

CHEMICAL AND BIOLOGICAL PREPAREDNESS

Notes On Sheltering In Place

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Following the "Gulf War" came persistent speculations about the potential for political terrorism from certain mid-eastern countries and warnings about the increased potential for chemical and biological warfare. However, the use of chemical and biological agents has been anything but uncommon in history.

The proliferation of many new and more effective chemical and biological warfare agents, along with more effective means of delivery, have brought these agents into the modern tactical theater. While relatively cheap and easy to make, the handling and storage difficulties associated with their use dictates that these weapons of war are limited only the most irresponsible and well-funded organizations in modern society, i.e., governments.

And it has been governments, especially in the last several decades, that have had little reticence about using these agents against military as well as civilian populations. We cite as examples World War I and the first large scale use of chemical agents (most notably mustard gas), the use of defoliants in Vietnam and various agents against the Mujadeen by the Soviets in Afghanistan and again by Iraq against the Kurds.

As informed individuals we can dismiss out of hand the absurd allegations of self-serving socialist bureaucrats who assert potential militia involvement with these inhumane weapons of war. These same bureaucrats however, have over the years thoroughly alienated a number of foreign organizations and governments some of which, given the opportunity, may not hesitate to use such weapons to terrorize our civilian population for political and/or religious ends.

For our purposes we will simply assume there is valid cause for concern for the possible release of chemical or biological agents. Since we have no control over the vector, it doesn't much matter whether the release is attributable to an industrial accident (Ex. Bophal, India) or an attack by some state-sponsored (the vast majority of it is) terrorist organization.

First let's deal with reality. There is no civil defense mechanism in place which can provide any real measure of public defense against such agents. Metropolitan areas are particularly vulnerable due to population density and a variety of concentration factors.

The U.S. government has not only failed to provide an effective civil defense system but, in anticipating the potential, has elected instead only to fund a "cleanup" organization (FEMA) to manage the aftermath. It has worked diligently to make certain the public remains both uninformed and, through the wholesale destruction of protective equipment, under-equipped to deal with potential threats.

Where does that leave us? Practically speaking, on our own. For one thing, it is extremely difficult to effectively prepare and cope with chemical or biological attack. There is no practical way to detect the use of biological agents. They are invisible to the unaided eye. Similarly, the detection of chemical agents is also generally impractical. Potential government sponsored early warning (i.e. civil defense) systems are unreliable and could be a means for manipulation for opportunistic political purposes. Further, dispersal of these agents can be implemented through a

wide variety of vectors, including but not limited to water systems, direct [aerial] spraying, vehicles, artillery, missiles, or even bombs. The variations are many; detection and defense is extremely difficult.

In order to implement effective response we need to know how to tell whether we may be under attack or the target of a release of a toxic material. Some possibilities include one or more of the following:

- Radio/TV reports
- Industry sponsored public warning systems
- Shortwave radio reports
- Loudspeakers on roving official vehicles
- Direct observations which might include but not limited to:
 - Actual observations of aerial spraying
 - Local release of unidentified weapons
 - Distress in birds, pets and/or small animals
 - Absence of bird sounds if in the country
 - Unusual visible haze, dust or mist in conjunction with above including foliage discoloration, etc.
 - Distressed behavior of more than one individual
 - Unusual public response: ambulance, law enforcement vehicle activity

Nerve agents may be indicated by faint, sweetish or fruity odor, shrinking pupils, blurring or dimming of eyesight, running nose, salivation, tightness in the chest and breathing difficulty. Other personal affects from debilitating agents might include disorientation, dizziness, blurred vision and weakness. Individuals may be affected in different ways and to varying degrees. Some biologicals, such as blood agents, are so toxic that any exposure is usually fatal.

It is beyond the scope of this review to examine the various biologic and chemical agents used in industry and modern warfare except to note the wide variety severely complicates protective measures. Further, agents can be directed at vegetation (crops), animals as well as people. Biologic agents may include fungi, bacteria or viruses including those that cause typhoid, anthrax, plague, cholera, and many other diseases. Chemical agents include the common "tear" gases as well as the nerve and blister agents, blood agents and various "incapacitating" agents such as vomiting and hallucinogenic chemicals. Some of these agents may remain viable in the environment for weeks or months after an attack, for others their effectiveness may degrade over weeks or even hours. Most are attenuated by natural forces including rainfall, sunlight, heat and dissipation by wind. The problem is that, as civilians, we may never know what hit us.

