surface drainage will concentrate any remnants of toxic compounds in depressions, streams, or ditches.

Collection of Soil Samples

Soil is a suitable place to collect samples for toxic organic compounds. A critical point, however, is that the precise site of the agent deposition must be sampled for best results.

How To Collect Soil Samples. Soil samples are collected by scraping into a collection container 2 to 5 centimeters of top soil from areas that appear to have been contaminated. If chunks or clods of earth are collected, select those that are no larger than 10 by 5 by 1 centimeters (see Table B-2). Also, collect a control sample of soil of the same type and texture from a nearby uncontaminated area.

Detailed procedures for collecting soil samples. Using a knife, spoon, spatula, or similar item, scrape 2 to 5 centimeters of suspect top soil into a collection container. Use a glass bottle, jar, or Teflon® jar as a container when available. Mylar bags also may be used. When using a identification. When using Mylar bags, place each sample in one bag, push excess air out, and seal by folding the open end over two to three times and wrapping with tape. Insert the first bag into a second bag, seal, tape, and mark for identification. If possible, place samples in a piglette.

Where To Collect Samples. Contamination is often recognized by discoloration or apparent deposition of material on the soil's surface.

If discoloration or deposits of material are evident, use something such as a garden trowel or wooden tongue depressor to carefully scrape up the soil. Collect only discolored soil or deposited materials, if possible.

Avoid direct contact with the sample (MOPP4 is required).

When To Collect Samples. Sample as soon as possible when directed or after the alleged incident.

Collection of Contaminated Vegetation

Before collecting samples of vegetation from an alleged attack area, the collector makes a visual survey of the area, dons protective equipment (MOPP4), and then enters the area from upwind.

Collect samples of vegetation that appear to be different from normal. Select leaves that have wilted or appear to have been chemically burned. Collect samples of vegetation that appear to have liquid or solid substances deposited on their surfaces (this may be noticed as a shiny or moist area).

Detailed Procedures for Collecting Vegetation. Collect samples of vegetation at several locations within the suspected contaminated area. Using a cutting tool or any sharp object, cut several affected leaves and/or a handful of grass whenever possible. Do not crush the sample. Place the sample into a Mylar or "ziplock" bag. Squeeze excess air out of the bag and seal. Fold open end of the bag over two to three times, and wrap with tape. The minimum size for a sample is three leaves or three handfuls of grass. One leaf is of little value, but is better than nothing. Bark is acceptable but not preferred. Mark the bag for identification. Take a control sample of similar material from an unaffected (uncontaminated) area. Fold, seal, tape, and

mark the control sample in the same manner as the actual sample.

Where To Collect Vegetation Samples. When it is possible to determine a probable center of attack in an area, collect vegetation samples near the center of the area, about 100 meters upwind of the area, and in several 100-meter increments downwind of the area. If the collector can discern a contamination pattern in the area, this should be reported.

Biomedical Samples

Just as blood and urine samples are taken from humans who were allegedly exposed in an attack, also collect samples from individuals who claim not to be affected by a toxic agent and are from the same group as exposed personnel. The purpose is the same as collecting environmental control samples; that is, to determine if a toxic substance is present in the individuals' natural environment or if it has been artificially introduced.

Selection of humans for control sampling is somewhat more complicated than selection of environmental control samples. This is because there are potentially large deviations introduced by ethnic diets, racial differences, physiological makeup, and actual living conditions of persons who are outwardly similar. Each of these factors must be accurately considered before selecting subjects as controls.

Consideration of ethnic diets is important because of unique foods or methods of food preparation that may exist. As an example, individuals in settled areas may purchase beer that has been carefully filtered and sterilized, while individuals in a nearby unsettled area may ferment their own beer by burying home crafted jugs for fermenting beer in the ground and extracting the product little by little over several months.

Racial differences can account for differences in mortality and morbidity rates in specific populations. One example of this could be the high rate of hemophilia in a population versus the rarity of the disease in another.

Physiological makeup is critical because of the differences in hormone balance and tissue composition in males, females, adults, and juveniles. For this reason, biomedical controls should be drawn from individuals of the same gender and approximate age as samples from exposed personnel, if possible.

Differences in the actual living conditions of people also require a close look. The point here is that conditions in remote, semicivilized camps are seldom the same as those in a well established camp that has access to modern amenities.

The bottom line in selecting subjects for biomedical control sampling is that they be as similar in all aspects as possible.

Collection

Trained medical technicians or physicians should collect biomedical samples (human or animal); however, LB team personnel are trained to do this procedure. Remember, the collector must have express permission (authority) to collect biomedical samples from the dead, because of religious beliefs in many cultures. To obtain such samples without permission may result in unnecessary mission complications. Ensure all personnel handling or collecting biomedical samples have received proper immunizations for their own protection. They must be inoculated IAW the surgeon general's guidance.

Biomedical samples collected during an investigation include blood, urine, and tissue samples from living victims and blood and urine samples from unexposed persons (background control samples).

Blood

Collect samples using either a standard 10 cc disposable syringe with a 1- to 1½-inch needle (20 to 22 gauge), or by using a vacutainer system. When using a vacutainer system, ensure that multiple sample. needles and "red top" vacuum tubes are used. Ten cc of blood is sufficient for analytical testing. Do not take more than 5 cc from small, malnourished children. After blood is collected, it should be transferred to a polypropylene-type container and sealed with parafilm before transporting. All body fluids should be collected without violating antiseptic techniques. Also, prior to transporting samples, collectors need to check specimen containers for paper labels IAW guidelines for labeling biomedical samples.

Note: Gloves should be worn for self-protection from transmission of contaminants whenever handling bodily ids. Do not freeze liquid blood and urine samples (ideal cooling temperature is between 35 and 40 degrees Fahrenheit, 2-4 degrees Celsius.)

Collect blood samples using the following materials and equipment:

- Gloves.
- 10cc sterile, disposable syringe.
- 1- to 1.5-inch sterile needle (20 to 22 gauge).
- Vacutainer device (adapter with needle).
- Constricting band.
- Disinfectant pads.
- Sterile 2x2-inch gauze pads.
- Betadine or alcohol.
- Labels.

Urine

Collect urine samples using either a standard urine cup or by a urine catheter. When using a urine cup, the person must urinate into the cup until sufficient fluid is collected (40 cc of urine is preferable, although 10 cc can support analytical testing). When the person is unable to urinate, the catheterization technique is preferable. The catheterization technique is best performed in a clinical environment. As with other body fluids collected, urine must be kept cod. Do not freeze.

