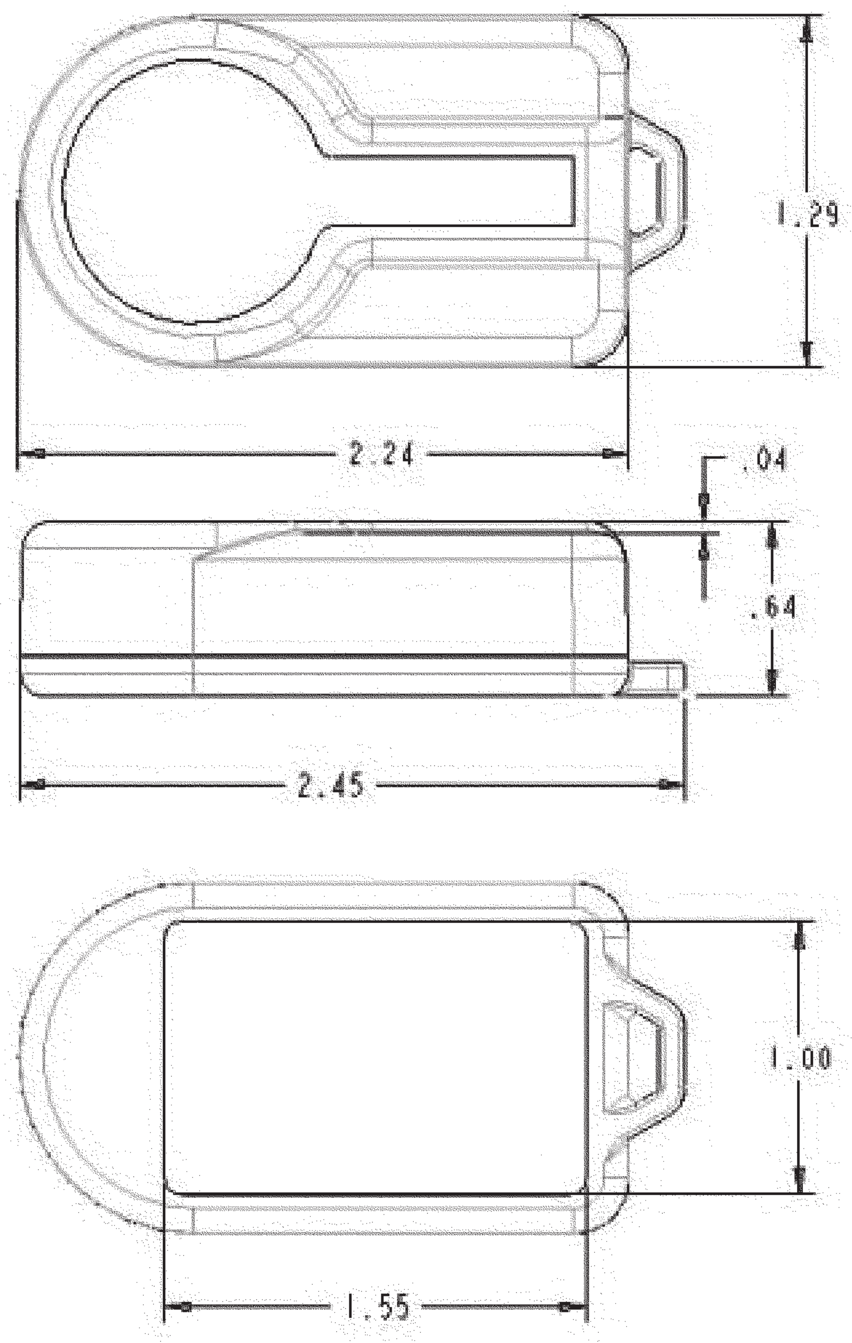
NukAlert™

Radiation Monitor & Alarm

~ Operating Instructions ~
&
~ Nuclear Response Survival Strategies ~

KI4U, Inc.
212 Oil Patch Lane
Gonzales, Texas 78629



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.04
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NukAlert™

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~ Operating Instructions ~

Your personal NukAlert™ Radiation Monitor & Alarm is designed to respond to gamma ray and x-ray radiation fields and produce audible alarm chirp groups at specific time intervals. The approximate radiation exposure is indicated by the number of chirps produced in each group.

A benefit of the NukAlert™, not to be overlooked, is that it will also confirm when and where dangerous levels of radiation are not present, too. With the anticipated general public panic accompanying any future nuclear emergency it will be very reassuring to know with confidence that, for your locale, your family is safe to continue going about their daily routine.

The State of the Art, Patent-Pending, NukAlert™ sensor is composed of a Cadmium Sulphide photocell exposed to light emitted by a radioluminescent rare earth phosphor (scintillator). The sensor signal is sampled with every tick or alarm chirp group by a small microprocessor. This rugged unit is completely sealed to prevent moisture or contaminants from affecting the readings.

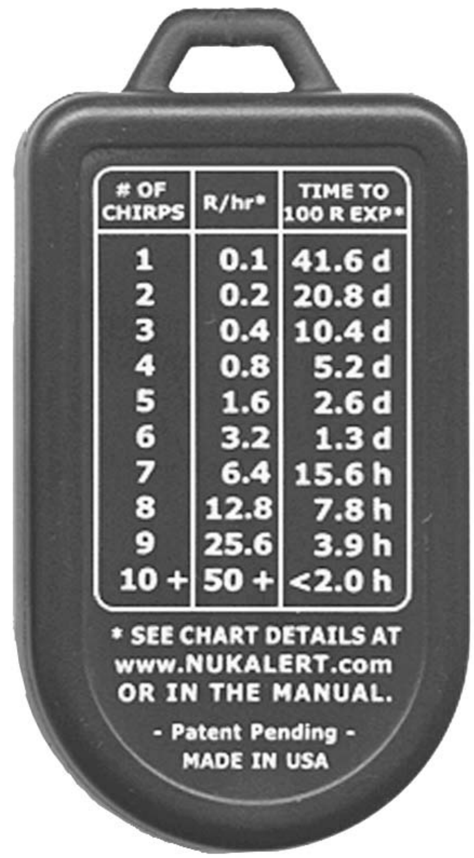
The accuracy, consistency and reliability of the NukAlert™ has been independently confirmed by a nationally recognized radiological laboratory. Additionally, every unit is individually tested with a NIST traceable Cesium-137 source to assure the highest quality control before being released.

