PROTECTION in the NUCLEAR AGE



Defense Civil Preparedness Agency Department of Defense

TABLE OF CONTENTS

	paj	zе
Introduction	ni	ii
Chapter 1:	UNDERSTANDING THE HAZARDS OF NUCLEAR ATTACK	1
Chapter 2:	WARNING 1	1
Chapter 3:	FALLOUT SHELTERS, PUBLIC AND PRIVATE 1	7
Chapter 4:	IMPROVISING FALLOUT PROTECTION 2	9
Chapter 5:	SHELTER LIVING	5
Chapter 6:	FIRE HAZARDS	5
Chapter 7:	THE RELOCATION OPTION	9
Chapter 8:	EMERGENCY CARE OF THE SICK AND INJURED	7

INTRODUCTION

In this uneasy age in which we live, strife abounds in many troubled parts of the world. The weapons of modern warfare have become increasingly powerful and numerous. Potential aggressors can deliver nuclear warheads accurately on targets up to 8,000 miles away.

Despite continuing efforts to achieve and maintain peace, a nuclear attack upon the United States remains a distinct possibility. In the face of this threat, a strong civil defense is needed not only throughout government, but on the part of the individual and the family. And that is what this handbook is all about—to help the individual and the family prepare for the possibility of nuclear attack.

Undoubtedly, millions of Americans would die if a nuclear attack should occur. However, studies show that tens of millions would survive the initial effects of blast and heat. Many more would survive these initial effects if they had blast and heat-resistant shelters, or if they could relocate to less vulnerable areas before an attack. But all survivors could be exposed to deadly radioactive fallout. That is why fallout shelter for everyone is important.

Much has been done to prepare for a possible nuclear attack. Public fallout shelter space has been located for millions. Civil defense systems also include warnings and communications networks, preparations to measure fallout radiation, emergency operating centers to direct lifesaving and recovery operations, emergency broadcasting stations, local governments organized for emergency operations, and large numbers of citizens trained in emergency skills.

If an enemy should threaten to attack the United States, you would not be alone. The entire Nation would be mobilizing to repulse the attack, destroy the enemy, and hold down our own loss of life. Much assistance would be available to you—from local, State, and Federal governments, from the U.S. armed forces units in your area, and from your neighbors and fellow-Americans. If an attack should come, many lives would be saved through effective emergency preparations and actions.

You can give yourself and your family a much better chance of surviving and recovering from nuclear attack if you will take time now to:

- Understand the dangers you would face in an attack.
- Make your own preparations for an attack.
- Learn what actions you should take at the time of attack.

Every family or individual should give special attention to plan for shelter. Depending upon your location and upon various circumstances, one of three possible shelter options may be available to you:

- 1. Seek private shelter at home.
- 2. Seek public shelter in your own community.
- 3. Leave vour community to seek shelter in a less dangerous area. This handbook contains basic general information on nuclear attack. This general guidance supplements specific instructions issued by local governments. Since special conditions exist in some communities, local instructions issued by local governments may differ slightly from this general guidance. In such cases, the local instructions should be followed.

Chapter 1

UNDERSTANDING THE HAZARDS OF NUCLEAR ATTACK

The first step in preparing for a possible nuclear attack is to understand the major hazards you would face if attack should come.

When a nuclear bomb or missile explodes, the main effects produced are intense light (flash), heat, blast, and radiation. How strong these effects are depends on the size and type of the weapon; how far away the explosion is; the weather conditions (sunny or rainy, windy, or still); the terrain (whether the ground is flat or hilly); and the height of the explosion (high in the air, or near the ground).

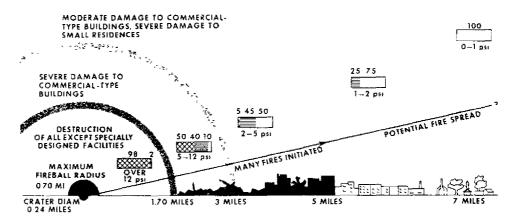
All nuclear explosions cause light, heat, blast, and initial nuclear radiation, which occur immediately. In addition, explosions that are on or close to the ground would create large quantities of dangerous radioactive fallout particles, most of which would fall to earth during the first 24 hours. Explosions high in the air would create smaller radioactive particles, which would not have any real effect on humans until many months or years later, if at all.*



DIRECT EFFECTS OF 1 MT. BLAST (SURFACE BURST)