Note: For correct procedures on catheterization refer to STP 8-91B25-SMTG.

Tissue

When alleged victims have unidentified skin lesions, photographs of the lesion(s) and overall photos of the extent of the lesion(s) should be taken, using color film before biopsy. A sample of the lesion should be obtained. This is done by surgically removing a portion of the skin with a sterile pair of scissors and forceps.

Place tissue samples in a Teflon® container filled 1/4 inch from the bottom with a preservative, (formalin 10%) for preservation of the sample until it reaches its proper destination. Seal the container and lid with parafilm. As with any other biomedical sample, tissue samples are refrigerated prior to shipment; but, do not freeze tissue samples.

Cadavers

Postmortem Examination. If a collector is able to collect samples from dead humans or animals, the following samples are collected:

- **Blood.** Use a 50-60cc sterile syringe with an 18-gauge, 5-inch (large bore) needle to collect blood from the heart, and urine directly from the bladder. Use a spinal needle to collect cerebral spinal fluids. Three of each samples must be collected.
- **Lungs.** A biopsy needle is needed to properly collect lung tissue samples. After collecting samples from the lungs, place sample in a plastic or Teflon® container filled with 10% formalin (preservative) and seal the container for transporting to its destination.
- **Liver.** If possible collect liver core samples, using a large-gauge needle (18-gauge, 5-inch long) via intercostal or abdominal puncture. Or, if the family consents, perform a mini laparotomy and obtain one or two 2x2x2cm sections of liver. Store and package the sample as directed for tissue samples.

Note: Before attempting any of the following procedures, collector must be certified by a qualified person (medical doctor) on the correct procedures to collect samples from cadavers.

Reporting, Packaging, and Shipment

Although a sample collected from an alleged attack area can be significant, it can become useless if proper steps are not talent to record critical information about its collection or if it is improperly packed and breaks during shipment to an analysis center, This section discusses the information needed when acquiring samples and the preferred methods for handling and packing samples for shipment.

Background Information

A complete history of the circumstances about each sample's acquisition must be provided to the agency analyzing the sample.

Critical information includes--

- **Circumstances of Acquisition.** How the sample was obtained, where it was found, and how it was collected.
- **Physical Description.** The physical state (solid, liquid, powder, apparent viscosity), color, approximate size, identity of the specimen (such as military nomenclature), dirt, leaves, or so forth.
- **Circumstances of Agent Deposition.** The type of delivery system, a description of how the weapon functioned, how the agent acted on release, sounds heard during dissemination, a description of any craters or shrapnel found associated with a burst, and colors of smoke, flames, or mist that may be associated with the attack.
- **Agent Effects on Vegetation.** A description of the general area (jungle, mountain, grassland) and changes in the vegetation after agent deposition (such as color change, wilting, drying, dead) in the main attack and fringe areas.
- **Agent Effects on Humans.** How the agent affected personnel in the main attack area versus fringe areas; the duration of agent effects; peculiar odors that may have been noticed in the area prior to, during, and/or after an attack; measures taken that alleviated or deteriorated the effects; and the approximate number of victims and survivors, to include their ages and genders.
- **Agent Effects on Animals.** The types of animals that were or were not affected by an attack and a description of how they were affected.

Handling and Packaging Materials

Materials used for packaging samples primarily consist of Mylar collection bags, Teflon® specimen jars and tubes, pigs and piglettes, ice chests, sealing materials, and wrapping and cushioning supplies.

Collection Bag

Use the Mylar bag as the initial container for such samples as protective masks and filter canisters, individual antidote and decon kits, munition fragments, and other items too large to place in a specimen jar. Use it also to package sample containers to ensure a vapor barrier in case the container is broken in transit. The bag acts as an initial or secondary vapor barrier to prevent air from leaking inward and toxic material outward. Follow the procedures below when using the bag.

If packaging a specimen container or non-environmental sample, first, verify it has a sample number. Carefully place the sample in a bottom corner of the Mylar bag.

Squeeze all the air out of the bag and seal it by removing the adhesive's protective strip, and pressing the two sides together.

Place a piece of 2-inch-wide fiber or cloth tape across the end of the bag that you just sealed to reseal the Mylar bag on the outside. This serves as extra insurance in case the internal seal is broken.

With the bag lying in front of you and the seal at the top, fold the bag across its width to as small a size as possible without damaging the sample. At this point, use tape to hold the fold. Next, fold the bag from the top down to the bottom of the bag to as small a size as possible. The sealing of the bag is the most critical step during the packaging process.

At this point, turn the bag over and use a marker or file label to put the sample number on the outside of the bag so that analysis center personnel can identify the sample.

Place the folded Mylar bag in a clear plastic ziplock bag, if available. Following the same steps you used for the Mylar bag, fold and seal the plastic bag. When this has been completed, again mark the sample number on the exterior of the bag.

Glass Specimen Jars and Polypropylene Tubes

Use glass containers to hold small environmental samples or autopsy specimens. Use polypropylene tubes to hold biomedical samples such as blood or urine. Polypropylene containers may be used for autopsy samples if required; however, glass containers are preferred. The use of glass rather than plastic containers is preferred for environmental samples because toxic agents may leach chemicals from plastics into a sample, introducing contamination and confusing the analysis efforts.

If the container has a screw-on lid, place Teflon® plumber's tape (NSN 8030-00-889-3535; Tape, Anti-Seize) on the threads of the container before putting on the lid. This helps to limit the leakage of liquids and vapor from the container and to assure the lid will not fall off while in transit. If the lid has a cardboard liner, remove the liner and replace it with one or two layers of parafilm (a laboratory sealant film).

Once the lid is on, stretch parafilm around the outside of the container at the junction of the

lid and the glass. Two wraps of the film is enough to provide a leakage barrier and more assurance that the lid cannot fall off.

At this point, ensure the sample number is on the outside of the container. Use a diamond etching pencil or an adhesive label to put the sample number on the exterior of the container.

Six-Pound Metal Can

Use metal cans as the external container for packaging small items that have been sealed in Mylar bags, specimen jars, and polypropylene tubes containing biomedical samples. The metal can helps absorb shock from rough handling during shipment and eliminates the spread of contamination if a specimen container is broken, The six-pound metal can is capable of holding more than one sample (depending upon size of samples).