The NukAlert™ is always "ON" 24/7 continuously monitoring and sampling its immediate environment. The long-life battery provides continuous monitoring for a minimum of ten years with enough reserve to respond to a prolonged radiation emergency. Even at full continuous alarming at the highest exposure range the battery will continue to provide power and be alarming for at least a full month.

The monitor's functioning can be confirmed by a faint ticking that can be heard each time the microprocessor cycles through its sampling program. The rate of ticking varies with temperature changes and radiation exposure but, by itself, changes in this ticking rate do not necessarily indicate that any significant radiation is present. Two to five ticks per second, with occasional skipped ticks, are typical. Double ticks repeated every eight seconds will be observed as the unit approaches the first alarm threshold.

Exposure of the NukAlert™ to gamma or x-ray radiation of about 0.1 Roentgen per hour (R/hr) is sufficient to trigger the initial single chirp alarm response. The unit will then repeat this single chirp alarm about every 35 seconds. With each doubling of the radiation exposure rate the number of chirps per alarm will increase by one. At about 0.2 R/hr the unit will double chirp every 30 seconds. Around 0.4 R/hr it will chirp three times in a row, repeating every 25 seconds, etc. At the highest level of 50+ R/hr the alarm will change to an uninterrupted series of siren like sounds that become shorter and more frequent if the exposure rate continues to increase.

Because the unit could be exposed to radiation that is close to an adjacent threshold, but not enough to force an increase or decrease in the number of chirps, it should be considered accurate to within plus or minus one range. In other words, if you were to have 4 chirps which would indicate 0.8 R/hr, you should consider that the true radiation exposure is accurate to between the two extremes above and below it; 0.4 R/hr and 1.6 R/hr. It would be prudent to always respond as if the higher exposure rate was possible.



The higher the radiation exposure the quicker the NukAlert™ will respond and alarm. At the lowest levels it will alarm within 3-5 minutes, mid-range 1-2 minutes and at the highest ranges within seconds. After removal from the radiation field it will quickly drop down to the next lower range alarm and then more slowly reset back down through all the ranges till silent once again.

The NukAlert™ is designed to operate between freezing and 120 degrees F. However, exposure to temperatures between -40 degrees F up to 185 degrees F will not cause damage.

The NukAlert™ can also be tested by chilling it and forcing low-level alarm chirps for 10-15 minutes when it's then later exposed to a warmer environment. This temperature induced 1 to 3 chirping level is normal as it achieves temperature equilibrium and does not occur with gradual temperature increases. You can use this test to hear what the alarm chirp sounds like by putting the unit in the freezer for a couple minutes and then removing it and allowing it to warm up to room temperature. It's also possible when the unit is on a key chain and in your car dangling in front of one of the blowing air conditioner vents that when you then exit the car and put your keys in your warmer pocket you could get a few minutes of low-level chirps as it warms up. It will then cease chirping when it again is at a temperature equilibrium with its warmer environment. This 1-3 chirping level, when moved from a much colder to warmer environment, should NOT be mistaken for radiation exposure. Also, if ever unsure if it was a cold-to-hot temperature induced chirping or radiation exposure, remember that it will be stopping soon if it was simply temperature induced. (The unit may also produce isolated sporadic chirps when exposed to extreme static electric fields produced by rubbing against synthetic fabrics in a very dry environment.) For any concern during those couple minutes, remember, too, that true radiation exposure at this lowest initial level of 0.1 R/hr is such that one would have to be exposed to it continuously for close to a month and a half before any ill effects might even begin to be noticeable. Remember, if the unit is alarming, because it is simply warming up, it'll be silent again in a few minutes.

Note: NEVER place the NukAlert™ in a microwave oven - microwaves are not nuclear radiation - the unit will be destroyed and the 1 year warranty voided.

What the R/hr numbers mean...

Since nuclear radiation affects people, we must be able to measure its presence. We also need to relate the amount of radiation received by the body to its physiological effects. Two terms used to relate the amount of radiation received by the body are exposure and dose. When you are exposed to radiation, your body absorbs a dose of radiation.

For radiation measurements the common measurement units and terms are...
Roentgen (Pronounced "Rent-gen"), rad and rem.

Fortunately, cutting through any confusion, for purposes of practical radiation protection in humans, most experts agree (including FEMA Emergency Management Institute) for gamma radiation and x-rays that Roentgen, rad and rem can all be considered roughly equivalent. The exposure rates you'll usually see will be expressed simply in terms of roentgen (R) or milliroentgen (mR).

Your NukAlert™ is calibrated in Roentgens and exposure rates are expressed in R/hr. So, if the NukAlert™ is alarming at the 6 chirp level (3.2 R/hr) and you stay there in that same radiation field for a total of 1 hour, you will have accumulated a dose of 3.2 R.