LIGHT DAMAGE TO COMMERCIAL-TYPE BUILDINGS, MODERATE DAMAGE TO SMALL RESIDENCES

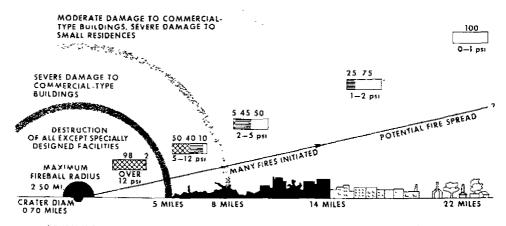




IF BURST IS ELEVATED TO ALTITUDE MAXIMIZING THE REACH OF BLAST DAMAGE, MODERATE DAMAGE FROM BLAST AND INITIAL FIRES ON A CLEAR DAY ARE EXTENDED FROM 5 MILES TO 8 MILES

DIRECT EFFECTS OF 25 MT. BLAST (SURFACE BURST)





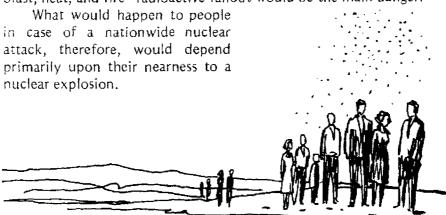
IF BURST IS ELEVATED TO ALTITUDE MAXIMIZING THE REACH OF BLAST DAMAGE, MODERATE DAMAGE FROM BLAST AND INITIAL FIRES ON A CLEAR DAY ARE EXTENDED FROM 14 MILES TO 22 MILES

What Would Happen To People

In a nationwide nuclear attack, people close to a nuclear explosion in the area of heavy destruction probably would be killed or seriously injured by the blast, or by the heat or initial nuclear radiation of the nuclear fireball.

People a few miles away—in the "light damage" area of the explosion—would be endangered by the blast and heat, and by fires that the explosion might start. However, it is likely that most of the people in the "light damage" area would survive these hazards, but they would be further endangered by radioactive fallout.

People who were outside the immediate damage areas would not be affected by the blast, heat, or fire. Department of Defense studies show that in any nuclear attack an enemy might launch against us, tens of millions of Americans would be outside the immediate damage areas. To them—and to people in the "light damage" areas who survived the blast, heat, and fire—radioactive fallout would be the main danger.



Type of Protection Needed

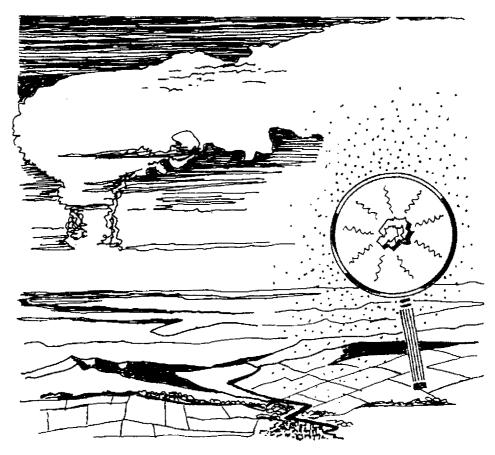
People in the areas of heavy destruction would likely need protection from various combinations of blast, initial radiation, heat, fire, and radioactive fallout. This would call for shelters strong enough to resist the blast pressure, made of heat and fire-resistant materials, and sufficiently dense or heavy and thick to protect from initial radiation and radioactive fallout. Usually, shelters affording protection from blast, heat, and fire would also provide appreciable protection from radioactive fallout. Although many people in the "light damage" areas would likely survive the blast, heat, and fire effects, they would still need protection from radioactive fallout. By improvising blast and heat protection with attendant improvement in fallout protection, the lives of millions of additional people could be saved.

However, people caught in the area of the fireball would no doubt be killed. Therefore, people living in or near likely target or high-risk areas may wish to relocate in safer areas and take fallout shelter there. (See Chapter 7, The Relocation Option.) This would be a serious option for many to consider if a period of international tension permitting time for such relocation should precede a nationwide nuclear attack.

For those people outside the immediate damage areas and for those relocating to lower-risk areas prior to an attack, effective protective measures can be taken against the danger of radioactive fallout.

What is Fallout?

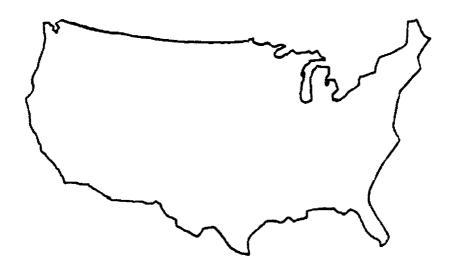
When a nuclear weapon explodes near the ground, great quantities of pulverized earth and other debris are sucked up into the nuclear cloud. There the radioactive gases produced by the explosion condense on and into this debris, producing radioactive fallout particles. Within a short time, these particles fall back to earth—the larger ones first, the smaller ones later. On the way down, and after they reach the ground, the radioactive particles give off invisible gamma rays—like X-rays—too much of which can kill or injure people. These particles give off most of their radiation quickly; therefore the first few hours or days after an attack would be the most dangerous period.



