CHAPTER 2

PRINCIPLES OF FIXED SITE NBC DEFENSE

Fixed sites are hard to define because of the variety of missions performed and size variance in manpower and acreage. Therefore, a fixed site could be defined as a military operation that requires developed real estate to accomplish its wartime mission. Examples of fixed sites are ports, airfields, hospitals, and railheads. Fixed sites are also locations that are likely to be pretargeted before hostilities begin. The functional classes of these sites can be listed as (see Glossary for definition of each) --

- Ammunition depots.
- Airfields and aerial ports of debarkation (APODs).
- Command and control sites.
- Communication and intelligence collection facilities.
- Maintenance sites (light and heavy).
- Medical facilities.
- POMCUS sites.
- Ports and seaports of debarkation.
- Special ammunition storage points and air defense artillery sites.
- Supply depots.

There are three types of fixed sites:

- Preexisting facilities that cannot move. Ports, airfields, hospitals, and railheads are examples. If war came to these facilities, they would be abandoned, not moved.

- Operationally fixed sites. These are sites that are relocatable but are not moved for various reasons such as there is a lack of transportation, there are political decisions not to disperse before a conflict begins, or the organization is unwilling to move because they would suffer an unacceptably marked drop-off in capability if they did so.

- Transportable support structures. These are sites that will be deployed to perform the same types of missions as are performed in theaters where the Army has preestablished facilities. Some of these may be offshore initally; but as the Army broadens its onshore presence, the rear area of operations would grow. This would consist of maintenance units, ports, medical facilities, supply depots, and so forth. Transportable units could replace those fixed site functions (critical to the force structure) that were lost in the theater.

As a defense against NBC weapons, fixed sites must apply the three basic fundamentals of NBC defense:

- Contamination avoidance.
- Protection.
- Decontamination.

To defend against NBC weapons you must know what to protect. The analysis performed in the previous chapter determined that the site was of particular importance and should be protected. Therefore, the primary mission of the site had been identified in order to perform the initial analysis. The

commander must also identify the supporting functions on his site, since they contribute to the primary mission. The following are considered to be critical functions generic to all fixed sites:

- C^3I.
- Light maintenance.
- Heavy maintenance.
- General supply.
- Storage.

The three fundamentals of NBC defense are applied to each of the critical functions listed above. These critical functions can be generic to each supporting function as well. For instance, an Army depot that has a primary mission of heavy maintenance support must perform the critical functions listed above and apply the three fundamentals of NBC defense to survive and operate in a NBC environment. Likewise, a hospital located on this depot providing medical care (a supporting function) to depot personnel would have these same critical functions internal to it and would apply the three NBC defense fundamentals to each of its critical functions.

Figure 2-1 shows a theoretical approach to how these three basic fundamentals work together in providing NBC survivability for a site. The graph shows a site's efficiency measured over a period of time. We expect the efficiency to decrease as the warning for an NBC attack is given and personnel take protective action. After the attack, the lowest point on the graph, we see the site's efficiency brought back to almost its full capability within a short time due to the NBC survivability measures (the three basic fundamentals) taken before the attack. Therefore, through the application of these fundamentals a site can expect to recover to some form of operational effectiveness.