The key thing to remember here is that "When you are exposed to radiation, your body absorbs a dose of radiation." And, that the radiation dose is cumulative! So, if you are exposed to a radiation field of 3.2 R/hr, then that is your exposure rate and if you remain there for ten hours you've just accumulated a radiation dose of 32 R (3.2 R/hr X 10 hours). This is essential to understanding the expected and potential radiation health effects that any radiation detecting device might make you aware of.

What are the potential radiation dose health effects?

The response to radiation varies widely amongst people and the longer the time frame over which a specific dose is accumulated the better your body can respond to, and recover from, the radiation damage. In other words, a normally fatal (to 50% of a group exposed to it) cumulative dose of 400 R, if received all within a week, would create few noticeable ill health effects at all if it was received, spread out, over a year's time at the rate of about 7.7 R per week.

Compare the difference in acquiring a suntan gradually over a years time at a rate of half-an-hour per day compared to packing that years worth of sun exposure (182 hours) all into one solid non-stop week, 24 hours a day, night and day, for 7 days. The difference in the ability of your body to recover from those two extremes, but both the same total dose, is obviously very dramatic.

Here below is a general overview of the expected health effects assuming the cumulative total radiation exposure was all received within a week's time. Remember, too, promptly removing yourself from the radiation source would have you no longer absorbing and adding to that cumulative dose. And, that can make all the difference between absorbing a dangerous radiation dose or getting only a tiny fraction you might not even be able to later notice. (Note: Adult doses below, 1/2 for children).

TOTAL DOSE	ONSET & DURATION OF INITIAL SYMPTOMS & DISPOSITION
30 to 70 R	From 6-12 hours: none to slight incidence of transient headache and nausea; vomiting in up to 5 percent of personnel in upper part of dose range. Mild lymphocyte depression within 24 hours. Full recovery expected. (Note: fetus damage possible from 50 R and above.)
70 to 150 R	From 2-20 hours: transient mild nausea and vomiting in 5 to 30 percent of personnel. Potential for delayed traumatic and surgical wound healing, minimal clinical effect. Moderate drop in lymphocyte, platelet, and granulocyte counts. Increased susceptibility to opportunistic pathogens. Full recovery expected.
150 to 300 R	From 2 hours to three days: transient to moderate nausea and vomiting in 20 to 70 percent; mild to moderate fatigability and weakness in 25 to 60 percent of personnel. At 3 to 5 weeks: medical care required for 10 to 50%. At high end of range, death may occur to maximum 10%. Anticipated medical problems include infection, bleeding, and fever. Wounding or burns will geometrically increase morbidity and mortality.
300 to 530 R	From 2 hours to three days: transient to moderate nausea and vomiting in 50 to 90 percent; mild to moderate fatigability in 50 to 90 percent of personnel. At 2 to 5 weeks: medical care required for 10 to 80%. At low end of range, less than 10% deaths; at high end, death may occur for more than 50%. Anticipated medical problems include frequent diarrheal stools, anorexia, increased fluid loss, ulceration. Increased infection susceptibility during immunocompromised timeframe. Moderate to severe loss of lymphocytes. Hair loss after 14 days.
530 to 830 R	From 2 hours to two days: moderate to severe nausea and vomiting in 80 to 100 percent of personnel; From 2 hours to six weeks: moderate to severe fatigability and weakness in 90 to 100 percent of personnel. At 10 days to 5 weeks: medical care required for 50 to 100%. At low end of range, death may occur for more than 50% at six weeks. At high end, death may occur for 99% of personnel. Anticipated medical problems include developing pathogenic and opportunistic infections, bleeding, fever, loss of appetite, GI ulcerations, bloody diarrhea, severe fluid and electrolyte shifts, capillary leak, hypotension. Combined with any significant physical trauma, survival rates will approach zero.

830 R Plus From 30 minutes to 2 days: severe nausea, vomiting, fatigability, weakness, dizziness, and disorientation; moderate to severe fluid imbalance and headache. Bone marrow total depletion within days. CNS symptoms are predominant at higher radiation levels. Few, if any, survivors even with aggressive and immediate medical attention.

Reference: FM 3-7. NBC Field Handbook, 1994. FM 8-9. NATO Handbook on the Medical Aspects of NBC Defensive Operations, 1996. FM 8-10-7. Health Services Support in a Nuclear, Biological, and Chemical Environment, 1996.

Bottom Line: While the grim reality of the above health effects created by the higher levels of radiation are at first overwhelming to grasp, we need to remember that simply and promptly removing oneself from the radiation field will stop further accumulation of dangerous radiation. The NukAlert™ chart has in its third column the exposure time required to accumulate a total dose of 100 R for each of the ten levels of radiation intensities it will alarm you to. At the lowest initial alarming threshold of 0.1 R/hr you would have to stay exposed in that radiation field continuously for 41.6 days before you would have even accumulated a dose of easily survivable 100 R. Even if you failed to remove yourself from that area during that lengthy time, few ill effects would likely ever be noticed by a healthy individual, as your body would naturally be able to repair any radiation damage spread out over such a long time period. On the other end of the NukAlert™ range, for instance at the 9 chirp alarming level (25.6 R/hr), you would need to get out of that higher intensity radiation field within a couple hours to assure staying beneath a total accumulated radiation dose of 100 R.

Obviously, the key to surviving a future nuclear emergency is in both being immediately alerted to the presence and intensity of any radiation in your local environment and then promptly minimizing your continued cumulative exposure to it. Be assured that nuclear survival can be confidently secured for your family with the proper knowledge, tools and preparation.

