Nuclear Weapons Effects

EMP Effect RADIATION BLAST Effect THERMAL Effect

Most city planners estimate that the largest weapon to be used against populations would be one megaton in size. Most references in this discussion are, therefore, made to these yields. The weapons effects of interest are electro magnetic pulse (EMP), radiation, blast and thermal. A more thorough discussion of these effects is found in our book, NUCLEAR DEFENSE ISSUES.

EMP Effect
Most experts agree that a full scale nuclear attack would be initiated by a high altitude (approximately 200 miles high) nuclear explosion, and that it would most probably be deployed from a satellite. A nuclear bomb detonated at that altitude will not damage living tissue, will not cause significant radiation fallout and is not a health threat to the population. The purpose of this explosion is to damage critical electrical circuitry in our retaliatory defense weapons and our military communications capabilities. This is accomplished by means of the electro magnetic pulse (EMP) associated with the explosion. One such explosion could affect an area of a thousand miles in diameter.

Collectors, such as long runs of cable, house wiring, conduit, large antennas, overhead power and telephone lines, railroad tracks, etc., gather this energy in the form of a strong current and voltage surge. All solid state electronics is vulnerable to this energy surge. The equipment does not have to be attached directly to the collector in order to be damaged. It's possible for a collector to gather in the order of a joule of energy from a one megaton, high altitude explosion. The fact that a small fraction of a joule can cause permanent damage to electronic devices, shows that the EMP threat is a serious one. The damage to equipment could include some or all of the automobile ignition systems, telephone and radio communications, airline communications, navigational aids, & computers. Our power grid throughout the United States will most probably fail. Therefore, about 95% of our radio stations will loose transmission.

If a power drop is detected, care should be taken to test telephones, radio stations, and other equipment for loss of function. Many radio stations have alternate power sources, but only about 5% of our radio stations have been hardened against the EMP. If, after checking a battery powered radio, you find that most of the radio stations are not functioning, you should take shelter immediately.

Immediately after the initial EMP explosion, SLBM's and ICBM's would probably be launched against targets in the United States. An ICBM from Russia would reach the center of the continental United States in about 25 minutes. A missile from a submarine could reach us in 8 minutes. However, we are not currently seeing Russian nuclear missile submarines in our coastal waters. The 25 minutes which the power failure alarm will give you could mean the difference between life and death.

If you are asleep, a simple power-drop alarm would awaken you when the power fails. Schematics for this alarm and techniques for protecting equipment against EMP can be found in our book, NUCLEAR DEFENSE ISSUES on page 78. Simulations of EMP and testing of automobiles suggest a failure of the computerized ignition system could possibly be overcome by removing the battery cables, discharging them against the metal frame, waiting a few moments for the computerized systems to re-set, and then replacing the cables. It's worth a try.

Top

RADIATION
If the fireball of the weapon touches the ground, the blast is defined as a `ground burst'. In a ground burst, rock, soil, and other material in the area will be vaporized and taken into the cloud. This debris is then uniformly fused with fission products and radioactive residues and becomes radioactive itself. It then falls to the ground as `radioactive fallout'. If the fire ball from the explosion does not reach the ground, the blast is said to be an `air burst'. Radiation (except for initial radiation) does not become a factor in an air burst.

The threat of exposure to initial nuclear radiation is confined to a radius of about one and one half miles from ground zero and would prove fatal to any unsheltered individuals. However, in hardened blast and radiation shelters, such as those that are being built from instructions in 'NUCLEAR DEFENSE ISSUES', people could survive all nuclear weapons effects, including initial radiation, within three quarter mile of ground zero. When constructing shelters which may be within the initial radiation zone, careful consideration must be made to the shielding and geometry of the structure and entrances.

Gamma radiation is a great health problem for a two week period. Everyone should stay sheltered in a good fallout shelter for two full weeks. If blast is not a consideration, 4 feet of earth cover is sufficient to shield from gamma radiation.

Alpha and Beta radiation can be stopped by a few layers of paper. However , internal to the body, they are a great health hazard. We must be careful to wash the lids of dust before opening canned food, and wash and peel all exposed fruits and vegetables. Water purification, food preparation, and post war survival are discussed in chapter 4 of NUCLEAR DEFENSE ISSUES.

Top

BLAST Effect
In the detonation of a one megaton size weapon (which is roughly equivalent to l million tons of TNT) in just a fraction of a second, the fireball grows to 440 feet. In 10 seconds, the fireball is over a mile wide. At the same time the fireball is forming and growing, a high-pressure wave develops and moves outward in all directions. This wave of air causes a huge increase in air pressure. At one quarter mile from the crater edge, the overpressures are about 200 psi.

At 5 miles from the epicenter, the winds are 165 mph and the overpressure is apx. 5 psi.. Most homes would be destroyed, but it is possible to survive in a basement shelter at that distance. At 6 and 7 miles from the epicenter, there will be moderate damage to residences and the likelihood of surviving in a basement is greater.

Survival in hardened blast and radiation shelters, such as the one described in NUCLEAR DEFENSE ISSUES, is possible at ground zero from an air burst; and at three quarters of a mile from a ground burst. At that proximity, an 8 foot diameter shelter must have at least 8 feet of dirt cover over head. A 40 ft. long shelter of that diameter can house 40 people at an installed cost of approximately $250 per person. Detailed instructions for construction are given in chapter 3 of NUCLEAR DEFENSE ISSUES.

In most war fighting scenarios, the vast majority of our populations would live in areas affected by less than 5 psi. Radiation shelters should be constructed in every available basement and every person should

know how to find expedient sheltering if caught away from home. Instructions for finding expedient shelters and using your basement for shelter are given in chapter 3 starting on page 131 of NUCLEAR DEFENSE ISSUES.

Top

THERMAL Effect
Within less than a millionth of a second of the detonation, large amounts of energy in the form of invisible x-rays are absorbed within just a few feet of the atmosphere. This leads to the formation of an extremely hot and luminous mass called the fireball. If we were standing 50 miles away, this fireball would appear to us to be many more times as brilliant as the noon day sun.

You should never look directly at the fireball of a nuclear explosion. Because of the focusing action of the lens of the eye, especially at night when our pupils are open, thermal radiation can cause temporary and even permanent blindness.

The thermal pulse travels at the speed of light and can last for a fraction of a second, up to several seconds. It also generally travels in straight lines, as does light. If there is no warning, you should drop and cover immediately. If you do have warning, you should take cover behind a large structure, or go to a basement or culvert. If unprotected you would receive third degree burns at 6 to 8 miles from the blast; second degree burns at a distance of 8 to 10 miles; and first degree burns at 10 to 12 miles from the blast. Burns would greatly complicate an otherwise survivable situation.

NUCLEAR DEFENSE ISSUES describes the fission and fusion process, fallout patterns, protection factors, shielding materials, and many, many other useful tools in calculating survival techniques for nuclear weapons effects. We hope this book will find a place in your emergency preparedness library online our at home.

Top