In dangerously affected areas the particles themselves would look like grains of salt or sand; but the *rays* they would give off could not be seen, tasted, smelled, or felt. Special instruments would be required to detect the rays and measure their intensity.

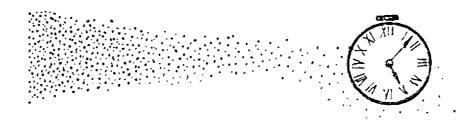
Fallout Would Be Widespread

The distribution of fallout particles after a nuclear attack would depend on wind currents, weather conditions and other factors. There is no way of predicting in advance what areas of the country would be affected by fallout, or how soon the particles would fall back to earth at a particular location.



Some communities might get a heavy accumulation of fallout, while others—even in the same general area—might get little or none. No area in the U.S. could be sure of *not* getting fallout, and it is probable that some fallout particles would be deposited on most of the country.

Areas close to a nuclear explosion might receive fallout within 15-30 minutes. It might take 5-10 hours or more for the particles to drift down on a community 100 or 200 miles away.



Generally, the first 24 hours after fallout began to settle would be the most dangerous period to a community's residents. The heavier particles falling during that time would still be highly radioactive and give off strong rays. The lighter particles falling later would have lost much of their radiation high in the atmosphere.

Fallout Causes Radiation Sickness

The invisible gamma rays given off by fallout particles can cause radiation sickness—that is, illness caused by physical and chemical changes in the cells of the body. If a person receives a large dose of radiation, he will die. But if he receives only a small or medium dose,



his body will repair itself and he will get well. The same dose received over a short period of time is more damaging than if it is received over a longer period. Usually, the effects of a given dose of radiation are more severe in very young and very old persons, and those not in good health.



Short-Term Effects of Radiation Exposure

Following are estimated shortterm effects on humans of external exposure to gamma radiation from fallout during a period of *less than* 1 week. The total exposure is given in terms of Roentgens (R), a unit for measuring the amount of radiation exposure:

0- 50R - No visible effects.

50-200R—Brief periods of nausea on day of exposure. 50% may experience radiation sickness (nausea); 5% may require medical attention; no deaths expected.

200-450R—Most will require medical attention because of serious radiation sickness. 50% deaths within two to four weeks.

450-600R — Serious radiation sickness; all require medical attention. Death for more than 50% within one to three weeks.

Over 600R — Severe radiation sickness, 100% deaths in two weeks.

No special clothing can protect people against gamma radiation, and no special drugs or chemicals can prevent large doses of radiation from causing damage to the cells of the body. However, antibiotics and other medicines are helpful in treating infections that sometimes follow

excessive exposure to radiation (which weakens the body's ability to fight infections).

Almost all of the radiation that people would absorb from fallout particles would come from particles *outside* their own bodies. Only simple precautions would be necessary to avoid swallowing the particles, and because of their size (like grains of sand) it would be practically impossible to inhale them.

People exposed to fallout radiation do not become radioactive and thereby dangerous to other people. Radiation sickness is not contagious or infectious, and one person cannot "catch it" from another person.

Protection is Possible

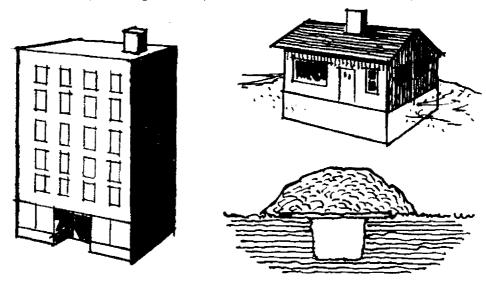
People can protect themselves against fallout radiation, and have a good chance of surviving it, by staying inside a fallout shelter. In most cases, the fallout radiation level outside the shelter would decrease rapidly enough to permit people to leave the shelter within a few days.

Even in communities that receive heavy accumulations of fallout particles, people soon might be able to leave shelter for a few minutes or a few hours at a time in order to perform emergency tasks. In most places, it is unlikely that full-time shelter occupancy would be required for more than a week or two.

Information from trained radiological monitors, using special instruments to detect and measure the intensity of fallout radiation, would be used to advise people when it is safe to leave shelter.