Before placing samples in the can for shipping, ensure a sample number is assigned and is visible on each item.

Place about 1 to 2 inches of packing material in the bottom of the can.

Wrap jars and tubes in plastic bubble wrap or 1/8- to 1/4-inch-thick foam rubber sheeting, secure the wrap with tape or a rubber band, and place the wrapped item in the can.

If bubble wrap or foam rubber is not available, use newspaper. The guiding principle is that the sample containers should fit snugly and not be able to move in the can.

Ice Chest

Standard polyethylene or metal ice chests are the most easily procured items used for transworld shipment of CB samples. The most easily used size is about 24 inches long by 18 inches high by 15 inches deep. This size permits the sender to ship two or three 6-pound metal cans in each chest with sufficient dry ice to maintain freezing temperatures for about four days. Also, each chest remains at a weight that one individual can handle.

Coolants

The best coolant available in most areas is dry ice. It maintains low temperatures for several days and is easy to handle. Blue ice, a plastic containerized refrigerant, is acceptable and used if available, but will not maintain freezing temperatures for as long as dry ice. Standard ice should only be used as a last resort, because of its rapid melting rate and the possibility that melted ice may contaminate samples.

Internal Insulation

While a commercial ice chest provides good insulation of both the samples and the coolant, it is best to place extra insulation and cushioning around the metal cans inside the chest.

Newspapers, plastic bubble wrap, and foam rubber may all be used with almost equally good results except newspapers and standard ice do not mix well.

Acquisition Reporting

The collector must provide a formatted message for transmission as soon as possible to report

acquisition and shipment of samples, During special operations in a theater in which a special forces group (SFG) is deployed, the message is transmitted by the fastest means through the fewest channels to the chemical-biological sampling control element (CBSCE). If a CBSCE has not been deployed to the area of operations, as in a low-sample volume peacetime CB sampling operation, the message is transmitted by the fastest means through the fewest channels to the message addressees below. In addition, a written report accompanies each sample or batch of samples. The collector ensures that the acquisition message has been properly classified.

The acquisition report includes at least the following addressees:

SECSTATE WASHDC
SECDEF WASHDC//OSD-ISA/OUS-DRE//
JCS WASHDC//J-3/J-5//
CIA WASHDC//OSWR-STD-LSB/NIC-NIO(STP)//
DIA WASHDC//DT-3B/DT-5A//
DIR AFMIC FT DETRICK MD//AFMIC-CR/AFMIC-SA//
DA WASHDC//DAMI-FIT/DAMO-SWC//
CMDT USACMLS FT MccLELLAN AL//ATZN-CM-CU//
CDR CBDA APG

MD//SMCCR-OPF/SMCTE-OPE-RA-ID2//
CDR FSTC CHARLOTTESVILLE VA//AIAST-RA-ID2//

An acquisition message contains the following information:

- ☐ The sample identification number is part of the subject line if only a single sample is referred to in the text. Otherwise, refer to the sample number within the message body with its background information.
- The shipment date, mode of transportation, courier identification, air bill of lading number, flight number destination, and estimated time of arrival are included if the sample is to be shipped immediately. Also, the material courier receipt form (DD Form 1911) should be used to maintain chain of custody.
- Background information on the sample. Questionable circumstances surrounding acquisition of a sample. The name of another country or agency that acquired a sample from the same event or area and is not shown on the message address.
- A recommended priority and rationale for analysis to guide the analysis center on the assessment of the potential value of the sample.
- All details relating to the acquisition of the sample, regardless of how insignificant they may seem to the collector.

Dispose of samples according to the physical category of each.

Ship all samples by the fastest, safest means--preferably by a technical escort unit (TEU)--to the theater CBSCE or to a location the CBSCE designates. If there is no CBSCE in the theater, send the samples IAW preplanned instructions from the Chemical-Biological Sampling Control Center (CBSCC) at CBDA, Aberdeen, Maryland. The CBSCC uses the following criteria to determine the final destination of each sample:

- Is the sample chemical or biological in content?
- Is the sample content completely unknown?
- Is the sample a possible combination of chemical and biological material?

In any case, the CBSCC must be notified in advance of shipment of the sample so additional instructions or deviations from standard instructions can be given. Figure B-1 shows an

example of a shipping notification message. The CBSCC will direct, in advance, that samples be sent to one or more of the following locations, depending on the category of the samples.

```
FM AMEMBASSY DDTTTT Z JAN 93
TO CDR TEU APG MD//SMCTE-OPE//
SECSTATE WASHDC
SECDEF WASHDC//OSD-ISA/OUS-DRE//
INFO CIA WASHDC//OSWR-STD-LSB/NIC-NIO(STP)//
JCS WASHDC//J-3/J-5//
DIA WASHDC//DT-3B/DT-5A//
DIR NSA FT MEADE MD
DIR AFMIC FT DETRICK MD//AFMIC-CR/AFMIC-SA//
DA WASHDC//DAMI-FIT/DAMO-SWC//
CDR FSTC CHARLOTTESVILLE VA//AIAST-RA-ID2//
CDR CBDA APG MD//SMCCR-OPF//
CDR USACMLS FT MCCLELLAN//ATZN-CM-CU//

    CLASSIFICATION

SECSTATE FOR...
SECDEF FOR...
CIA FOR...
JCS FOR J-3/J-5 FOR...
DA FOR DAMO-SWC FOR...
AFMIC FOR...
CBDA FOR FIO...
FSTC FOR AMXST-FM/...
USACMLS FOR THREAT MGR...

E.O. 12356: DECL: OADR (Note: This is included if the message is classified.)
TAGS: ...

Subject: Shipment of CB Samples

REF(S): TEU MSG #_____, (DTG DDTTTT [time zone] JAN 93)

1. (X) SHIPPING INFORMATION:
    A. DATE SHIPPED: JANUARY 11, 1993.
    B. MODE OF TRANSPORTATION: AIR EXPRESS, AIR BILL NUMBER RPT _____
    C. FLIGHT SCHEDULE: TO TYO BY JAL XXX, JANUARY 11, 1993. TO JFK BY JAL
YYY, JANUARY 12, 1993. TO IAD BY DEC ZZZ, JANUARY 12, 1993.
    D. DESTINATION: DULLES INTERNATIONAL AIRPORT.
    E. ESTIMATED TIME OF ARRIVAL: 2010 HOURS, JANUARY 12, 1993.

2. SPECIAL HANDLING REQUIREMENTS: DRY ICE ENCLOSED AS COOLANT.

3. SHIPMENT CONSISTS OF TWO ICE CHESTS (1 FOR CRDEC AND 1 FOR
AFMIC) CONTAINING SIX SAMPLES. ALL LIQUID SAMPLES ARE IN POLYPROPYLENE TUBES
AND HAVE BEEN CAREFULLY PACKED TO AVOID BREAKAGE. THE FOLLOWING SAMPLES ARE IN-
CLUDED IN THE SHIPMENT:

SAMPLE NUMBER                          MESSAGE REFERENCE
TH-850102-001AG THRU                   BANGKOK DDTTTTZ JAN 93
TH-850102-005AG

4. USDAO HAS STATED THAT THIS SHIPMENT IS PARTIAL FULFILLMENT OF CIR.
```