Note: Many today will argue that any radiation at all will cause ill effects and zero dose accumulation is the only safe and healthy amount. Unfortunately, besides radiation always being present and occurring naturally, for a future nuclear emergency we have to be initially most concerned with recognizing and minimizing those temporarily excessive, most harmful, higher levels where immediate survival is our first and primary focus. However, after first successfully surviving that immediately life threatening radiation emergency, late and delayed effects of radiation can occur following a wide range of doses and dose rates. Delayed effects may appear months to years after irradiation and include a wide variety of effects involving almost all tissues or organs. Some of the possible delayed consequences of radiation injury are life shortening, carcinogenesis, cataract formation, chronic radiodermatitis, decreased fertility, and genetic mutations. Irradiation of almost any part of the body increases the probability of cancer. The type formed depends on such factors as area irradiated, radiation dose, genetic predisposition, and age. Irradiation may either increase the absolute incidence of cancer or accelerate the time or onset of cancer appearance, or both. Risk analysis and comparison is very difficult due to the high concern and controversy of radiation exposure. However, the Committee on the Biological Effects of Ionizing Radiation (BEIR V), National Research Council, estimated that the risk of dying of cancer for low-level exposure to radiation is about 0.08% per rem.

Here below is the spectrum of published radiation limits from different sources as compiled in The Medical NBC Battlebook, USACHPPM Tech Guide 244 (August 2002):

Dose	Function	Dose	Function
500	LD 50/60 with supportive care	10	Protection of valuable prop; EPA
350	LD 50/60 without supportive care	5.0	Occupational annual limit; 10 CFR
300	Early erythema	5.0	Public organ dose limit; 10 CFR
200	Threshold for cataract	0.5	Average all X-ray procedures; NCRP
150	Emergency risk; STANAG 2083	0.5	Public, annual, infrequent; NCRP
100	Urgent action, accident; ICRP 63	0.30	Naturally occurring annual dose, US; NCRP
70	Moderate risk; STANAG 2083	0.10	Public, annual, continuous exposure; NCRP
50	Negligible risk; STANAG 2083	0.10	Public; 10 CFR
50	Emergency limit; ICRP	0.015	Annual Public limit for decontamination; EPA
25	Life Saving; EPA	0.001	Insignificant dose; NCRP

LD 50/60 above refers to Lethal Dose for 50% exposed to that dose within 60 days.
STANAG 2083 is the NATO Commanders Guide on Nuclear Radiation Exposure of Groups.
ICRP is International Commission on Radiological Protection.
EPA is Environmental Protection Agency.
10 CFR is from the Nuclear Regulatory Commission.
NCRP is the National Council on Radiation Protection and Measurements.

Bottom Line: Regardless of the controversy and debate surrounding acceptable limits of radiation exposure, the guide to action in limiting ones radiation exposure, both in a nuclear emergency and in everyday life, is always ALARA - As Low As Reasonably Achievable. Below follows what to do when the alarm is real to best assure your future radiation exposure stays ALARA.

~ Nuclear Response Survival Strategies ~

First, some critical background information.

Before your NukAlert™ would even alarm you may have an indication of an initial nuclear detonation with its characteristic blinding bright flash. The first effects you may have to deal with before radiation, depending on your proximity to it, are blast and thermal energy. Promptly employing the old “Duck & Cover” strategy will save many from avoidable flying debris injuries and also minimize thermal burns. Think tornado strength wind destruction descending upon you as you quickly dive behind any solid object or into any available depression. A 500 KT blast, 2.2 miles away, will be arriving about 8 seconds after the detonation flash with about a 295 mph wind blast that’ll last about three seconds. An even larger 1 MT blast, but 5 miles away, would arrive in about 20 seconds.

Regardless of the cause or proximity of a nuclear ‘event’, if your detector produces an alarm due to exposure to radiation, you should note and write down the time and the chirp rate as soon as possible. Then you should either use additional instrumentation to better determine the radiation field and/or consult your radio or other news sources for additional information. At the same time you should try to move out of the radiation field. A lot will depend on why you are in a radiation field.

There will be a big difference between a terrorist attack with a dirty bomb or a small nuclear weapon or multiple nuclear detonations in a nuclear war. A terrorist attack will probably allow you to move out of the danger area more easily. The weapons used in a nuclear war are another matter. However, both scenarios are survivable with the proper knowledge and preparations. A lot will depend on your initial exposure, your pre-planning for different potential nuclear emergency scenarios and what you first do after your instrument alarms.

You may have to deal with both internal radiation contamination and exposure, where one could inhale or ingest radioactive materials OR external radiation exposure, that generates radiation much like an X-ray machine stuck in the "ON" position would create.

To minimize internal exposures much can be done by simply assuring your water and food stays free from contamination by fallout particles and by employing a simple common dust mask or damp cloth over your mouth and nose to reduce inhaling airborne radioactive particles. While this will not guarantee full internal protection, it will go a very long ways towards protecting the lungs from inhaling radioactive particles and should not be overlooked.

Additionally, the internal uptake by the body of radioisotopes can be blocked in some cases. For example, potassium iodide (KI) or iodate (KIO3) if given prior to or soon after an intake of radioiodine, will reduce the uptake of radioiodine by the thyroid gland. Similarly, orally administered Prussian Blue will reduce the absorption of cesium from the gut and Alginate will reduce strontium absorption.

There are three fundamental principles involved in the protection of people from the effects of external radiation (basically gamma radiation). These are time, distance and shielding.

