



AFTERMATH!™

Survival Guide



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AFTERMATH! Survival Guide

AFTERMATH! Survival Guide provides background information for setting up and running AFTERMATH! campaigns set during the collapse. Information is presented as a survival guide to the players - to let them plan and prepare, with the gamemaster section as a reference in the back. This format allows the gamemaster to decide what collapse scenario will be presented, without informing the players. This book covers the following disaster scenarios:

- **Nuclear**
- **Biological**
- **Chemical**
- **Hurricanes and Tornadoes**
- **Extreme Cold**
- **Drought**
- **Civil Unrest and Terrorism**
- **Hostile Occupation**
- **Zombie Uprising**
- **and more....**

This book is also useable as a guide for real world survival, and includes crucial information on the hazards of nuclear, biological, and chemical hazards, instructions on how to prepare an evacuation kit, or “Bug Out Bag”, missile targeting and fallout predictions, and a checklist for keeping it all together.

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Aftermath! Survival Guide

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Aftermath! Survival Guide

Introduction

"A human being should be able to change a diaper, plan an invasion, butcher a hog, conn a ship, design a building, write a sonnet, balance accounts, build a wall, set a bone, comfort the dying, take orders, give orders, cooperate, act alone, solve equations, analyze a new problem, pitch manure, program a computer, cook a tasty meal, fight efficiently, die gallantly. Specialization is for insects." - Robert Heinlein

When disaster strikes – things fall apart. Whether it is a hurricane, earthquake, terrorist attack, or other incident, the result is that the order and civilization we are used to having around us collapses. Communications break down. Logistics services, utilities, and emergency services fail or are overloaded. Stores are emptied and cannot be restocked. Transportation networks are overloaded and choke down.

It all goes to pieces.

From this rubble, there are those who are prepared to weather the storm. To feed, house, defend, and protect their selves, friends, and family - until the crisis is over, and civilization returns. Sometimes this may be hours – but in most cases, a disaster takes days – or even more – to recover and stabilize.

When people think of disasters, the biggest fear is usually the global catastrophes – nuclear war, biological pandemic, a complete collapse of civilization. But the reality is that while a pandemic may be real (too real in fact), the most likely scenarios are regional or localized disasters- fire, hurricane, tornado, even a terrorist attack. These regional disasters become generally disruptive with the accumulated media hype and hysteria.

Imagine for a moment the effect on the US economy if the terrorist attacks of September 11, 2001 had occurred on August 29th of 2005. Right as the country was reacting to Hurricane Katrina. Katrina had already knocked us for a loop, and FEMA and other services were scrambling to respond to the needs of the survivors. Then imagine it was followed closely by the collapse of the sub-prime lenders. The stock market takes a dive, and the bottom begins to fall out.

Then just add one more event – some global trigger that causes investors to panic. Bird Flu. Conflict in the Middle East. Then Black Friday looks like a church social. People make a run on the gas pumps to fill up their cars – and the stations run out. Rioting and other civil disturbance ensues. The police, National Guard, and emergency services can't keep up.

In the midst of this, you are trying to keep food on your table, a roof over your head, and your family safe. You drive to work and home through a maze of abandoned cars, trash in the streets, burned out houses and shops. That's if your company was prepared. Do you have running water? Is your gas and electricity working? Does your phone happen to work today?

How much is that food and supplies you stashed away worth now? How valuable are the preparations and practice you've put into your family plan?

This book is not a Survivalist Manifesto, nor is it a Business Continuity template. It is a guidebook on the planning, preparation, and special information that will assist you in surviving a disaster, as an individual, family, group, or business. It is not a question of "if" a disaster will occur, but "when." The difference is that if you are prepared for the events that will unfold, the Disaster may be just an inconvenience or a story to tell over dinner or at the water cooler.