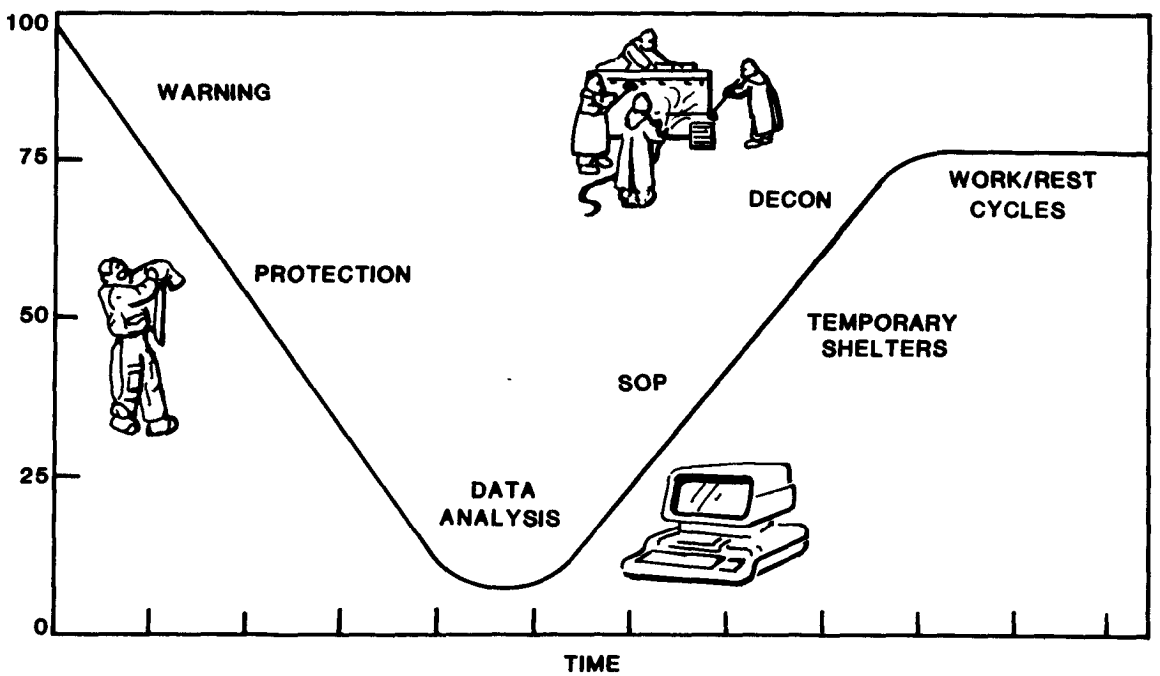

Figure 2-1. NBC survivability.

As you read through this chapter, you will see similarities and differences in the way the three fundamentals are implemented at fixed sites as compared to tactical units. In the latter part of the chapter we discuss nuclear survivability and smoke and obscurants as they apply to fixed sites.

CONTAMINATION AVOIDANCE

The key to continued operations at fixed sites is contamination avoidance. The principles of contamination avoidance are the following:

- Contamination control.
- Detection and warning.
- Identification and marking.
- Passive measures.

The use of smoke and obscurants is perhaps another way to avoid becoming a target by obscuring those target acquisition weapon systems which require visually controlled fires, such as aircraft, artillery forward observer, and so forth. This is discussed later in this chapter and in Chapter 6.

CONTAMINATION CONTROL

Contamination control encompasses decisions to limit the spread of contamination, reduce or eliminate its effect on sustained operations, and limit personnel exposure to agents. Fixed sites will obviously have a greater reliance on the need for contamination control than maneuver units because of limitations on relocation. Commanders must decide what critical equipment or structures warrant protection before and during an attack. After an attack, selective critical assets are decontaminated and relocated to restore operations. For contamination control to be successful, the commander must know where the contamination is, what type it is (for example, nerve, blister, and so forth), and the extent of contamination. This should be considered to be among the commander's priority intelligence requirement (PIR), since it will involve site operations.

The commander should keep abreast of weather phenomena at his site location. The commander should know what effect the weather has on NEC hazards, because MOPP levels could be adjusted based on weather. Once an attack has covered parts or all of the facility with contamination from an NBC munition, take actions to reduce the spread of contamination. Isolate contaminated areas or use field expedient means, for example, in the case of a chemical agent, covering roads with uncontaminated soil. Continue to use contaminated assets until they fail or are given maintenance.

DETECTION AND WARNING

Detection and warning will provide the information needed to coordinate NBC defensive actions. The more successful a facility can be in avoiding contamination of personnel and material by NBC agents, the less time and resources required to recover from the attack. The detection and warning capability will --

- Warn personnel of an imminent attack.
- Cancel the warning (when appropriate) to reduce the MOPP level.
- Locate the hazardous areas.
- Identify the state and type of agent.

With sufficient warning, installation personnel can take protective action and prevent exposure to, and subsequent assimilation of, militarily significant levels of NBC hazards, thereby preventing casualties. Warning cancellation, the issuance of a signal that the recent attack was not an NBC attack, will permit personnel to immediately remove mask, hood, and gloves without risk of exposure to NBC hazards, thereby preventing unnecessary wear of protective gear. By locating the hazard impact areas of agent clouds passing across an installation, actions can be taken to minimize the exposure of personnel to NBC contamination and to alert medical personnel of casualty areas, while allowing unaffected areas to continue their mission. Information on the class and physical state of the agent will assist in determining dry-up time for residual contamination and identify requirements for decontamination.