Many Kinds of Fallout Shelters

The farther away you are from the fallout particles outside, the less radiation you will receive. Also, the building materials (concrete, brick, lumber, etc.) that are between you and the fallout particles serve to absorb many of the gamma rays and keep them from reaching you.



A fallout shelter, therefore, does not need to be a special type of building or an underground bunker. It can be *any space*, provided the walls and roof are thick or heavy enough to absorb many of the rays given off by the fallout particles outside, and thus keep dangerous amounts of radiation from reaching the people inside the structure.

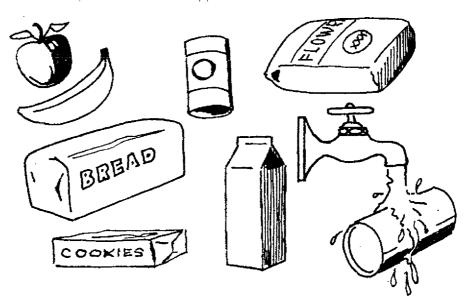
A shelter can be the basement or inner corridor of any large building; the basement of a private home: a subway or tunnel; or even a backyard trench with some kind of shielding material (heavy lumber, earth, bricks, etc.) serving as a roof.

In addition to protecting people from fallout radiation, most fallout shelters also would provide some limited protection against the blast and heat effects of nuclear explosions that were not close by.

Chapter 3, Fallout Shelters, Public and Private, discusses the various types of fallout shelters that people can use to protect themselves in case of nuclear attack.

Food and Water Would Be Available and Usable

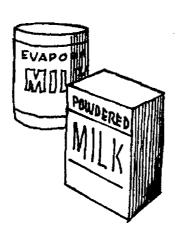
From many studies, the Federal Government has determined that enough food and water would be available after an attack to sustain our surviving citizens. However, temporary food shortages might occur in some areas, until food was shipped there from other areas.



Most of the Nation's remaining food supplies would be usable after an attack. Since radiation passing through food does not contaminate it, the only danger would be the actual swallowing of fallout particles that happened to be on the food itself (or on the can or package containing the food), and these could be wiped or washed off. Reaping, threshing, canning and other processing would prevent any dangerous quantities of fallout particles from getting into processed foods. If necessary to further protect the population, special precautions would be taken by food processors.

Water systems might be affected somewhat by radioactive fallout, but the risk would be small, especially if a few simple precautions were taken. Water stored in covered containers and water in covered wells would not be contaminated after an attack, because the fallout particles could not get into the water. Even if the containers were not covered (such as buckets or bathtubs filled with emergency supplies of water), as long as they were indoors it is highly unlikely that fallout particles would get into them.

Practically all of the particles that dropped into open reservoirs, lakes, and streams (or into open containers or wells) would settle to the bottom. Any that didn't would be removed when the water was filtered before being pumped to consumers. A small amount of radioactive material might dissolve in the water, but at most this would be of concern for only a few weeks.



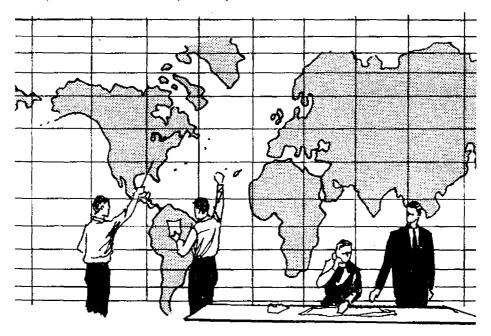
Milk contamination from fallout is not expected to be a serious problem after an attack. If cows graze on contaminated pasture and swallow fallout particles that contain some radioactive elements, their milk might be harmful to the thyroid glands of infants and small children. Therefore, if possible, they should be given canned or powdered milk for a few weeks if authorities say the regular milk supply is contaminated by radioactive elements.

In summary, the danger of people receiving harmful doses of fallout radiation through food, water or milk is very small. People suffering from extreme hunger or thirst should not be denied these necessities after an attack, even if the only available supplies might contain fallout particles.

Chapter 2

WARNING

An enemy attack on the United States probably would be preceded by a period of international tension or crisis. This crisis period would help alert all citizens to the *possibility* of attack.



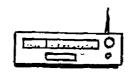
If an attack actually occurs, it is almost certain that incoming enemy planes and missiles would be detected by our networks of warning stations in time for citizens to get into shelters or at least take cover. This warning time might be as little as 5-15 minutes in some locations, or as much as an hour or more in others.