To be sure, there are many potential natural causes which can result in the same symptoms as chemical or biologic exposures. In the absence of "official" public warnings or determinations, all observations and effects must be weighed in context of the perceived threat and local conditions. Precipitous actions may not be warranted in the absence of definitive evidence of actual or potential attack. In other words, be cautious. Fear is also an effective weapon for public manipulation; knowledge, preparation, and careful consideration of events is the antidote. Proper response to potential emergencies demands calm, rational response commensurate with the perceived threat.

Assuming a terrorist or military attack is authentic, some factors to consider in evaluating the potential effects include atmospheric conditions, time of day, location and weather. It is likely that

weather and location will be major determinates along with the strategic or tactical value of the intended target. For example, the release of chemical and biological agents are most feasible during stable atmospheric conditions, with low or absent wind. Air stability is often at its best during early morning hours just before dawn or after sunset. Similarly, the absence of pending rainfall, relatively flat terrain and minimal vegetation help to maximize effective dispersion of the agent(s).

Chemical and biological are generally designed to settle to the earth, follow topography and disperse over hours to days depending on rainfall, wind patterns, temperature and other factors. Deterioration of agents can be accelerated by rainfall, sunlight, wind or even through natural breakdown. Just the opposite of what may be required for protection from radiation. Therefore, it may make more sense to seek shelter from chemical or biologic agents by going up, not down.

Individual preparation may be sufficient for light, short term exposures, as evidenced by the effectiveness of various municipal hazmat teams and the wide dissemination of military NBC equipment. But terrorist attacks are extremely difficult to anticipate, equip for and almost impossible to contain or mitigate once released.

Many agents can attack directly through the skin, or through inhalation or ingestion. Protective clothing offers relatively short term protection. Few protective suits are capable of complete protection against all possible chemicals. Even completely sealed (encapsulated) protective suits require a support team for effective use. There are also severe limitations with even the best military respirators (gas masks). The major drawback of even the best masks is that there is no way to detect breakthrough, or the point of failure. Any failure could be catastrophic.

Individual protective equipment, even if decontamination facilities are available, not only represents significant cost, but is inherently infeasible for most families or civilian groups. It takes time to develop proficiency in its maintenance and use.

If we do not have the option of not being in the wrong place at the right time, what options do we have if faced with the threat of biological or chemical attack? Many if not most might survive by what is known as sheltering in place. Evacuation, i.e., running, may not be an option. Having nowhere to go, an uncertain route, inadequate equipment and too little time may be insurmountable barriers to successful evacuation. We might likewise have some reticence about abandoning our homes on the pretext of some alleged danger at the demand of public officials.

Therefore, most of us may have little choice except to make our homes, business or other building into a suitable shelter. If you conceive of the potential need for such shelter your preparations are relatively simple, but you must prepare now. If you rely on government, the instructions are likely to be a too late and too generalized to be really effective. If you elect to go to a public shelter, you put your life in the hands of others who may be less competent and conscientious than you.

Sheltering in place involves the selection and preparation of a "safe" room in your home. Ideally it might include a bathroom with access to sanitary facilities. You could also seal the entire house or apartment itself. The larger the area, the more difficult to effectively isolate, but you would capture a larger volume of air which would be beneficial if no means of ventilation were available. The objective is not to establish a mass barrier between you and chemical or biological agents as you would to provide protection from radiation, but a protective barrier between you, your family, and the agent(s). You may want to select a second floor location if possible as these agents tend to follow land surface during dispersal.

The process of making an in-place shelter is relatively simple, but its implementation should be thought-out beforehand to be effective. In short, you must completely seal ALL openings of your selected safe area. Tape windows, door and other openings with packing or duct tape, every single crack and crevice must be sealed. Foam sealant and caulking works well for cracks and to seal around wall switches and outlets. Don't forget to seal off floor openings (Ex. laundry chutes, etc.) and heating/cooling ducts if not part of a specially prepared ventilation system. Windows are a special problem. While it may be desirable to maintain a window to the world during an emergency situation, its' vulnerability to breakage could seriously impair the integrity of your shelter. Completely covering any window area with sturdy plastic sheeting and taping it securely in place would be prudent. Doors are a special problem; double your tape barrier with secondary plastic sheeting. Alternatively, plastic sheeting can be used to completely line your safe area. If stapled in place it might be prudent to make sure staple tears are securely taped before considering the job complete.

Don't forget, the rest of your house or building can also serve as a sort of pre-filter for your safe room. Remember to shut and lock all windows, garage doors, pet doors, fire place dampers, and air conditioner units, to restrict all potential sources of infiltration. Similarly, having appropriate personal protective equipment, including a HEPA or NATO equivalent respirator for everyone in your in-place shelter will help ensure your safety if you either have to temporarily leave your shelter, or if symptoms develop which may be indicative of possible infiltration of contaminants.

