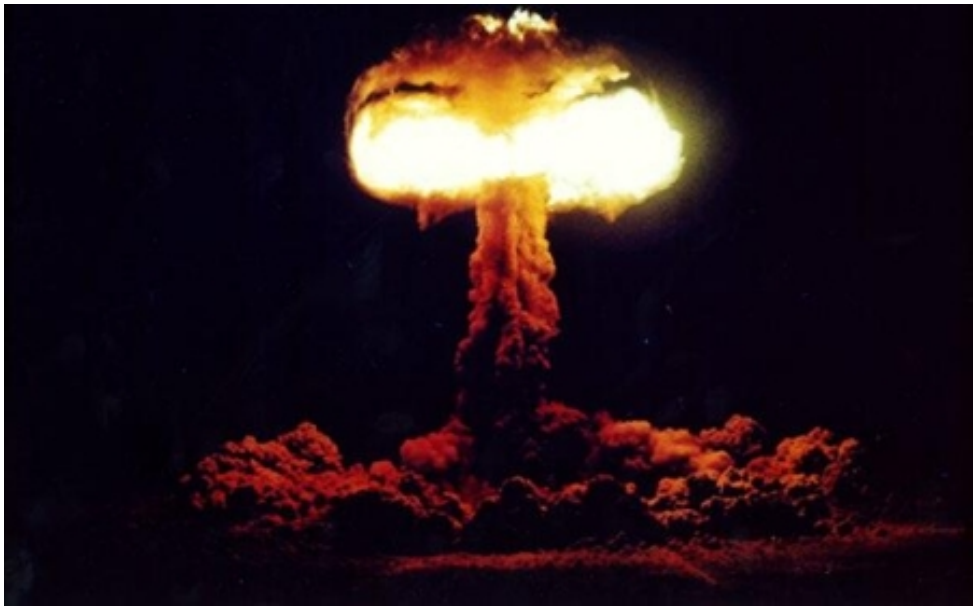
PROMETHEUS COUNCIL

Nuclear Attack



Nations that have nuclear weapons capabilities are protected with the highest degree of security in terms of weapons available, psychological testing of personnel staffing these facilities and priority to respond to potential threats against these facilities.

Most nations also participate in nuclear weapons treaties and nuclear weapons bans imposed. The possibility of an all out nuclear attack against one nation is remote. For our purposes an attack is defined as a continuous and willful assault using a nation's entire arsenal of nuclear weapons in an act of war. It does NOT include nuclear accidents, incidents, accidental launchings or limited terrorist incidents such as a rogue nation launching a single nuke or terrorists detonating a dirty bomb.

Broken Arrow is a serious accident involving nuclear weapons that can include fire, non-nuclear explosions, accidental launching, radioactive contamination, bomb (s) or warhead(s) lost and not recovered.
Bent Spear is a less serious incident involving nuclear weapons.
Nucflash is a Broken Arrow that risks starting a nuclear war.
Dull Sword is an accident less serious than a Bent Spear often involving radioactive material, not weapons, in road transports, train wrecks or incidents similar to the United States incident of Three Mile Island and the Russian Chernobyl incident.
Faded Giant is an accident involving a naval nuclear reactor.
Each nation that have nuclear systems; whether weapons, power generators, uranium ore processing, fuel element production, uranium enrichment, reprocessing or other components have response units which have the mission to deal with these particular incidents. None of these are even close to an ELE.

An attack that may rise to the level of an ELE would be in the vicinity of 12000 megatons total yield. That is close to the entire nuclear arsenal of the United States and Russia. No nation even comes close to having this capacity for devastation based upon each nations own internal megaton yield capacity.
The radii of destructive effect for a 1 Mt weapons from ground will vary considerably based upon the climatic and atmospheric conditions at the target, the height of the explosion and the geographical features of the target. The information given below should only be regarded as approximate.

There are five major events in a nuclear weapon usage are; light flash, heat, blast (both out and back), electromagnetic pulse (EMP), and fallout.