Figure B-1. Sample shipping notification message.

Figure B-7. Sample shipping notification message.

Prior to shipment, contact must be made with--
Commander
Technical Escort Unit
ATTN: SMCTE-OPE
Aberdeen Proving Ground, MD 21010

DSN--584-4381 (Duty hours)
584-2773 (After duty hours)

This unit controls the transport of samples to their final destination(s). Do not ship suspected toxic samples or munition systems to CONUS technical centers or intelligence agencies without coordination and prior approval by the recipient.

Appendix C

SOP Outline

I. Command and Control.

- A. Troop leading procedures.
- B. Orders.
- C. Responsibilities.
- D. Communications.
- E. Intelligence.

II. Operation Security.

- A. Readiness conditions.
- B. Stand to.
- C. Security plan.
- D. Sleep plan.

III. Organization for Combat.

- A. Vehicle load plan.
- B. Precombat checks.
- C. Actions in assembly area.
- D. Communication checklist.

IV. Tactical Operations.

- A. Formations and movement techniques.
- B. Conduct of an NBC route recon.
- C. Conduct of an NBC area recon.
- D. Conduct of an NBC zone recon.
- E. Conduct of an NBC survey.
- F. Conduct of an NBC surveillance.
- G. Conduct of an CB sampling.
- H. Conduct of conventional reconnaissance.
- I. Cross and bypass a contaminated area.
- J. Road marches.
- K. Occupation of assembly areas.
- L. Passage of lines.
- M. Defensive operations.

O. Limited visibility operations.
P. Flank coordination.
Q. Consolidation/reorganization checklist.

V. Personnel.

A. Health and hygiene.
B. Medical evacuation.
C. POWs.
D. OEG status.
E. First aid and preventive medicine.

VI. Logistics.

A. Classes of supply and maintenance.
B. Recovery procedures.

VII. Appendixes.

A. Organizational clothing and individual equipment.
B. Air defense.
C. Fire support.
D. Safety.
E. Reports.
F. Brevity codes.
G. Marking contaminated areas.
H. Weapons and sensitive items security list.
I. Operational terms.
J. Land navigation.
K. Range cards.
L. Call for fire.
M. NBC

1. NBC reports.
2. M8 alarm operation.
3. MOPP.
4. Preparation for friendly nuclear attack.
5. Detection and effects of chemical agents.
6. Radiological survey procedures.
7. Radiological monitoring procedures.
8. Decon procedures.

Appendix D

Operations Checklist

1. What is the minimum information required to conduct the recon mission (extracted from the OPORD) (for example, recon, survey, support of chemical units)?

- Enemy situation.
- Friendly situation.
- Supported unit's mission.
- Supported commander's intent.
- Command and control.
- Logistics support.
- Signal.
- Security support.
- Coordinate MOPP level, OEG, and correlation factor.
- Supported unit.

2. What type of recon mission is to be conducted?

- Route.
- Zone.
- Area.
- Survey.
- Surveillance.
- Sampling.

3. How many vehicles will be required for the mission?

4. What are the actions at the contaminated area?

- Mark.
- Locate bypass routes (which sides).
- Find shortest route across.
- Collect sample.
- Continue mission.
- Remain and assist units in avoiding the contaminated area.
- Report (format, what net, and so forth).

5. Analyze the recon mission.

- Type of search technique to be used.
- Intervals at which samples and readings will be taken.
- Mounted/dismounted.

6. Is a survey required?

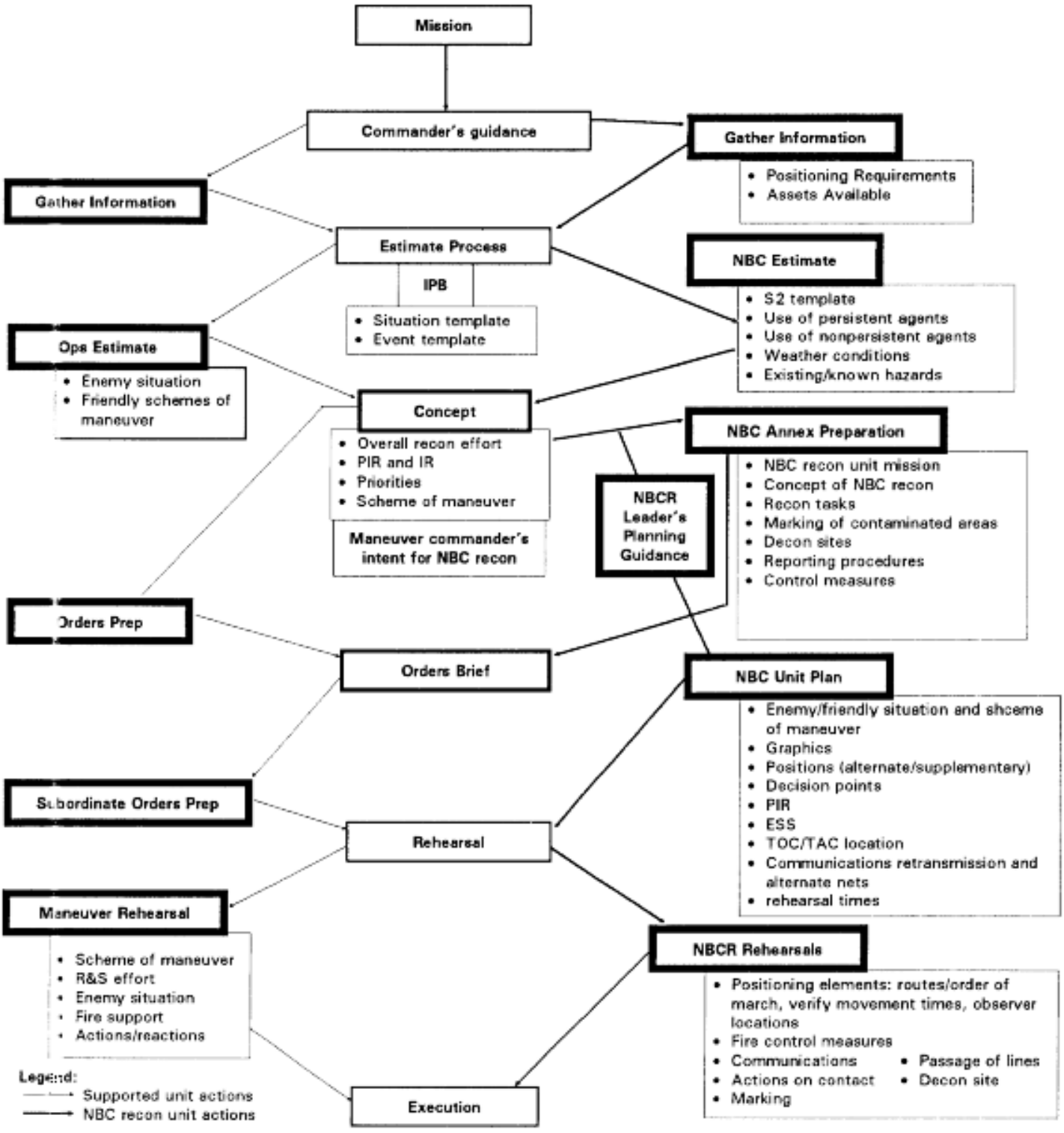
- Type of technique.