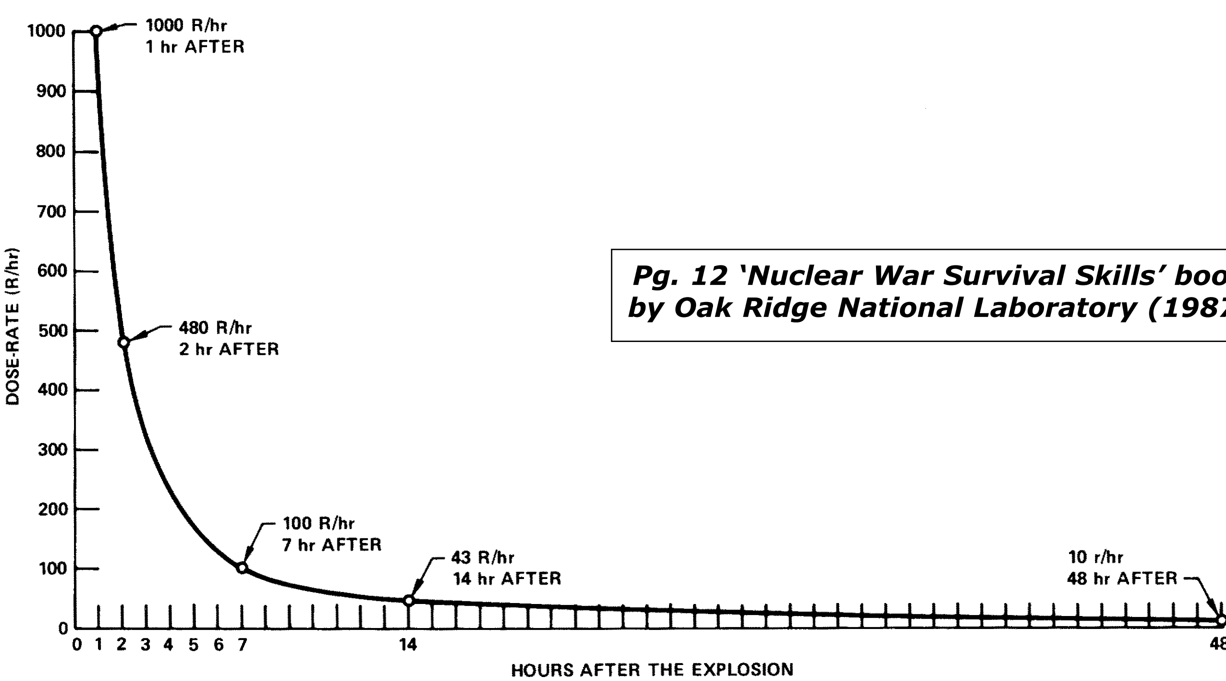
Protection of a person from harm by external radiation may be provided by, first, controlling the <u>time</u> of exposure; secondly, by controlling the <u>distance</u> between the person and the radiation source; and third, by placing a radiation absorbing material, i.e., some <u>shielding</u> between the source of radiation and the person. The first of these, <u>time</u>, is always involved. That is, <u>time</u> is used in conjunction with <u>distance</u> or <u>shielding</u> or both.

As a comparison, consider protection of your eyes while trying to obtain a tan from a sun lamp. The ultra-violet rays that produce the tanning are harmful to the eyes. A small amount can be tolerated but exceeding that amount will cause damage to your eyes. You can protect your eyes by any one or a combination of three ways. First, you can protect your eyes by limiting the amount of <u>time</u> you spend under the sun lamp. The less time you look at the lamp, the less damage will be done to your eyes. Second, the greater the <u>distance</u> you are from the sun lamp the less the intensity of the ultra-violet rays will be on your eyes. Thus, by regulating the distance between you and the sun lamp, the source of harmful rays, you are protecting your eyes. Third, you can <u>shield</u> your eyes by wearing effective tanning goggles.

To better understand these three types of protection, let's consider each separately. First, <u>time</u> is very important. The dose received by a person exposed to radiation is the product of the rate of exposure and the total time exposed. Thus if you are exposed to a radiation field of 12.8 roentgens per hour (R/hr), the NukAlert™ eight chirp alarm level, for 2 hours, you will have received a radiation dose of approximately 25.6 R. That is very straightforward. It is simply the rate times the time. Minimizing that time exposed will minimize your total dose received.

Another time consideration is the fallout radiation intensity following a nuclear explosion. Time is a major protection factor following a nuclear explosion. The fallout radiation intensity "decays" or is diminished at a specific rate. The rate of decay is usually identified as the radioactive half-life. Half-life is the time required for the activity of a particular isotope to be reduced by one-half. The half-lives of the multitude of radioisotopes produced in a nuclear detonation range from fractions of a second, to seconds, to minutes, to hours, to years and to multiple years. The total radioactivity of the newly formed fallout from a nuclear explosion decreases very rapidly at first because it contains many radioisotopes with very short half-lives. The rate of decrease lessens as time goes by because the short half-life materials have decayed and the remaining materials are radioisotopes with longer half-lives.

There is a mathematical formula to describe the average decay of the fallout from a typical nuclear weapon, but a generalized "rule-of-thumb" serves us better for emergency field use. The rule-of-thumb is "for every seven fold increase in time after a nuclear detonation, the radiation intensity (exposure rate) decreases by a factor of ten". It is important for you to know that <u>as time increases the radiation intensity decreases</u>. For example: if the radiation level is measured to be 1,000 roentgens per hour (R/hr), one hour after a nuclear detonation, then seven hours after the detonation the radiation intensity will be 1,000/10 or only 100 R/hr. Additionally, for another 7 fold increase in time (7 x 7 hr = 49 hr) the radiation intensity will have reduced to only 10 R/hr. And, yet another seven fold increase in time (7 hr x 7 x 7 or 49 hr x 7 = 343 hr or 14.3 days) the radiation level would be reduced to 1 R/hr. The following chart graphically illustrates this decay.



Pg. 12 'Nuclear War Survival Skills' book by Oak Ridge National Laboratory (1987)

The previous chart shows why Civil Defense planning placed so much emphasis on fallout shelters and why sheltering in the event of a nuclear disaster can be so important. Sheltering allows you to take advantage of the natural factors of radioactive fallout decay and allows you to wait out the danger, putting time on your side to provide you with protection.