The cost of disaster preparedness is high, perhaps sometimes too high, but the cost of not being prepared is even higher. If you are unprepared, you will probably become just another statistic. Being prepared means that you have a chance of weathering the storm, in some cases completely intact. While luck plays a big factor, preparedness allows you to leverage the luck you have been given to maximize its potential.

While writing this book, I was forced to re-evaluate my own Disaster Preparedness plans. Surprisingly (to me) I even experienced my own mini disaster. While traveling to Cornwall, UK from my home in the United States, I was caught up by the transportation delays and cancellations caused by the 2007 summer flooding in the UK. I realized that while I tend to travel frequently, I had neglected to plan for disasters while I was on the road. Disasters rarely occur when it is convenient.



I have included throughout this book information that pertains to specific needs of individual disasters, that is commonly left out of other books. Most primers on Nuclear Events tell you that the Law Enforcement or Media will let you know the levels and status of radiation dangers. While this may be true after the first 72 hours, when they've adjusted to the communication needs, the first few hours after a disaster will be critical to survival. During the Chernobyl disaster at reactor 4 on April 26, 1986, Most of the casualties – civilian, employees, and emergency workers received their radiation exposure within the first 24 hours after the incident. During this time, the firemen were told that the radiation was safe, even though the dosage rate was in excess of 50R per hour. One fireman kicked a piece of burning debris away from the tire of the truck. The debris was actually a section of the core of the reactor. Estimates are that he received over 1500R of radiation in just that moment alone. Most of the firefighters at Chernobyl died as a result of radiation poisoning.

When the disaster hits, you must remember not to panic. With this book, and some advance preparation, you will be better prepared to handle the disasters that you may have to face.

While researching this book, I was working on the EMP (Electro-Magnetic Pulse, usually from a nuclear bomb) section, and was unable to find any actual details on the effects. During my lunch, I called my father, a retired professor of Nuclear Physics, and asked him if he knew anything about the effects of EMP on equipment. He said "hold on a second," and handed the phone to someone he was having lunch with. A British accent came on the phone, and said "Hello David, this is Ian."

The person I was talking to was actually the chief physicist for some of the US Government experiments on EMP. He carefully told me only information that was unclassified, but relayed a story about one of the experiments. They were trying to test the EMP effects on radio crystals that are used for military communications. The worry is that the EMP will change the resonance frequency of the crystal, changing the frequency that they would transmit and receive on. It was hoped that this change would be predictable, so they could plan for the differences in the radio design. They spent months testing crystals, documenting their frequencies, mapping their locations around the blast. They placed the crystals in specially padded tubes (to protect them from the shock) and buried them around the blast site. After something like 6 months of preparation, they were ready for the blast. The countdown ensued, and then the bomb went off. It blew all of the pipes apart, and they were unable to ever find any of the crystals.

A note on legalities:

When a disaster happens, things fall apart. People start looting, raiding their neighbors, whatever they think they can get away with. During the Los Angeles riots of April 1992, TV crews filmed looters smashing electronics stores and grabbing TVs, stereos, even refrigerators. Wandering gangs roamed the streets wreaking violence on whomever and whatever they came across – smashing and destroying vehicles and buildings, setting fires, and even pulling people from their cars and assaulting them. The three days of rioting left 55 people dead and 2,000 injured. Reginald Denny was a man who was in the "wrong place at the wrong time." He was trapped in traffic behind scores of abandoned cars, with nowhere to go, and was

pulled by the mob from his truck in the middle of an intersection and beaten nearly to death, while TV cameras on helicopters recorded the entire scene. The police never arrived, as they had been ordered to withdraw for their own safety. After the dust settled, the police subpoenaed the raw footage, and used it to track down and prosecute the criminals. There were 12,000 arrests and about \$1 billion in property damage in Los Angeles related to the riots. Even without a TV crew, modern security technology has hidden video cameras and backup power supplies readily available to the average homeowner. A disaster is not a "license to break the law" – though the ultimate decision is up to you. The suggestion I will offer as a guideline for you and your own "moral compass" is a lesson my grandmother taught me long ago. She told me, "Don't do anything that you wouldn't want published in the paper the next day."