The ideal detection and warning system consists of several integrated capabilities. Information from radar and intelligence networks will provide the capability to give early warning of an attack. A central processing station, located at the C³I center, will provide the capability to manage the NBC detector matrix, minimize the occurrence of false alarms, automatically issue attack warnings, and to process attack data and provide decision aids to the site commander. The C³I center will use a network of alarms to expeditiously warn site personnel through the use of prearranged visual and audible signals and to issue warning cancellation signals (see Appendix A, STANAG 2047, Emergency Alarms of Hazard or Attack, as a guide). A matrix of on-site NBC detectors will allow the C³I center to continuously monitor for NBC attacks. The detector matrix will be tailored to the site based on its size, mission, and probable type of attack, on-target and/or off-target. Furthermore, NBC detection devices, not part of the matrix, must be placed in all work, rest, and relief areas and decontamination stations to prevent needless casualties and the further spread of contamination.

IDENTIFICATION AND MARKING

In addition to detecting and warning of contamination, the installation needs to have the ability to identify and mark it. The installation must be able to identify both vapor and liquid contamination. The most difficult type of agent to identify is a biological agent. This can be done by casualties incurred as well as by soil and water samplings. Through identification the agent duration can be approximately determined. When dealing with biological agents, the proper treatment may be initiated. In addition to identification, marking the contaminated area(s) becomes crucial. Commanders must look at the possibility of cleaning up these areas when the mission permits. An internal reconnaissance team may best accomplish this identification and marking mission.

PASSIVE MEASURES

A commander must consider passive measures to further enhance survivability of his installation, since these measures are more practical, easier, and produce more benefits for an installation than for maneuver units. The following are passive measures that apply to both tactical units and fixed sites. Chapter 3 will discuss passive measures in greater detail.

- Disperse.
- Cover supplies and equipment.
- Plan ahead.

- Use preventive medicine.
- Instill discipline.
- Seek protection.
- Limit exposure.
- Provide warning.
- Prevent spread of contamination.

PROTECTION

An installation should have a capability of providing both individual and collective NBC protection for its personnel. At a minimum, personnel will have individual protective equipment (IPE). Individual protection allows personnel to operate freely in a contaminated environment but not without some degradation. Collective protection on fixed sites may be permanent or movable. Permanent collective protection will be built into fixed sites, either through the design of new facilities or the remodeling of existing ones. This will provide personnel rest and relief from continuous wear of IPE and a contamination-free working area for critical missions. Movable collective protection is provided to those areas on a site where it is not feasible to permanently emplace collective protection. An example of this is heavy maintenance and general supply operations. In this case, temporary rest and relief shelters are provided as break areas within the area of operations. At a minimum, collective protection (permanent or movable) should be provided for critical missions such as C^3I operations.

Individual and collective protection is applied to the following critical functions mentioned previously: C^3I, light maintenance, heavy maintenance, general supply, and storage. C^3I and light maintenance are type I functions which are best performed in some form of collective protection. Heavy maintenance, general supply, and storage are type II functions which require individual protection with some form of rest and relief capability at the work site for periodic breaks.

A good shelter management program must be established to obtain maximum use of personnel when dealing with collective protection. This will be discussed further in Chapter 6.

For a commander to have a successful protection program, he must ensure the accomplishment of proper planning, training, and exercising.

DECONTAMINATION

Decontamination on a fixed site will occur when the mission dictates or when assets become available. Decontamination systems and procedures are grouped into three major categories: stationary systems that are built into the site; mobile systems for limited decontamination of buildings, roads, or equipment that cannot move to a stationary site; and personnel decontamination for entry into and exit from collective protection shelters. Constraints normally associated with tactical decontamination equipment (for example, weight, size, and transportability) do not have a significant impact on decontamination of a fixed site. Additionally, fixed site systems are built to allow for ease of decontamination and for control of contaminated runoff.

Decontamination equipment should be tailored to the mission of the particular site and be simple to operate. Biological agents are the hardest to decontaminate because of the inability to rapidly detect and identify the agents, especially in the case of toxins.