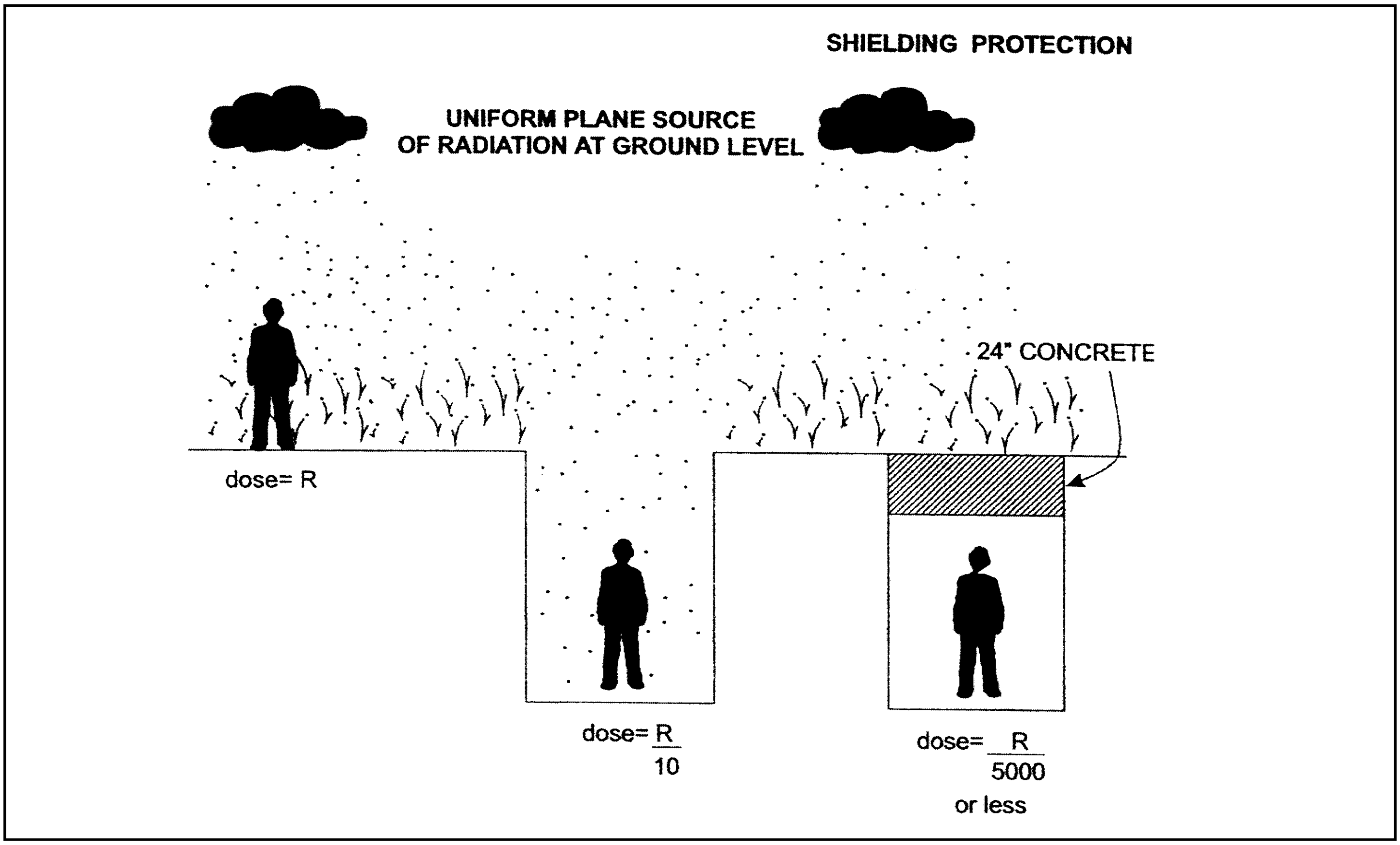
Note that the above chart applies only to fission and fusion weapons and does not apply to the so-called "Dirty Bomb" or RDD (Radiological Dispersal Device). The reason it does not apply to an RDD is that they are expected to be made up of only a couple of the common and more easily obtainable commercial isotopes (such as Cobalt-60 or Cesium-137) that all have relatively long half-lives. Fortunately, though, they will likely not have contaminated as extensive an area as a fission or fusion nuclear bomb and effective prompt evacuation will likely be a more viable alternative.

The second item in your defense is <u>distance</u>. There is a relatively simple mathematical relationship between the distance and intensity for a "point" source of radioactive material. It is somewhat more complex for an extended or "plane" source where the radioactive material is all around you. However, it is sufficient to note that the further you are from radioactivity, the less your exposure will be.

For example: suppose you are standing by a large fluorescent light panel. Up close, the light will appear to be very bright. However, as you move away from the light panel, the brightness of the panel will appear to diminish. The same effect occurs when you move away from a large, extended source of gamma radiation. As you move away from the source of radiation, the intensity of the radiation that reaches you diminishes.

Now let's consider the third method of protection, <u>shielding</u>. One of the ways that gamma radiation damages living tissue is by knocking electrons from their orbits in the atoms composing the tissue. This is called ionization. If ionization occurs to a sufficient number of atoms in living tissue, without sufficient time for recovery, the result is radiation damage. To prevent radiation damage we can stop a large portion of the gamma rays before they reach the living tissue by placing a <u>shield</u> of some dense material, containing many electrons, between the source of the gamma rays and our body. Just as body armor can stop bullets, shielding can protect us from gamma rays and radiation damage. In general, the denser the material used for a shield, the more electrons available to interact with the gamma rays and act as absorbers.