I have used specific brand names for certain items. This should be construed as my personal endorsement of those brands, but the names are used without permission or compensation. I have also sometimes adjusted the facts of certain historical events, combining events and stretching explanations to make a point in the book.

Phases of Survival

The 4 phases of disaster survival are Education, Planning, Implementation, and Recovery. Success in surviving a disaster can be improved by preparation and awareness.

Education

The most common question about Disaster Preparedness is "What do I need to do?" Understanding the nature of the different kinds of disasters will allow you to make the correct decisions when the time comes. When a disaster happens, you are going to be stressed, and knowing the correct steps and procedures can help prevent you from panicking.

Most people have been educated by the government about what to do, and generally the instructions are "stay put and we'll tell you what to do." This is a good answer for the government, as it makes it easier for them to manage large numbers of people. But for you as an individual, self-autonomy and self-sustenance are more viable in an emergency situation.

Planning

The second phase in preparing is planning. This is when you prepare your disaster procedures, prepare your kits, communicate these plans with your family, and practice the plans.

Implementation

When disaster strikes, you have to put your plan into action – do you evacuate? Or stay where you are? Do you know what to do? Or will you rely on the government to help? Remember the first thing to fail in a disaster is communication.

Recovery

After the disaster, how and when can you go home? How do you salvage what is left? How and when can you rebuild? Who will help?

The basic rules of Survival can be summarized by the Survival Acronym:

Size up the situation
Undue haste makes waste
Remember where you are
Vanquish fear and panic
Improvise
Value living
Act like the natives
Learn basic skills

A universal survival guide is difficult, as survival is reacting to the current situation and solving local problems – what is important is to understand the situation, know the proper reaction, and implement it quickly. The decision implementation time can be as little as a few seconds in some situations.

To help explain the survival procedures, some initial understanding must take place. You must determine whether to find safe ground, or shelter in place. An understanding of the duration of the disaster is in order. Will this be a “hide and pray” or a “fight for what you’ve got”?

The first 72 hours after the collapse are the most critical. Many people will make mistakes during this time that cause them to lose their life. Planning will help keep you from being one of them. After 72 hours, continuing survival demands require an adjustment to maintenance mode survival.

An organized plan is also key to survival. A plan allows you to take safe time (before crisis) to work out the details of a set of possible emergency plans – and be familiar with them. This allows for faster action in time of crisis.

- The plan should be written down and stored with the Bug Out Bag (“BOB”).
- All members of a group should rehearse the plan in advance.
- Make sure you know where all the pieces of your kit are, and how long it will take to get them together. Having them all together in advance is good, but can be more difficult and/or expensive.
- Have alternate options for each section of the plan – in case a given option is not available.
- Make a list of “optional items” – those things that could be helpful, handy, or even sentimental, if you have time and space.

Education

Emergency Preparedness

When people talk about Disaster Planning or Disaster Recovery, they usually are referring to Business Continuity – the ability of a business to continue to operate after a disaster. Businesses can spend millions or more to ensure the availability

of their systems and operations to perform after likely disasters. Unfortunately, their plans usually fail to include Disaster Planning for their personnel. Businesses seem to expect that an employee’s first priority will be their job, and getting the business running, when in actuality, the employee’s first response will be protecting themselves and their family. Only after their continued well being and their family’s safety is assured will they begin to focus on the needs of the business. Businesses also rely heavily on 3rd party shared services like Sunguard and others. These are options chosen to reduce the cost to the business, but as we observed recently during (and after) Katrina, the 3rd party services and facilities were overwhelmed with the magnitude of the disaster, and recovery resources were assigned based on a “critical need” formula:

- First was government and Security.
- Second was Medical and Life Saving
- Third was companies with a “Global Impact”
- Fourth was companies with “Significant regional Financial influence”
- And so on.