Light flash
The nuclear explosion creates a blinding flash of light, which will temporarily blind anyone looking directly at it for a distance of 100 miles.

Heat
The detonation gives rise to temperatures as great as the center of the sun and 35% of the weapons energy is given out in the form of very intense heat. This heat travels outwards at a speed of 186,000 miles per second, and will vaporize almost all substances immediately below the point of detonation and up to 3 miles. Many materials up to 8 miles will ignite spontaneously in the resulting firestorm. Severe burns will be sustained by people caught in the open out to 11 miles, and first degree burn and skin reddening as far as 20 miles.

Blast
About half the energy of the weapon is dispersed by the blast, which travels outward at a speed around 760 miles per hour. At 1.5 miles the overpressure is about 450 psi; at 15 psi or greater overpressure structures are reduced to rubble except specially designed BLAST SHELTERS (not fallout shelters), 5.2 psi is sufficient to destroy brick buildings, and 2 psi will destroy wood stick (home) structures. Blast pressures of 7 psi exist out to about 4 miles and are approximately 2 psi at about 8 miles.
Damages to vehicles, buildings and structures will occur out to about 25 miles with sustained wind speeds of about 120 miles per hour.
These pressure waves are exacerbate with the heat, which hurl burning wreckage about including vehicles, concrete rubble etc., which will further damage any structures including blast shelters in the area.
Blast waves radiate out in all directions and the blast wave will bounce off the upper atmosphere and back down to the earth. This is called the Echo or Mach effect, and should the outgoing blast wave and the echo wave intersect on the ground, peak overpressures are doubled. This wave can also bounce back down to the Earth hundreds of miles away and destroy structures not even close to the initial area of detonation.
The blast may also create subterranean shockwaves, which are similar to an earthquake, can cause damage by creating a rolling pressure wave in the ground, this also may destroy blast shelters designed to survive peak overpressures, but not the effects of earthquake type actions.
The initial detonation creates a huge vacuum, which must be filled, and this creates a returning wave of air in vortex form. This returning wave will be traveling back toward the initial detonation at the same 750-mile per hour velocity. It will be carrying with it debris and ultimately, this is what makes up the micro particles of fallout, and creates the “mushroom cloud”.

Electromagnetic Pulse
Simply put, any electronic device that is not shielded and unplugged will cease to operate. The pulse will literally melt all transistorized and microchips that are not protected and unplugged. Telephone communications, radios, televisions, radars, computers, power supplies, cellular phones etc., will cease to function. Telephone companies that rely upon computers and solid state circuits will be inoperative, older telephone exchanges and telephones which are direct copper wired (like older payphones) may still function, but if they are dependent upon a circuit board for relay at the switching station they are inoperative as well.
Nuclear detonations, which are detonated high in the air, can have effects of 750 miles away. The closer to the ground or even surface contact reduces the EMP range but not its effect.
Modern vehicles driving down the road will have their internal computers fried, and will come to a halt. Aircraft will not have navigation, computers etc., and the pilots must land quickly to avoid crashing – if it is completely automated without mechanical overrides, it will fall out of the sky. Older vehicles without electronic

computers may function normally since they rely upon mechanical functions, if their battery remains intact and charged.

Fallout

The materials vaporized by the intense heat condensing back into solid particles of radioactive dust as the fireball cools cause fallout. Larger, heavier particles fall back to earth within a few hours and are most likely to fall locally or a little downwind of the target area. The remaining dust, which consists of microscopic particles, may take weeks or months to descend, for above ground detonations, there is very little or no fallout.

Radioisotopes may be stored in the body, which mistakes them for elements necessary for sustaining life. Strontium-90 is very similar to calcium, if absorbed and stored by the body instead of calcium, may cause cell mutations and cancers. Other radioisotopes, such as uranium and plutonium, affect other organs such as liver, kidneys and lymph nodes.

There are three main types of nuclear radiation emitted from radioactive materials: alpha, beta, and gamma radiation.