So, considering the density of shielding material, lead is better than concrete, which is better than dirt, which is better than water, which is better than wood. Any one of which may be used to provide an effective shield against gamma radiation. To compare, the "tenth-value" thickness, in inches, for concrete, 11; for earth, 16; for water, 24; for wood, 38. That means that where you have those thicknesses you'll have only 1/10th as much gamma radiation pass through with that barrier material. Plain dirt is free and plentiful and just 3.6 inches of packed earth reduces the gamma radiation penetration by half which means you have a Protection Factor (PF) of 2. With 18 inches you have a PF 32 and with 30 inches it's over PF 300 and with 3 feet of earth you are at about 1000 PF under it or 1/1000 the radiation on the topside!



Considering the three protection methods of time, distance and shielding, when the alarm sounds, there are two options that you have in order to assure your survival. You will need to choose whether to seek shelter or evacuate. The following discussions will aid you in making the choice that is best for you, your situation, and the nature of the particular future nuclear emergency you may have to deal with.

Your initial concern should be, "Why did my NukAlert™ alarm?"

First, it is important to note the time of the alarm and approximate the radiation intensity by the number of chirps from your alarm. It would be a good idea to write down the time and number of chirps. That will allow you to determine your initial approximate exposure.

Immediately afterwards, you should try to determine if there is information available on the radio or television. If you have access to additional radiation instrumentation, you should also try to measure and confirm the radiation field in your immediate area. Then, as quickly as possible, try to move to an area with less radiation intensity. This is important because you want to keep your radiation exposure As Low As Reasonably Achievable (ALARA). Ideally, in the event of a nuclear emergency, you would like to keep your acute exposure (exposure received within a two week period) at 100 roentgens (R) or less. That is because a person who has received 100 R or less of acute exposure has a 100% probability of survival and will have little or no symptoms of radiation sickness. (Note that even if your NukAlert™ monitor is in the highest continuous alarm mode, you probably still have time to move to a lower radiation level before you have received a dangerous dose.) The alarm rate indicates the radiation intensity in R per hour but may be just on the verge of the next alarm level. So, if your alarm is giving 6 chirps in each sequence that would indicate 3.2 R per hour. But, to be conservative, you should consider it to possibly be approaching the next higher level, which would be 6.4 R per hour. And it would take over 15 hours before you would have a cumulative exposure of 100 roentgens. (6.4 R/hr X 15.6 hr = 99.84 R) However, during that time you should be doing things to reduce your exposure to As Low As Reasonably Achievable (ALARA).

Now, should you evacuate or shelter?

Variables to be considered are whether a nuclear emergency has already commenced or is only imminent. Also, the nature, quantity, and proximity of the nuclear threat; localized nuclear terrorism or a possible escalation into an international nuclear exchange. Quickly changing scenarios may even deteriorate to where evacuation becomes impossible and last minute sheltering in-place is your only option. Or, you may even be forced from an inadequate shelter situation into a rushed evacuation and refuge status. The following table lists some of the factors that you should consider in making these important decisions for future nuclear emergencies.

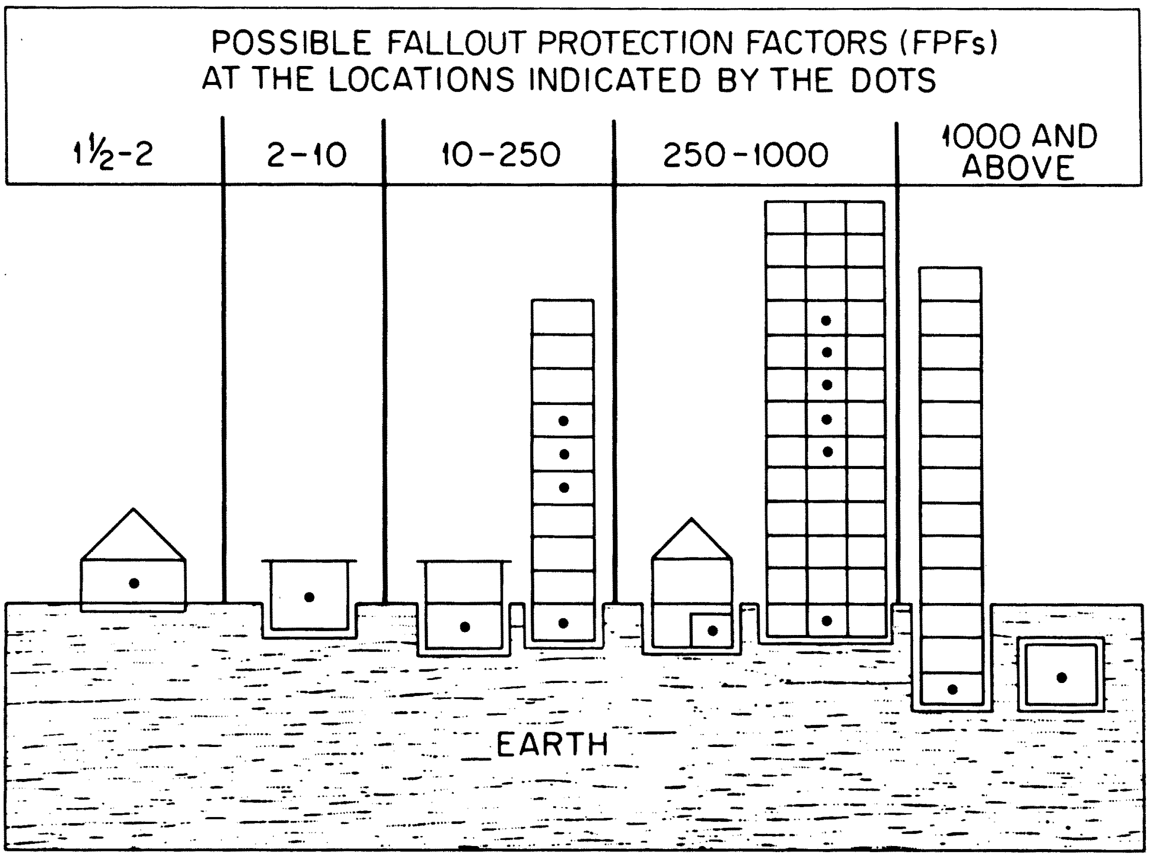
FAVORABLE FOR EVACUATION	FAVORABLE FOR SHELTERING
You live within 10 miles of a major target and attack is imminent or an RDD 'dirty-bomb' explosion has contaminated your neighborhood.	You live outside a high risk area, can build or develop a fallout shelter and make other essential family survival preparations.
You have a vehicle with enough fuel and are confident the roads you'll need to use will be open and clear to a lower risk area.	You have no means of transportation or the roads required will probably be impassable.
You and your family are in good health or you have someone who can help take care of those who need assistance.	You are sick or are invalid or lack confidence in challenging situations. (Basically, you don't need to be trying to survive on the open road.)
You are not a person that is vital to your local government, such as police, fireman, medical, utility (water, elec., phone), etc.	You cannot leave the area suddenly without endangering others.
You have shelter, tools, clothing, bedding, food/water, and other preps to assure survival at your evacuation destination.	You have not acquired supplies necessary for immediate evacuation, nor pre-positioned any at a safe evacuation destination.
You have pre-planned alternatives of what to do if your family is not all together when it is time to evacuate.	You have no formal evacuation plans, check lists or methods of communication with family members when not together.