Many of these businesses had personnel dedicated (in the plan) to Disaster Recovery who were unavailable due to evacuations, inability to transport to recovery centers, and other personal reasons.

Because of this, business and personal Disaster Planning should be performed “hand-in-hand.” A business DR plan should also include plans for the individual employees and their families, and an individual DR plan should include continuity of income.

Recovery providers usually have policies that prevent new contracts from being instituted right before a disaster. Here is an example letter from one Disaster Recovery company.

To Whom It May Concern:

In light of recent tropical activity, I want to take this opportunity to remind you and your organization of our policy: [REDACTED] will not accept any new [REDACTED] memberships from organizations within the path of imminent danger, such as a tropical storm, forest fire, flood, etc.

As you can imagine, we have an obligation to recover our current members first and cannot recover any organization that is not an [REDACTED] member.

If you are considering a [REDACTED] membership for your organization, or have an active proposal, please contact [REDACTED] at [REDACTED] or [REDACTED]@[REDACTED].com for more information.

Sincerely,
[REDACTED]
President and CEO
[REDACTED]

Disaster plans are meaningless without training and practice runs. An untested plan is dangerous, as there will be things left out. Imagine that a disaster requires evacuation of all employees from the building to a remote DR site that has been previously prepared. In theory, a DR plan could be known by a few, and the remaining employees will follow the key individuals "in a caravan" to the destination. It all sounds fine, on paper. But in reality – what events would cause this type of evacuation? What if it is a Hazardous Materials incident? Then everybody from the affected area will also be evacuating – traffic will be rerouted, congestion on all major and minor roads, and a terrible panic. Think about it this way – during rush hour in any major city, try to form and keep together – without any special equipment or training – a 3 car caravan. Now imagine the same caravan during a thunderstorm. Even a simple trip of a dozen miles can take hours. So what happens to the tail end of the caravan that gets lost? Cell Phone grids will be overloaded by the volume of calls. Walkie-Talkies are good – but FRMS systems (the cheap ones we all use) will also be saturated. People who don't understand how to use the radios will turn on VOX functionality, which ends up broadcasting constantly and drowning out other transmissions. During a recent fire drill at an office building in Roswell, Georgia, the Fire Wardens were attempting to use 2 way radios to coordinate the building evacuation. One of the people turned on Vox accidentally, and one was using the "call" button to try to transmit (which makes all the other radios ring like a phone). The radios were effectively useless just because of these 2 people's misuse of the units. Private frequencies are often too expensive for individuals. Satellite Phones are good, but also expensive.

Compound Disasters

Often it is not the primary disaster that causes the most problems and risk, but the secondary disasters. For example, during and after a hurricane flooding can cause the water to be unsafe to drink, overload sewer systems causing effluent to be pumped onto the streets and into flooded homes, loss of power will cause water shortages and food shortages, damages to roads will cause problems delivering relief supplies, fires can break out, and firefighters will not have water pressure to fill the hoses to fight the fire.

The most common secondary disaster falls under the heading of Civil Disturbance. Looting, pillaging, violence and vandalism all seem to become rampant during disasters. When law enforcement resources are taxed by dealing with the disaster, criminals and criminals of opportunity seem to spring up like weeds. It will not be the primary disaster that destroys the world, but the sequence of secondary disasters.

Communications

The first thing to fail in a disaster is communications. The news media, while traditionally our primary source of information, is easily misled or shut down. During Operation Desert Storm, the communications infrastructure in Iraq was one of the first targets of the Coalition forces. During a Hurricane, the power may fail, and telephone lines may be damaged. In the end, it is possible that the only information you will have is whatever you can gather yourself.

Cell Phone and landline services are usually overloaded during a disaster, however experience has shown that text messaging still gets through, when the cell towers have power. There is a delay associated with these messages, sometimes up to 15 minutes, and it is a connectionless service, (meaning there is no guarantee of transmission), but the reduced bandwidth necessary for this type of communication ensures a higher rate of success of messages.