How you received warning of an attack would depend on where you happen to be at that time. You might hear the warning given on radio or television, or even by word-of-mouth. Or your first notice of attack might come from the outdoor warning system in your own city, town or village.

Many U.S. cities and towns have outdoor warning systems, using sirens, whistles, horns or bells. Although they have been installed mainly to warn citizens of enemy attack, some local governments also use them in connection with natural disasters and other peacetime catastrophes.

Different cities and towns are using their outdoor warning systems in different ways. Most local governments, however, have decided to







use a certain signal to warn people of an enemy attack, and a different signal to notify them of a peacetime disaster.

The Standard Warning Signals

The two "standard" signals that have been adopted in *most* communities are these:

THE ATTACK WARNING SIGNAL. This will be sounded only in case of enemy attack. The signal itself is a 3- to 5-minute wavering sound on the sirens, or a series of short blasts on whistles, horns or other devices, repeated as deemed necessary. The Attack Warning Signal





means that an actual enemy attack against the United States has been detected, and that protective action should be taken immediately. This signal has no other meaning, and will be used for no other purpose.

THE ATTENTION OR ALERT SIGNAL. This is used by some local governments to get the attention of citizens in a time of threatened or impending natural disaster, or some other peacetime emergency. The signal itself is a 3- to 5- minute steady blast on sirens,



whistles, horns or other devices. In most places, the Attention or Alert Signal means that the local government wants to broadcast important information on radio or television concerning a peacetime disaster.

What To Do When Signals Sound

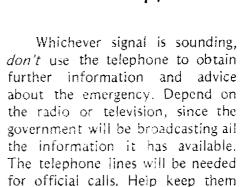
1. If you should hear the Attack Warning Signal—unless your local government has instructed you otherwise—go immediately to a public fallout shelter or to your home fallout shelter. Turn on a radio, tune it to any local station that is broadcasting, and listen for official information. Follow whatever instructions are given.

If you are at home and there is no public or private shelter available, you may be able to improvise some last-minute protection for yourself and your family by following the suggestions in Chapter 4, Improvising Fallout Protection.

2. If you should hear the Attention or Alert Signal, turn on a radio or TV set, tune it to any local station, and follow the official instructions being broadcast.

Don't Use the Telephone





Learn Your Community's Signals Now

As mentioned before not all communities in the U.S. have out-door warning systems, and not all communities with warning systems have adopted the two "standard" warning signals.

You should therefore find out now from your local Civil Defense Office what signals are being used in your community; what they sound like; what they mean; and what actions you should take when you hear them. Then memorize this information, or write it down on a card to carry with you at all times. Also, post it in your home. Check at least once each year to see if there are any changes.

If there is a Nuclear Flash

It is possible—but extremely unlikely—that your first warning of an enemy attack might be the flash of a nuclear explosion in the sky some

open.

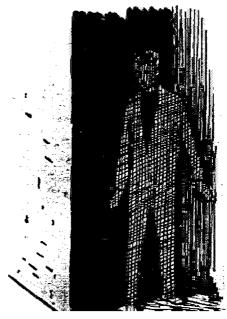


distance away. Or there might be a flash after warning had been given, possibly while you were on you way to shelter.

● TAKE COVER INSTANTLY. If there should be a nuclear flash-especially if you are outdoors and feel warmth at the same time take cover *instantly* in the best place you can find. By getting inside or under something within a few *seconds*, you might avoid being seriously burned by the heat or injured by the blast wave of the nuclear

explosion. If the explosion were some distance away, you might have 5 to 15 seconds before being seriously injured by the heat, and perhaps 15 to 60 seconds before the blash wave arrived. Getting under cover within these time limits might save your life or avoid serious injury. Also, to avoid injuring your eyes, never look at the flash of an explosion or the nuclear fireball.

• WHERE TO TAKE COVER. You could take cover in any kind of a building, a storm cellar or fruit cellar, a subway station, or tunnel—or even in a ditch or culvert alongside the road, a highway underpass, a storm sewer, a cave or outcropping or rock, a pile of heavy materials, a trench or other excava-



tion. Even getting under a parked automobile, bus or train, or a heavy piece of furniture, would protect you to some extent If no cover is available, simply lie down on the ground and curl up. The important thing is to avoid being burned by the heat, thrown about by the blast, or struck by flying objects

BEST POSITION AFTER TAKING COVER. After taking cover you should lie on your side in a curled-up position, and cover your head with your arms and hands This would give you some additional protection.





● MOVE TO A FALLOUT SHELTER LATER. If you protected yourself against the blast and heat waves by instantly taking cover, you could get protection from the radioactive fallout (which would arrive later) by moving to a fallout shelter