The reasons for decontamination discussed in FM 3-5 also apply to fixed sites:

- Lethality. Some agents (nerve) are capable of killing or incapacitating within minutes upon making contact with exposed skin or unprotected troops.

- Performance degradation. Personnel forced to operate for extended periods of time (greater than or equal to 12 hours) in MOPP4 will experience reduced or zero performance capability.

- Equipment limitations. Protective characteristics of filter elements for the protective mask and the lining for the MOPP suit will begin to break down within a given period of time or become overwhelmed by sufficient concentrations of an agent.

- Spread of contamination. Uncontaminated personnel and equipment allowed to come in contact with contaminated personnel and equipment or travel through contaminated terrain into clean areas will spread the contamination.

The following principles are discussed in Chapter 5:
- Decontaminate as soon as possible.
- Decontaminate only what is necessary.
- Limit spread of contamination.
- Decontaminate by priority.

Remember, decontamination operations on fixed sites differ from tactical decontamination operations due to mission and assets available. By applying the principles of decontamination, an installation commander should be able to develop and conduct effective decontamination operations.

NUCLEAR SURVIVABILITY

In a nuclear attack the damage and casualties occur over a large region in a short time. In addition, the radiation hazards from fallout continue for a long time, greatly limiting the capability of the installation to recuperate from the attack and to resume the essential functions of its mission. Therefore, facilities are built or modified to withstand the impact of blast, thermal radiation, and nuclear radiation. Electronic equipment must be thoroughly protected against the damaging effects of electromagnetic pulse (EMP) and transient radiation effects on electronics (TREE). Nuclear hardening with collective protection systems allows a facility to maintain its C^3I capabilities after an attack. Contamination avoidance principles are applied, as well, to enhance survivability.

OPERATIONAL SIGNIFICANCE OF RADIATION EXPOSURE

The effects of gamma radiation can be divided into two categories: early effects (initial radiation) and late effects (residual radiation). Early effects are those noticeable during exposure of the individual or within a few

hours or days after exposure; late effects appear much later, probably years after exposure. Commanders need to apply operational exposure guidance to reduce the number of casualties. The details of this can be found in FM 3-3.

PHASES OF NUCLEAR DEFENSE

Nuclear defense is divided into three time-phases: the emergency phase (during attack); the operational recovery phase (after attack); and the restoration phase (postattack recovery). The basis for dividing nuclear defense into three time-phases lies principally in the manner in which the gamma radiation hazard decays with increasing time after burst. In addition to the three phases of nuclear defense, some preattack planning for a nuclear attack should take place. The following are basic preattack planning measures:

- Implementation of basic estimates by the site.
- Choice of countermeasure system.
- Implementation of plan.
- Use of basic estimates at higher headquarters.
- Initial assumptions.
- Evaluation of recovery estimates.

The three time-phases and preattack planning measures will be discussed in greater detail in Chapter 6.

SMOKE AND OBSCURANTS

The use of smoke and obscurants is another way of increasing a fixed site's survivability. A concept, far term at this time, for the use of smoke requires the emplacement of smoke systems in hardened positions away from the perimeter to provide 360-degree coverage. The system will be able to provide obscurants of visual through millimeter wavelengths of the electromagnetic spectrum. The smoke should be remotely and automatically controlled from a central location using the facility's meteorological data system in order to change coverage of the facility. These smoke systems would not require personnel except for periodic maintenance. A near term approach is to request smoke generator support through higher headquarters. Smoke is used to conceal details of the site's operations and additional decoy systems should be used to deceive the enemy, such as camouflage techniques (see FM 5-20, Camouflage).

The following uses of smoke are applicable to fixed sites:

- Degrade the enemy's ability to see and gather information.
- Degrade effectiveness of enemy weapon systems target acquisition.
- Deceive the enemy.
- Restrict nap-of-the-earth and contour approaches for enemy aircraft.
- Attenuate the flash and thermal effects of nuclear weapons.
- Conceal friendly forces.

Coordination must be made for all smoke operations because of troop movements, critical supply routes, adjacent airfields, and supply operations.

Commanders should consider using smoke in conjunction with naturally occurring phenomena such as fog, rain, and snow.