Have handy a set of 2 way radios, preferably with NOAA weather alert, for short range instant communications. Keep an extra set of batteries with them. If using GMRS radios, an FCC license is required. The fee is \$85.00 and it takes about one week to get the license back. You can apply in about 8 minutes at <http://www.fcc.gov>. The General Mobile Radio Service (GMRS) is a land-mobile radio service available for short-distance two-way communications to facilitate the activities of an adult individual and his or her immediate family members, including a spouse, children, parents, grandparents, aunts, uncles, nephews, nieces, and in-laws (47 CFR 95.179). Normally, as a GMRS system licensee, you and your family members would communicate amongst yourselves over the general area of your residence or during recreational group outings, such as camping or hiking.

The FCC grants five-year renewable licenses for GMRS Systems. The individual licensee is responsible for the proper operations of the licensed GMRS system at all times.

Some rules to know:

95.119 Station identification.

- (a) Except as provided in paragraph (e), every GMRS station must transmit a station identification:
 - (1) Following the transmission of communications or a series of communications; and
 - (2) Every 15 minutes during a long transmission.
- (b) The station identification is the call sign assigned to the GMRS station or system.
- (c) A unit number may be included after the call sign in the identification.
- (d) The station identification must be transmitted in:
 - (1) Voice in the English language; or
 - (2) International Morse code telegraphy.
- (e) A station need not identify its transmissions if it automatically retransmits communications from another station which are properly identified.



Morse Code Alphabet:

Char	Code	Char	Code	Char	Code
A	.-	M	--	Y	-.--
B	-...	N	-.	Z	--..
C	-.-.	O	---	0	-----
D	-..	P	-.-	1
E	.	Q	--.-	2	..--
F	..-.	R	.-.	3	...-
G	--.	S	...	4-
H	T	-	5
I	..	U	..-	6	-....
J	.---	V	...-	7	--...
K	-.-	W	.-	8	---..
L	.-..	X	-.-	9	----.
.	.-.-.-	,	-.--	?	..-..
`	..-.-.	!	-.--	/	-.-.
(-.-.)	-.-.	&	.-...
:	---...	;	-.-.	=	-...-
+	.-.-.	--	_	..-.-
"	.-.-.	\$...-.-	@	..-.-.

FRS and GMRS radios are rated at a distance by the manufacturer. This is the maximum range, under optimal conditions. Optimal conditions are over calm water within direct line of sight, with no other EM interference. Real world ranges are more on the order of 1/4 of this, unless blocked by dense structures. Also, most people never change the channel from the default, and don't set security codes. This means that they will likely experience crosstalk and chatter from other people during the emergency. Make sure you set your channel and security codes in advance, and have a plan for what channel to switch to next if the one you are attempting to use is crowded. Don't step up a channel at a time, as this is the most likely choice of others. If you want to test this, take them shopping on "Black Friday" (the day after Thanksgiving) at a major shopping mall during the "early bird" sales. Also, even though the channels are standardized, different brands of radios receive and transmit differently on these channels. It is possible that you can receive but not transmit to another brand of radio on a specific channel/security code combination.



I suggest sticking your call sign and channel sequence to the back of the radio with a durable, waterproof label.

Use earpieces or headsets. They make communication easier, you can understand better in noisy environments, and help avoid misunderstandings and eavesdropping. Keep a spare set of batteries with the radio. Most radios, even if they use rechargeable batteries will also use AA or AAA batteries, so keep a set on hand for use in a pinch. Practice with the radios. Make sure everyone in your group knows how to use them.

Planning

Protecting your health and safety is the first priority during an emergency. FEMA and others suggest being ready to be self-sufficient for the first 72 hours after an emergency, and up to 2-3 weeks for a Shelter-in-place scenario. An Evacuation kit or Bug Out Bag is a kit to sustain and protect you for that critical period, until you can relocate or obtain further assistance.