If you plan to evacuate, there is a very good checklist of what you need on page 33 of "Nuclear War Survival Skills" by C. H. Kearny, author of the original Oak Ridge National Laboratory edition. Embracing the motto:
"Be Prepared" could mean the difference between a thoughtful survival response or a wasteful panicked reaction.

If you decide to shelter, you have several options with a little pre-planning. First, you may explore if any buildings in your community have been identified as Civil Defense Shelters. Less emphasis has been placed on these in the past few years. However, if you look around and contact government agencies, before an emergency develops, you may find buildings marked with the signs identifying these shelters.

Additionally, you should become aware of other potential sheltering options in your area and along regularly traveled routes. Tunnels, subways, caves, culverts, overpasses, ravines and heavily constructed buildings. In the case of existing buildings, below ground basements give the best protection. With minimum effort, windows and the overhead floor can be sandbagged or covered with dirt to provide additional protection.

Likewise, the following illustration shows you how to make the "best use" of existing buildings and how different locations may provide an acceptable radioactive fallout protection factor (FPF) in an emergency. The important thing to remember is to put as much mass and distance between you and the source of the radiation and then allow sufficient time to pass for the radiation to die down to a tolerable level.



Page 4-7 'Radiation Safety in Shelters' FEMA 1983

Your other choice is to provide your own shelter. Kearny's book, "Nuclear War Survival Skills," again available free on-line, provides plans and instructions on how to do this at home or at a remote location, even if caught out on the road.

Amongst expedient last-minute sheltering options at home you'll learn how simply pushing a heavy table or pool table into the corner of a below ground basement and piling atop and around it any available mass (such as books, wood, bricks, sandbags or boxes of anything heavy) is extremely effective when then crawling in under it. A basement already provides a 10 to 50 PF (Protection Factor) and hunkering down under that table of extra mass can add another 2-4 PF which would give you a total of 20 to 200 PF. That means that if there was an initial 1,000 R/hr radiation intensity outside you would have under that table only 5 – 50 R/hr. And, with every passing hour that fallout would be decaying and quickly losing its energy to where 7 hours later, it would only be 1/10th of that strength. As cramped as that might be, you would have achieved a Protection Factor, in less than half an hour of moving some mass into place, that could clearly be the difference between exposure to a lethal dose or survival for your family.

Think what you could accomplish if you started now, well before any nuclear emergency, to explore your available options and built (or at least acquired the materials for) a mass encased small fallout shelter in your own basement. Or, a combination tornado/fallout shelter in the backyard. With 30" of earth covering alone you would achieve a PF of 300 and occupants would receive less than 1/300th of the gamma-ray dose of fallout radiation that they would otherwise have received out in the open.

Also, there are commercially available "ready made" shelters.

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Now, a few words about what to do if you or someone with you develops the symptoms of radiation sickness. The **most important thing to remember** is that the majority of people who have received a dose of radiation sufficient to induce radiation sickness **will recover**. That is assuming that they are prevented from becoming infected with common illnesses because of their radiation induced lowered immune response. A person with radiation sickness needs to be treated as any burn victim. You should provide fluids, easily digestible food and keep them in a clean sanitary environment. If available, provide antibiotics to fight infection. Additionally, give them moral support with the positive attitude that they will be soon recovering.

In summary, **you will survive**, if you keep your exposure low (ALARA) and take care of yourself and your loved ones. Dangerous levels of radiation from fission or fusion detonations in most all areas affected will be of a very temporary nature, and actually quite brief measured in only days or a week or two at the most. (For those small areas of longer lasting 'dirty bomb' contaminations, prompt evacuation till clean-up is accomplished will be your likely best protective action.) You will need to have become educated about radiation dangers, secured provisions of food and clean water, and have continuing updated information, either from the government via radio or from your own radiological instruments.

If any questions about your **NUKALERT™** or its operation, don't hesitate to contact:
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