Note that ensuring a thoroughly sealed room may require the removal of carpet or other flooring or even ceiling material if they are of porous construction. Vinyl wallpapers and similar wall coverings may contribute added vapor barrier protection.

A source of fresh air is highly desirable, but not essential. Your refuge will only be suitable for a period of hours to several days. One method might be to very slowly release clean breathing quality compressed air, such as from a SCUBA tank, into your room to create a positive pressure atmosphere. This positive pressure can effectively prevent infiltration of contaminants by "closing" openings you may have missed as well as helping to mitigate fouling of the captured air by your presence. An added benefit of a supplied air system might be realized if the threat involved an industrial accident with the release of an oxygen displacing chemical such as ammonia which would effectively disable a mechanical air filtration unit. Your assessment of possible toxic chemical storage sites near your home will assist you in preparing your in-place shelter for industrial type contingencies.

Perhaps a better way to ensure shelter ventilation is to acquire a high efficiency particulate (HEPA: 99.97% efficient at 3 microns) air filter such as those commonly available in air purifying equipment. The high efficiency of the filter makes it impractical to rely on natural air flows. Therefore, the problem is in developing a reliable mechanism, electrical or manual, with which to pull filtered air into your shelter. Installing the HEPA filter directly into your home heating system ductwork could be a feasible alternative if you do not anticipate a problem with electric power. In installing the filter be sure to observe the manufacturers design velocity recommendations and ensure a good seal around the filter to avoid bypassing pollutants. Installation of a simple prefilter will extend the working life of your HEPA filter.

Personal hygiene is an important factor in personal susceptibility to exposure to chemical or biological agents. It should be considered an essential proactive step in ensuring your in-place shelter safety. Frequent cleaning or changing of clothing and potentially exposed equipment with

cleaning agents can be effective in reducing your personal exposure. Commonly available hygiene and decontamination materials which can be used in dilute solutions for general use include: bleach, ammonia, sodium bicarbonate, and of course, plenty of soap and water. Be especially careful when preparing cleaning agents and cleaning with unfamiliar materials around the eyes and other sensitive areas of the body. Field expedient decontamination agents include baking soda (sodium bicarbonate; for brushing teeth), washing soda (sodium carbonate), caustic soda (lye; for equipment only, NOT personal decontamination) and water or steam for gas masks, disposable clothing, etc.

While in your shelter time and anxiety are likely to be among your greatest problems. Proper preparation by pre-stocking your in-place shelter with a few essentials will help. Make sure to have communication equipment, at least a battery powered radio (AM/FM/Shortwave) and lights. Store water and food for at least several days; include sufficient water for basic personal hygiene needs. Games and books help mitigate uncertainty; don't forget a Bible. Blankets, games, extra batteries, fire extinguisher, and extra clothing should be included. Of course, stock an adequate quantity of packing tape, plastic sheeting and sealant. If your sheltered area is unventilated, any light or heat source should be battery powered; strictly avoid candles and other flame producing devices. Remember, your breathable air may be quite limited depending upon the size of your shelter, temperature, and the number of occupants.

When it is safe to leave your shelter is impossible to predict. Radios will likely be your best source of information; other sources might include telephone, and visual observations (window). While your in-place stay may be resource dependent, if in doubt, the longer the better may be the prudent option.

Generally speaking it is better to stay in place, properly prepared than to evacuate without proper preparation and a clear destination. Becoming a refugee, subject to the whims and mercy of a host population or government bureaucrat should be among your last options. With preparation, the likelihood of your survival is greatly enhanced. Protective measures are relatively simple, but within their limitations they can be effective only if properly implemented. But, there should be no doubt, there are too many variables to guarantee your success regardless of the option you select. Your best protection is to be well informed, prepared for all reasonable contingencies, and outside of any potential terrorist target area.

We do not know all answers, and we can't predict the exact nature of the potential problem(s) you may encounter. But we all know what it takes to be a good Boy Scout.

"What we accept as normal today, any generation prior to the Great Depression would have seen as unconstitutional. According to the Constitution, the central (federal) government is to have no powers except those specifically granted it by the Constitution. All other rights and powers not specifically granted the individual states are preserved for their citizens. That includes the right to succeed or fail according to one's own abilities, unrestrained by the government. So fearful were the founders of this country of a strong central government that they went to great lengths to ensure that its powers were severely limited. Basically, the central government could settle arguments between the states, organize an army to defend the nation's common cause, regulate interstate commerce, and negotiate foreign treaties. The federal government was allowed to raise its operating

capital by charging an interstate tariff on goods only -- period!" Larry Burkette, The
Coming Economic Earthquake
