

## **REDUCING THE EFFECTS OF A NUCLEAR EXPLOSION**

### **Introduction:**

Blast effects are dynamic winds and static overpressure.

Dynamic winds are like those experienced in hurricanes although more localised and of higher velocity. In addition to blowing down structures, these winds can pick up debris that can damage other objects and persons due to their high velocity.

Static overpressure is the increase in pressure when the blast wave surrounds an object. This has a crushing effect on hollow objects and can crush buildings and damage internal organs.

When a nuclear weapon explodes close to the earth's surface, large quantities of dirt or water are drawn up with the hot air rising from that explosion. It becomes radioactive as it rises.

Heavy debris will fall back close to the point of explosion. Lighter particles are carried down wind to spread across the surface as a carpet of 'fallout'.

### **Amounts of radiation experienced with a detonation depend on the method of detonation and this can be in the form of:**

Air  
Surface  
Subsurface

Level of radiation also depends on the components of the bomb, and what type of bomb it is: fission (explosion and radiation) or fission-fusion (an initial nuclear explosive component that triggers a bigger reaction / explosion and radiation release).

Thermal radiation is the intense heat and light released by a nuclear burst, it can cause temporary or permanent blindness, burns and fires. Burns can be related to the blast (flash burns) or a result of secondary fires. Severe eye injury leading to blindness can occur from looking directly at the blast many miles beyond the range at which all other immediate effects occur.

All radiation is dangerous to the body, some of that within 'fallout' causes burns if it lands on exposed skin.

Ionizing radiation is the radiation produced by a nuclear detonation. Outside of the detonation zone this is the most critical issue for survivors. Initially there is intense burst of gamma and neutron radiation that travels outward from ground zero with the thermal radiation. Soil below the fireball can also become radioactive.

### **Environmental conditions can greatly influence the effects of the blast and the resultant fallout are:**

Weather patterns  
Rain  
Wind  
Terrain

### **It is a serious hazard if:**

Inhaled  
Swallowed  
Enters open wounds

Particularly dangerous is gamma radiation, which causes 'radiation sickness'. This takes the form of:

Nausea  
Vomiting  
Loss of appetite  
General malaise

If it's a high dose - eventually death

Radioactive fallout can be recognised only by special instruments called dosimeters and dose rate meters. Military and other organisations will have these in various forms.

You cannot destroy radiation but can protect yourself by removing `fallout` from your body and equipment as soon as possible by brushing, wiping, dusting or shaking. This should be conducted in an area where it will not be a hazard to yourself or colleagues later on.

Need to know:

What precautions taken before and after a nuclear explosion will minimise its effects.

The two most important issues for survivors of a nuclear detonation are shelter and decontamination.

The importance of sheltering in a place, preferably inside a sealed room, for at least the first 48 hours after a nuclear detonation cannot be over-emphasised.

The most lethal threat to persons in a contaminated area after a blast is exposure to and ingestion of radioactive fallout.

Planning should be on preparing shelter and supplies and on understanding and providing for decontamination.

It is essential to put as much physical mass between yourself, the blast and the resultant radiation as possible.

Identify locations that afford the greatest protection. Ideal places are basements and other reinforced underground space. As an alternative, windowless interior spaces should be considered, above ground to protect from surface radiation. For example a windowless room on a mid-level floor of a high-rise building affords the most protection from radioactive fallout on the ground and on roof surfaces.

Radioactivity weakens rapidly in the first hours of an explosion. This is called `decay`. After 7 hours fallout has lost about 90% of the strength it had one hour after the explosion. After 2 days it has lost 99%. Nevertheless if the radiation at the beginning is high enough, the remaining percentage could be dangerous. Ideally you should be prepared to stay in cover for up to 14 days with all food, first aid supplies and water.

### **Decontamination**

Prepare to decontaminate individuals exposed to fallout. The object of decontamination is to remove the particles of radioactive dirt or dust that have come into contact with the skin and clothes. Clothing that has been contaminated should be removed or discarded prior to entering the sheltered area. The water used for decontamination, i.e. the shower water, etc., should be contained and covered and kept separate or drained outside of the shelter area to avoid shelter contamination.

### **Medical**

In a nuclear detonation, medical supplies and resources will be quickly overwhelmed. Traumatic injuries and burns are the most immediate consequences of a nuclear detonation and require conventional medical and surgical care.

### **Critical points to remember are:**

The injured are not radioactive and pose no danger to first responders

Stabilising injuries is the first priority

Decontamination comes second

Injured personnel should have wounds decontaminated by medically trained personnel if possible

Vigorous scrubbing disrupts the skin, potentially embedding radioactive particles into tissue

Radiation sickness may follow

Nausea and general weakness are the immediate effects of significant radiation exposure

Delayed effects may appear days to weeks later and may involve the central nervous, immune and gastrointestinal systems

Generally, no specific therapy for radiation exposure is immediately necessary, beyond routine supportive care for victims

## **POINTS TO REMEMBER**

The Nuclear Immediate Action Drill

You have to be able to recognise a nuclear explosion and carry out the immediate action drill (IAD).

The main differences between a nuclear and any other explosion are its scale and the fact it gives out radiation.

You cannot sense radiation - recognise such an explosion by its other characteristics. These are:

Blindingly bright flash  
Followed by a wave of intense heat and a devastating blast wave

### **To survive this:**

As soon as you sense the flash - shut your eyes  
Drop to the ground face downwards  
Place your hands under your body  
Remain flat until the heat and TWO blast waves have passed you

### **Protection:**

The best cover is essentially specially prepared hardened shelters such as those at airfields but there are precautions which those who are not in such shelters can take to reduce effects.

### **Pre-Attack:**

Build narrow trenches with straight sides, as deep as possible with at least 18 inches of overhead cover to protect against heat, blast and immediate radiation  
Remain under cover whenever possible  
Keep all essential clothing and equipment in your trench with you

### **Post-Attack:**

Carry out the Immediate Action drill (IA)  
Any shielding will be better than none  
If there is a significant dust hazard then wear full Individual Personal Equipment (IPE - chemical suits / gloves / boots / respirator)  
Stay under cover whenever possible  
Keep food and water covered at all times  
Keep any cuts / abrasions, etc. covered at all times  
When moving around outside - try to avoid disturbing the dust or touching objects unnecessarily

### **Practice:**

Learn what precautions you must take to improve your chances of survival both before and after a nuclear attack.  
Ensure that you know how to wear and look after the IPE.  
Ensure you carry it at all times if there is a threat warning.