7. Marking the contaminated area.

- Type of marker.
- Interval markers are to be emplaced.

Appendix E

Planning Guide



Appendix F

Specimen Documentation

Chemical/Biological Specimen Documentation

Note:

This sample report allows a collector to note the most relevant details associated with pre- and post-specimen collection conditions. Do not consider the report to be all-inclusive.

1. ID Number _____
2. Collection (Date/Time): _____
3. Collector/Unit: _____
4. Type: Environ ☐ Biomed ☐ Single ☐ Multiple
5. Purpose: Attack ☐ Chem/Bio Alarm ☐ Chem Detect ☐ Recon Illness/Death ☐ Other
6. Post Exposure: ☐ Hours ☐ Days ☐ Weeks ☐ Unknown
7. Location: Town _____
   Coordinates _____
   a. Terrain: ☐ Flat ☐ Hills ☐ Mountain ☐ Desert ☐ Jungle ☐ Sparse Trees ☐ Grass ☐ Body of Water/Type: _____
   b. Weather: ☐ Clear ☐ Cloudy ☐ Rain ☐ Fog ☐ Snow ☐ Dust
   c. Wind: ☐ Light ☐ Heavy ☐ Gusty ☐ None
   d. Odor: ☐ Sweet ☐ Fruity ☐ Pepper ☐ Flower ☐ Irritating ☐ Changing ☐ None ☐ Other
   e. Temp at Time of Attack: _____ Temp at Time of Sample Collection: _____
8. Comments: _____
9. Attack: Date/Time _____ Method: ☐ Artillery ☐ Rocket ☐ Aircraft ☐ Mortar ☐ RPG/Grenade ☐ Other Describe: _____
   a. Explosion: Air _____ (Height) _____ Ground _____ Size _____ Distance _____ Describe: _____
   b. Consistency: Smoke ☐ Mist ☐ Dust ☐ Rain ☐ Gel ☐ Invisible Describe:
10. Environ Specim: ☐ Soil ☐ Water ☐ Veget ☐ Other ☐ Air
11. Bio-Med Specimen: ☐ Acute ☐ Convalescent ☐ Exposed, ☐ Not Ill ☐ Post Mortem ☐ Control Explain: _____ ☐ Blood ☐ Liver ☐ Lung ☐ Spleen ☐ Brain ☐ Skin ☐ Kidney ☐ Urine Other Describe: _____
12. Comments: _____
13. Casualty: SSN _____ Unit _____ Sex _____
14. Signs/Symptoms: ☐ Onset ☐ Duration
   a. Head: ☐ Fever ☐ Chills ☐ Headache ☐ Flushed ☐ Dizziness ☐ Unconsciousness ☐ Coma ☐ Hallucinations
   b. Eyes: ☐ Sunlight Sensitive ☐ Painful ☐ Burning ☐ Droopy Eyelids ☐ Double Vision ☐ Blurred Vision ☐ Large Pupils ☐ Pinpoint Pupils
   c. Nose: ☐ Runny ☐ Bleeding
   d. Throat: ☐ Sore ☐ Dry ☐ Salivating ☐ Bloody Sputum ☐ Hoarseness ☐ Difficulty Speaking
   e. Respiration: ☐ Difficulty Breathing ☐ Chest/Pain Discomfort ☐ Wheezing (In/Out) ☐ Coughing ☐ Labored Breathing
   f. Heart: ☐ Pounding of Running ☐ Irregular Hearbeat
   g. GI: ☐ Loss of Appetite ☐ Nausea ☐ Frequent Vomiting ☐ Frequent Diarrhea ☐ Vomiting Blood ☐ Diarrhea with Blood
   h. Urinary: ☐ Bloody Urine ☐ Unable to Urinate
   i. Musculo-Skeletal: ☐ Neck Pain ☐ Muscle Tenderness ☐ Muscle Tremling/Twitching ☐ Weakness ☐ Parulysis

Describe_____

_____

☐ Convulsions ☐ Tremors ☐ Muscle Aches ☐ Back Pain ☐ Joint Pain

j. Skin: ☐ Rash ☐ Reddening ☐ Itching ☐ Blisters ☐ Pain ☐ Numbness ☐ Profuse Perspiration

15. Comments: _____

_____

_____

_____

16. Related Specimens: _____

ID Number_____

Description: _____

_____

_____

Appendix G

Chemical and Biological Incident Interview Report

Note:

This report allows a collector to note the most relevant details of testimony given by personnel associated with alleged use of chemical or non-living biological agents. Do not consider the form to be all-inclusive.

