Nuclear Explosions
Facts, Questions and Answers
by Vermont Department of Public Safety
Civil Defense Division

Will a nuclear explosion kill everything within a specified range?

Nuclear weapons, like any explosive device, are limited in what they can do. Unless someone specifies a specific yield of a weapon, no one can predict exactly what will happen. In discussing nuclear weapons and their affects, generalities are generally false. For example, in the case of a 5 megaton weapon, the range of extreme blast damage is in the order of 15 miles; but this does not mean that everybody within that range will be killed. In fact, with relatively simple precautions such as sufficient warning to enable the population of an area to get into ordinary basements, a large number of people would survive these blast effects who would otherwise be killed. However, if one does survive the immediate effects of blast, he still must be prepared to contend with the effects of radiation fallout, and the means of protection against this hazard are surprisingly simple. Everybody isn't going to be cremated. More people will be in danger from radioactive fallout than from blast or heat. We can take many positive steps to protect our families and ourselves. Providing an adequate fallout shelter and stocking same with essential items should head the list. The properly designed and constructed fallout shelter can reduce lethal radiation levels to levels not much more than those produced by a series of medical X-rays. If caught away from home, we may have from 30 minutes to several hours to get to the shelter depending on the location of the blast, wind direction and velocity, et cetera. Remember, we are not going into eternal hibernation. The radiation level 48 hours after the blast is only 1/100 of what it was one hour after the blast. After the first two days, increasing amounts of time may be able to be spent outside the shelter.

Is it true that the amount of devastation which would be wrought makes it useless to want to live after attack?

It is true that the devastation which would be caused by nuclear detonations would be great. However, the physical effects of the explosion are limited to the immediate area of the explosion. Cities such as Hiroshima and Nagasaki were destroyed but they have since been rebuilt. Additionally, there would be extensive areas in the country which would be unaffected by the attack and which will ensure a capability of surviving under reasonable conditions.

What is fallout?

When the fireball from the nuclear weapon touches the earth's surface, great masses of pulverized debris are sucked

upward. These minute particles mix with particles from the weapon itself and will be intensively radioactive. They may rise to a height of more than 16 miles above the earth. Eventually, wind and gravity will bring this dust, which may be invisible, known as fallout back to earth. Where fallout will occur eventually depends on prevailing winds, condition of the weather, intensity of the blast and the size of the particles themselves. You might be safe from fallout radiation within a few miles from the site of a direct hit or you might be killed by it hundreds of miles from the target site. The only guarantee of safety is the protection you have provided for yourself. Keep in mind the fact that small amounts of radiation absorbed over a period of time are less harmful than a concentrated exposure at one time. Wherever you live, Civil Defense agencies will know existing conditions in every part of the country, not only at the time of the initial attack but throughout an emergency period. All of us should know and automatically respond to Civil Defense signals. A three to five minute steady blast means attack alert. A wailing signal or series of short beeps means attack, take cover now.

Why you should have a shelter.

Most of the radiation which hits the thick walls of a shelter can't go through. Neither can it go around a cornor. For this reason the entrance to a shelter should have a short corridor with a right angle turn. Radiation travels in a straight line with limited scattering affects. If radioactive fallout is filtered from the air or can't enter an area due to protecting walls, what air you then come in contact with is safe to breath. However, if your shelter is outside, either above or below the ground, you will need intakes through which filtered air can come. Instruction booklets for building your own shelter are available and are easy to understand. You may obtain these booklets through either your local Civil Defense office or the State Office of Civil Defense in Montpelier.

Some of the common questions asked about fallout shelters have concerned protection, ventilation, space, sanitary arrangements, food and water supplies and period of occupancy.

Under protection, the question arises, what kind of protection does this shelter give me and my family?

The shelter mentioned above has been designed to give adequate protection in the basement of a light stud frame construction house. In this type of construction, it will have a protection factor of approximately 100. It will not give protection against blast or fire. There is no requirement to install filters in the ventilation system. Fallout dust will not normally penetrate to the basement if the doors and windows of the house are closed in the normal way. If a small amount of fallout does get in, it will still be insignificant in relation to the gamma radiation penetrating the walls from outside.

Ventilation. How do we get air into the shelter?

With this type of shelter there is no requirement for forced air ventilation. Now, the type of shelter we are discussing is the basement type shelter. The normal air circulation is induced by the heat emanating from the occupants, cooking, lighting and the shelter heater, if required, and is controlled by means of a curtain hung across the doorway, if a curtain is used. The use of one gallon of fuel per day for cooking and heating will not induce any harmful effects either by way of oxygen depletion or combustion products. A certain amount of odors will be carried away in the circulating air, but even when this is not complete, it has been found by experience that after relatively few hours of life in the shelter the sense of smell becomes dulled and odors tend to be imperceptible. The shelter as recommended in the Federal pamphlet, MP-15, entitled, "The Family Fallout Shelter," is designed to accommodate six persons and these shelters can be very nicely arranged by having triple tiered bunks in the shelter thereby taking less space.

Sanitary arrangements. What facilities are there for sanitation?

The toilet can be of the bucket type in which polyethylene bags are used to dispose of waste matter. These should be tied at the neck and placed in the garbage can at the entrance way. Other waste matter from cooking, left over scraps of food, et cetera, should be similarly disposed of in polyethylene in the garbage can. Arrangements for disposal of waste water must be made either to the existing basement drainage or, once again, by placing in litter cans until it can be disposed of.

Food and water. How much food and water should we store?

We should store a minimum of two weeks supply of food. We should have a minimum of two weeks supply of water with a minimum of seven gallons per person.

Period of occupancy. How long would we have to stay in the shelter?

The shelter will be occupied on the receipt of a fallout warning. It will not be vacated until instructions have been issued by the local Civil Defense authorities. These statements will be issued via the 640 or 1240 Conelrad frequencies, specifically assigned for Civil Defense emergencies during the time of an attack. While the shelter is stocked for an occupancy of fourteen days, it is anticipated that in some areas personnel may be released from the shelter after a relatively short period of time, while in others it may be necessary to occupy the shelter for the full period. Only local radiation conditions will establish the period of

occupancy and this, therefore, cannot be predetermined. It is essential that some form of battery operated radio is available and working within the shelter so that the instructions may be communicated to the occupants over the frequencies specified 640 or 1240. In most cases, it may be possible to premit short visits to the basement and even to other parts of the house after the first 48 hours but these too will form the subject of instructions broadcast over the Conelrad system.

What can you do now?

Know your local Civil Defense Director, discuss the plans for your local area with him. Obtain and study all Federal and State pamphlets and heed their instructions. Understand our Civil Defense signals and follow them carefully. Prepare a safe home shelter, stock it properly with adequate supplies, water and food each selected and stored for safe keeping and emergency use. Know what fallout means and the significance of varying degrees of radioactivity. Know what is safe and not safe to do once the critical period of shelter life is over. Familiarize each member of the Family with his responsibilities. Be sure there is no uncertainty in anyone's actions.

Afterward, then what?

Once you receive the news that you may return to your home or come up out of the basement, things aren't automatically going to be right back to normal. Recovery from fallout, blast, et cetera, will not happen overnight. Though a lethal intensity of fallout decays extremely rapidly to a point where it is no longer harmful, we cannot guess about it. We must play it safe. We must make sure that we act upon official instructions from the Civil Defense authorities. The whole purpose of survival is the hope of a future worth living.