Alpha particles are the heaviest and most highly charged of the nuclear particles. They cannot travel more than a few inches in air and are completely stopped by the outermost layer of dead skin that covers the body. If ingested through eating, drinking, or breathing contaminated materials, they can become an internal hazard.

Beta particles can travel several millimeters through tissue, but they generally do not penetrate far enough to reach the vital inner organs. If the skin is exposed to large amounts of beta radiation for long periods of time, skin burns may result. Beta particles can be washed or wiped off of the body and not cause serious burns. Like Alpha particles, they are an internal hazard if taken into the body by eating, drinking, or breathing contaminated materials. They can also enter the body through unprotected open wounds.

Gamma radiation is from what acute radiation sickness occurs when an individual is exposed to a large amount of radiation within a short period of time. Symptoms of acute radiation sickness include; skin irritation, nausea, vomiting, high fever, hair loss and dermal burns. These particles can travel great distances and can penetrate most materials. Gamma rays are powerful enough to reach and attack all tissue and organs within a human.

Three very common terms are used to describe the radiation exposure, (1) roentgen, (2) rad, and the (3) rem. A roentgen is a measurement of how much gamma radiation is present. The rad is a measurement of how much radiation is absorbed by the body or radiation meter. A rem is a measurement of how much damage the absorbed radiation does to the body. In our context they are virtually interchangeable and thus simplify it considerably. The letter R will be used to represent radiation collectively.

This is where FALLOUT SHELTERS come into play. The human can absorb only so much radiation in a specific amount of time until sickness and death set in.

Acute Effects

Acute Effects	1 week	1 month	4 months
Medical care not needed	150 R	200 R	300R
Some need medical care [Very few deaths]	250 R	350 R	500R
Most need medical care [50% die]	450 R	600 R	

The rate of radiation exposure changes all the time, for general purposes the standard unit of 1 hour is used. Fallout will increase until it reaches a peak, and then it starts to decline and decay has set in.

Of critical importance here is total dosage vs. exposure. These are two separate forms of measurement and confusion can get people killed. There is hourly exposure rate and accumulated (total exposure). Personnel need to ensure that the civilians completely understand this. Each local emergency operation center

(EOC) is supposed to have individuals trained in radiological monitoring and fallout tracking. They are in theory, supposed to be able to plot these measurements on maps and then warn the civilians and set up evacuations. In practicality, many local EOC's simply don't have the individuals trained to perform this function.

For example if the initial radiation starts out at 10 R per hour, the total dosage for an unprotected person is 10 R for that hour. The fallout continues to arrive until it reaches a peak about in two hours; with the rate of exposure is 1000 R per hour. After five hours, the new radiation has stopped, but the exposure rate is settling in at 300 R per hour for 1 hour, drops to 200 R for 2 hours, 150 R for 2 hours, 100 R for 2 hours, 90 R for five hours, 80 R for one hour. To place this in table form, consider the hourly exposure vs. total exposure.

Time into detonation	Hourly Exposure	Total Exposure
1	10	10
2	100	110
3-5	1000	1110-3110
6	300	3410
7-8	200	3610-3810
9-10	150	3960-4110
11-12	100	4210-4310
13-17	90	4400-4760
18	80	4840

A person can go out even during the maximum hourly exposure at 1000 R, if they stay out for only 9 minutes [1000/60=16.6 R per minute], 9 x 16.66=149.94 R exposure. However, this person cannot proceed outside of the shelter for at least a week without suffering some medical attention, and this is presuming the shelter is 100% successful in stopping ALL radiation, which it won't. Additionally this individual can only be exposed to another 50 R, which will bring his total body exposure to 199.94, for another entire month.

If another person was outside during peak hourly exposure of 1000 R per hour for a mere 45 minutes, his accumulated exposure is 749.7 R. In other words, he is going to be dead within four months. Civilians need to know what the accumulated fallout radiation is outside and the current hourly exposure rate in case they need to evacuate.

A giger counter will indicate the hourly exposure and a dosimeter worn by each individual will indicate a total exposure.

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