CB Incident Interview
Date: _____ Interviewer:_____
Subject's Name: _____
Alias 1: _____ Alias 2: _____
Age: ___ Sex: ___ Year of Birth: _____
Nationality: _____
Subject's Address: _____
_____
_____
_____
Identity Card Number: _____
Military Service? Yes ☐ No ☐

	Units Assigned	Dates	Position
1.			
2.			
3.			
4.			

Occupation/Training:
1. _____
2. _____
3. _____
4. _____
Possible prior experiences of this nature?
Yes ☐ No ☐
Where? _____
When? _____
Describe: _____
_____
_____
_____
Where? _____
When? _____
Describe: _____
_____
_____
_____
Current Incident Information
Location: Town: _____
District: _____
Province: _____
Country: _____

or:
Days/Hours Walk From _____ Direction
Days/Hours Walk From _____ Direction
Days/Hours Walk From _____ Direction
Terrain Description:
Flat ☐ Hills ☐ Mountain ☐ Desert ☐
Jungle ☐ Shore ☐ River ☐ Sparse ☐ Trees ☐
Other Terrain Comments: _____
_____
_____
Weather:
Clear ☐ Cloudy ☐ Rainy ☐ Foggy ☐
Misty ☐ Snowy ☐ Dusty ☐
Other Weather Comments: _____
_____
Wind:
None ☐ Windy ☐ Gusts ☐ Mild ☐ Breeze ☐
Describe: _____
_____
_____
_____
_____
_____
Military/Guerrilla Operations in Area:
None ☐ Offense ☐ Bivouac ☐ Retaliation ☐
Retreat ☐ Patrol ☐ Unknown ☐
Describe: _____
_____
_____
Delivery Methods
Type:
Unknown ☐ Ground ☐ Air ☐ Arty/Rkt ☐
Other ☐
Describe: _____
_____
_____
_____
Est Height: _____ Size: _____ Distance: _
Agent Characteristics—Odor:
None ☐ Sweet ☐ Fruity ☐ Irritating ☐
Pepper ☐ Flower ☐ Changing ☐ Other ☐
Describe: _____

Agent Characteristics—Consistency:
Smoke☐ Mist☐ Dust☐ Rain☐
Gel☐ Dry☐ Visible☐ Invisible☐
Describe: _____

Agent Characteristics—Color (Use Federal Color Standard Chart): # _____ . _____
Describe Development of Color: _____

Area Coverage: _____

Physical Dissemination Coverage (for example droplet size and distance apart)
Describe or Let Subject Draw on Reverse: _____

Physical Effects
Symptoms: _____

Individual's Actions

During Attack: _____

After Attack: _____

Protective Measures: _____

Treatment Received: _____

Environmental Effects
Vegetation Changes? Yes☐ No☐
Describe: _____

Animals Affected? Yes☐ No☐
Describe: _____

Others Affected

	Name	Age	Symptoms	Resolution
1.				
2.				
3.				
4.				

Appendix H

Sample Shipment Report

FM AMEMBASSY DDTTTT Z JAN 85

TO CDR TEU APG MD//SMCTE-OPE//
SECSTATE WASHDC
SECDEF WASHDC//OSD-ISA/OUS-DRE//
INFO CIA WASHDC//OSWR-STD-LSB/NIC-NIO(STP)//
JCS WASHDC//J-3/J-5//
DIA WASHDC//DT-3B/DT-5A//
DIR NSA FT MEADE M D
DIR AFMIC FT DETRICK MD//AFMIC-CR/AFMIC-SA//
DA WASHDC//DAMI-FIT/DAMO-SWC//
CDR FSTC CHARLOTTESVILLE VA//AIAST-RA-ID2//
CDR CRDEC APG MD//SMCCR-OPF//
CDR USACMLS FT MCCLELLAN AL//ATZN-CM-CU//

CLASSIFICATION

SECSTATE FOR . . . .
SECDEF FOR. . . .
CIA FOR....
JCS FOR J-3/J-5 FOR . . . .
DA FOR DAMO-SWC FOR.. . . .
AFMIC FOR . . . .
CRDEC FOR FIO . . . .
FSTC FOR AMXST-FM) . . . .
USACMLS FOR THREAT MGR . . . .
E.O. 12356: DECL: OADR (NOTE: This is included if the message is classified.) TAGS: . . . .

SUBJECT: SHIPMENT OF CB SAMPLES

REF(S): TEU MSG, # _____, (DTG DDTTTT [time zone] Jan 85)

1. (x) SHIPPING INFORMATION:
A. DATE SHIPPED: JANUARY 11, 1985.
B. MODE OF TRANSPORTATION: AIR EXPRESS, AIR BILL NUMBER RPT
C. FLIGHT SCHEDULE:
TO TYO BY JAL XXX, JANUARY 11, 1985. TO JFK BY JAL YYY, JANUARY 13, 1985. TO IAD BY DEC ZZZ, JANUARY 12, 1985.
D. DESTINATION: DULLES INTERNATIONAL AIRPORT
E ESTIMATED TIME OF ARRIVAL; 2010 HOURS, JANUARY 12, 1985.
2. SPECIAL HANDLING REQUIREMENTS: DRY ICE ENCLOSED AS COOLANT.
3, SHIPMENT CONSISTS OF TWO ICE CHESTS (1 FOR CRDEC AND 1 FOR AFMICO CONTAINING SIX SAMPLES. ALL LIQUID SAMPLES ARE IN POLYPROPYLENE TUBES AND HAVE BEEN CAREFULLY PACKED TO AVOID BREAKAGE. THE FOLLOWING SAMPLES ARE INCLUDED IN THE SHIPMENT:

MESSAGE REFERENCE TH-8501 BANGKOK DDTTTTZ JAN 8502-00 IAG

SAMPLE NUMBER	THRU
TH-850102-005AG	

4. USDAO HAS STATED THAT THIS SHIPMENT IS PARTIAL FULFILLMENT OF CIR.

Search

Appendix I

CB Sample Collection Equipment List

ITEM	AMOUNT	DESCRIPTION	STOCK NUMBER
1	20	Labels, paper, pressure sensitive	7530-00-577-4376
2	2	Edmont Wilson gloves 8-8 1/2	8415-00-J02-2902
3	2	Edmond Wilson gloves 9-9 1/2	8415-00-634-4639
4	1	Tape, pressure sensitive adhesive, 2 inches	7510-00-159-4450
5	1	Pliers, #17, 5 inches	5120-00-543-5330
6	1	Screwdriver, flat tip 1/4 inch	5120-00-598-8853
7	1	Tongs, teflon tips	AF 15-202-5
8	2	Micro spatula with teflon ends	AF 21-401-50A
9	1	Scissors, universal type	AF 08-951-30
10	1	Polypropylene scoop 5x2x2	ASP 51021-5
11	2	Spoon spatula with teflon	AF 14-356-10
12	1	Knife, pocket	5110-00-526-8740
13	5	PFA sample bottles 6-ounce	CP J-6103-50
14	1	Pipet, jumbo transfer type	AF 13-711-7 (500/pk)
15	10	Pipet, gradual transfer type	AF 13-711-9A (500/pk)
16	10	Insulated bag, type 1	AF 01-814-8
17	10	Insulated bag, type 2 (will be replaced by mylar bag)	AF 01-814-10
18	1	Whirl/pak bag, 8-ounce	AF 01-812-6B (500/pk)
19	1	PH paper,non-bleeding plastic strip	SW 5-85271
20	1	Sep-Pak C18	W 51910 (50/bx)
21	2	Syringe, hyp 50 or 60 ml	6515-00-188-6913
22	2	Three way stopcock	ASP 58965-2

22	2	Three way stopcock	ASP S8965-2
23	1	R3802 Clear laboratory tubing	AF 14 169 38
24	1	Marking pen, waterproof	AF 13-381(12/pk)
25	2	Tenax tubes	LC ST-023
26	1	Blade, surgical cs21 150S	6515 01 009 5297

ITEM	AMOUNT	DESCRIPTION	STOCK NUMBER
27	2	Ice pack	CP TR 6345 20
28	6	Pad, non-adhesive 3x4 100s	6510-00-111-0708
29	4	Pad, cooling, chemical 4S	6530 00 133 4299
30	2	Pigletts	Special order
31	1	Tape, antiseizing	8030-00-889-3535
32	1	Personal air sampler	LSS G4980
33	1	Pocket bubble metric kit	GL4981
34	2	Methanol	
35	1	Distilled water	(5 bot/pkg)
36	1	matches, waterproof	
37	20	Razor, surgical perp	6515 00 926 2089
38	10	Watch, wrist	6645-00-086-4279
39	2	Parallax w/diagram	[illegible]
40	2	Clear [illegible]	[illegible]
41	100	[illegible]	
42	1	A non-motor module of providing [illegible]	
43	1	A [illegible]	
44	1	A non-motor [illegible]	

Glossary

This glossary provides readers a fast explanation of shortened word forms and terms used in this field manual.

A

AAR--after-action review.
ACR--armored cavalry regiment.
AGCF--air ground correlation factor.
ASG-1--radiac meter found on the M93 Fox.
ASG--area support group.
ADA--Air Defense Artillery.
ATGM--antitank guided missile.
AWS--Air Weather Service.

B

battle focus--
the process of deriving peacetime training requirements from wartime missions.
BDU--battledress uniform.
BSA--brigade support area.
BSK--bacteriological sampling kit.

C

C--Celsius.
CAB--combat aviation brigade.
CAM--chemical agent monitor.
CB--chemical/biological.
CBDA--Chemical Biological Defense Agency.
CBATEB--chemical/biological agent technical evaluation board.
CBS--chemical/biological sampling
CBSCE--chemical/biological sampling control element.
CBSCC--chemical/biological sampling control center.
CBSU--chemical/biological sampling unit.
CBW--chemical/biological warfare.
CHEMWARN--friendly chemical strike warning.
combat readiness--
the ability of a unit to perform in combat, it considers the status of personnel, equipment, and training.

COMMZ--communications zone.
COMSEC--communications security.
CONUS--continental United States.
COS--Chemical Operation Specialist.

COSCOM--corps support command.
CP--command post.
CS--combat support.
CSS--combat service support.
CW--chemical warfare.

D

decon--decontamination.
DF--direction finding.
DISCOM--division support command.
DS--direct support.
DSA--division support area.
DTG--date time group.

E

ECCM--electronic counter-countermeasures.
EDM--effective downwind message.
EEI--essential elements of information.
EOD--Explosive Ordnance Disposal.
EPW--enemy prisoners of war.
EW--electronic warfare.

F

F--Fahrenheit.
FEBA--forward edge of the battle area.
FLOT--forward line of own troops.
FM--frequency modulated.
FMIB--Foreign Material Intelligence Battalion.
Fox--M93 NBC Reconnaissance System.
FRAGO--fragmentary order.
FPF--final protective fires.
FPL--final protective line.
FSCOORD--Fire Support Coordinator.
FSE--Fire Support Element.

G

G1--Assistant Chief of Staff, G1 (Personnel).
G2--Assistant Chief of Staff, G2 (Intelligence).
G3--Assistant Chief of Staff, G3 (Operations and Plans).
G4--Assistant Chief of Staff, G4 (Logistics).
GN--grid north.
GPS--global positioning system.
GS--general support.
GZ--ground zero.

H

HE--high explosive.
HMMWV--high-mobility, multipurpose, wheeled vehicle.
HNS--host nation support.

I

IAW--in accordance with.

ICD--imitative communications deception.
IED--imitative electronic deception.
IPB--intelligence preparation of the battlefield.
IR--information requirement.

J

job--
the duties and tasks performed by a single worker.

L

LACR--light armored cavalry regiment.
LD--line of departure.
LOA--limit of advance.
loran--long-range aid to navigation

M

MACOM--major Army command.
MBA--main battle area.
MCC--movement control center.
METT-T--mission, enemy, terrain, troops, and time.
MIJI--meaconing, intrusion, jamming, and interference.
MM1--mobile mass spectrometer-found on the M93 Fox.
MOPP--mission-oriented protective posture.
MORTREP--mortar report.
MRL--multiple-rocket launcher.
MSR--main supply route.

N

NAI--named area of interest.
NATO--North Atlantic Treaty Organization.
NBC--nuclear, biological, and chemical.
NBCC--nuclear, biological, and chemical center.
NBCE--nuclear, biological, and chemical element.
NBCRS--nuclear, biological, and chemical reconnaissance system.
NBCWRS--nuclear, biological, and chemical warning and reporting system.
NCS--net control station.
NSA--National Security Agency.

O

O&I--operations and intelligence.
OEG--operational exposure guidance.
OP--observation post.
OPCON--operational control.
OPFOR--opposing forces.
OPORD--operation order.
opposing forces--
organized forces created from US Army units to portray he doctrine, tactics, and configuration of a potential adversary armed force during US armed forces training.

OPSEC--operations security.

P

PIR--priority intelligence requirement.
PL--phase line.
PLL--prescribed load list.
PMCS--preventive maintenance checks and services.
POL--petroleum, oils, and lubricants.
PSG--platoon sergeant.

R

REC--radio-electronic combat.
recon--reconnaissance.
RES--radiation exposure status.
RP--release point.
RTOC--rear tactical operations center.
R&S--reconnaissance and surveillance.

S

SFG--special forces group.
SHELREP--shell report.
SITREP--situation report.
SM--soldier's manual.
SOF--special operations forces.
SOI--signal operation instructions (replaces the term "CEOI").
SOP--standing operating procedures.
SP--start point.
SPETSNAZ--Soviet special forces.
SSM--surface-to-surface missile,
STANAG NATO--Military Standardization Agreement.
STRIKWARN--friendly nuclear strike warning.

T

TA--theater army.
TAACOM--Theater Army Area Command.
TAC CP--tactical command post.
TAML--Theater Army Medical Laboratory.
TC--track commander.
TEU--Technical Escort Unit.
TIRS--terrain index referencing system.
TL--team leader.
TOC--tactical operations center.
TOE--Table of Organization and Equipment.
TM--technical manual.

U

UW--unconventional warfare.
US--United States.
USAMRIID--US Army Medical Research Institute for Infectious Disease.

V

VEESS--vehicle engine exhaust smoke system.

W

WIA--wounded in action.

References

Sources Used

These are the sources quoted or paraphrased in this publication.

Joint and Multiservice Publications

FM 3-3. NBC Contamination Avoidance. FMFM 11-7. 16 November 1992.

FM 3-3-1. Nuclear Contamination Avoidance. FMFM 11-8. (Date).

FM 3-4. NBC Protection. FMFM 11-9. 29 May 1992.

FM 3-6. Field Behavior of NBC Agents (Including Smoke and Incendiaries). AFM 105-7,FMFM 7-1l-H. September 1992

FM 3-100. NBC Defense, Chemical Warfare, Smoke, and Flame Operations. FMFM 1l-2. 23 May 1991.

Army Publications

FM 3-18. Special NBC Reconnaissance (LB Team). (Date).

FM 3-101. Chemical Staffs and Units. 22 April 1987.

FM 5-36. Route Reconnaissance and Classification. 10 May 1985.

FM 7-7. The Mechanized Infantry Platoon and Squad (APC). 15 March 1985.

FM 17-95. Cavalry Operations. 19 September 1991.

FM 17-98. Scout Platoon. 7 October 1987.

FM 25-100. Training the Force. 15 November 1988.

FM 34-130. Intelligence Preparation of the Battlefield, 23 May 1989.

FM 71-1. Tank and Mechanized Infantry Company Team. 22 November 1988.

FM 71-2. The Tank and Mechanized Infantry Battalion Task Force. 27 September 1988.

FM 71-100. Division Operations. 16 June 1990.

FM 90-3 (HTF). Desert Operations (How to Fight). 19 August 1977.

FM 90-5 (HTF). Jungle Operations (How to Fight). 16 August 1982.

FM 90-6. Mountain Operations. 30 June 1980.

FM 90-10 (HTF). Military Operations on Urbanized Terrain (MOUT) (How to Fight). 15 August 1979.

FM 90-13. River Crossing Operations. FMFM 7-26. 30 September 1992.

FM 90-14. Rear Battle. 10 June 1985.

FM 100-15. Corps Operations. 13 September 1989.

FM 101-5-1. Operational Terms and Symbols. 21 October 1985.

CRDEC-SP-87023. Management Procedures for Chemical and Biological (CB) Agent Sampling, Transport, and Evaluation. Chemical Research, Development, and Engineering Center. Aug 1987

Documents Needed

These documents must be available to the intended users of this publication.

DA Form 2028. Recommended Changes to Publications and Blank Forms. February 1974

ARTEP 3-207-10-MTP. Mission Training Plan for NBC Reconnaissance Platoon. 23 October 1989.

Readings Recommended

These readings contain relevant supplemental information.

FM 3-101-1. Chemical Unit Tactics, Techniques, and Procedures. TBP

FM 100-5. Operations. 5 May 1986.

FM 100-10. Combat Service Support. 18 February 1988.

STP 3-54B1-SM. Soldier's Manual, MQS 54B, Chemical Operations Specialist, Skill Level 1. 12 March 1992.

STP 3-54B2-SM. Soldier's Manual, MQS 54B, Chemical Operations Specialist, Skill Level 2. 6 March 1992.

STP 3-54B-34-SM-TG. Soldier's Manual, Chemical Operations Specialist, MOS 54B, Skill Level 3 & 4 and Trainer's Guide. 8 November 1992.

STP 21-1-SMCT. Soldier's Manual of Common Tasks, Skill Level 1. 1 October 1990.

STP 21-24-SMCT. Soldier's Manual of Common Tasks, Skill Level 2/3/4. 1 October 1992.

STP 21-II-MQS. Military Qualification Standards II Manual of Common Tasks for Lieutenants and Captains. 31 January 1991.

STP 3-74II-MQS. Military Qualification Standards II Chemical Branch (74) Company Grade Officers. 29 March 1991.

Search

FM 3-19
FMFM 11-20
19 NOVEMBER 1993

By Order of the Secretary of the Army

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
05308

BY DIRECTION OF THE COMMANDANT OF THE MARINE CORPS

C. C. KRULAK
Lieutenant General, U.S. Marine Corps
Commanding General
Marine Corps Combat Development Command
Quantico, Virginia

DISTRIBUTION:
Active Army, USAR, and ARNG: To be distributed in accordance with DA Form 12-11E,

DISTRIBUTION:

Active Army, USAR, and ARNG: To be distributed in accordance with DA Form 12-11E, Requirements for FM 3-19, NBC Reconnaissance (Qtr rqr block no. 5094).

☆U.S. GOVERNMENT PRINTING OFFICE: 1994 - 300-421/82228