If you think assistance will be readily available, guess again. Think about what happened during hurricane Katrina in 2005. Police, Fire, and Disaster Recovery workers may not be on the scene for days, and may be victims of the disaster themselves. Even if Federal aid is requested in time, it can take days for Federal resources to arrive, especially if the disaster is more generalized.

In preparing your Bug Out Bag, also referred to as a "BOB", you need to think about what kinds of disasters you need to be ready for, and how long you may be aware of them in advance. If you are in a situation where you need to "bug out", reaction time can be critical – the faster you can get everything together and get on the road may make the difference between life and death. Your BOB should be always ready to go, and conveniently located.

After Hurricane Katrina hit, an Atlanta radio talk show host suggested to his listeners that since a large portion of Atlanta's gasoline supply comes from the Gulf of Mexico, that there could be a fuel shortage, and that all of them should go fill their cars. Within 8 hours, gas stations were running out of gas, and charging as much as \$7.00 per gallon if they did have any. But there are storage tanks around Atlanta with millions of gallons of fuel. So what happened?

Gasoline distribution is sized to handle the average load – where everyone fills up an average of about once per week, plus some cushion. Most filling stations get resupply trucks 2-3 times per week. (and some every day) – so if everyone goes at once, the station will only have enough to service about a third of their customers. Keeping this in mind, you should never let your fuel tank go below 1/2 full. If there was an emergency, and time mattered, waiting in line for the pump could mean failure of your survival plan.

Always keep your gas tank above half full in all your vehicles.

Grocery distribution follows similar patterns. When interviewing a grocery store manager in Atlanta about stocking for ice storms (when the whole city freaks out just from the threat of ice or snow) he told me that the first things to sell out are milk, bread, beer, and condoms (in that order). This happens within

the first few hours of the announcement of an impending storm. Once the storm hits, and the transportation network gridlocks, things will get even worse. In March, 1993, a severe ice storm hit Atlanta, dropping 1-2 inches of ice, and then 10 inches of snow on top of it. The storm now is listed among the National Oceanic Atmospheric Administration's (NOAA) Top Billion Dollar Weather Disasters. The city services did not have the capability of handling such a storm, and people were literally "frozen in place". Regional support was unavailable, as the storm shut down the entire East Coast of the United States, from Alabama to New England. There were an estimated 270 deaths, and there were recorded snowfalls of over 20" in the southeast. After the first 2 days, the students at Georgia Tech faced a real dilemma – they couldn't drive anywhere, and all the stores and restaurants (that had been open) were out of food. Waffle House (who never closes) had to lock their doors because they had no more food to serve, only to find that they had never had a lock installed on the doors. Even if they managed to hike to another area, there was no food to be had, or the doors were all locked. The manager at one fast food store near campus had a 4 wheel drive vehicle, and actually owned snow chains for his tires. He drove to suppliers and managed to get some food to be able to continuously serve the students through the disaster. It took 3 days before the roads became somewhat passable, and some minor roads in the area were still frozen almost a full week later.

These examples show the criticality of planning in advance. My family and I were able to weather through the "Freeze of '93" with only minor discomfort. We had food stored enough to last us over a week, camping stoves, firewood, sleeping bags, bottled water, pretty much everything we needed. We were lucky and were only without power for 2 days. We even had enough supplies and fuel to share with our neighbors, pooling our resources.

In a power outage related to a disaster, if you are staying at your home and can access the kitchen, use the food in your refrigerator first, and then the remainder of your pantry in order of expiration date. It is easy to keep a good stock of canned food on hand to supply you through these kinds of emergencies. To build the stock, buy one or two extra cans every time you go to the grocery store. In no time, your pantry will be well stocked.

Another item to stockpile is water. Next time you get your water bill, look at how many gallons of water your house is actually using. When I did it, I was shocked. In a house with only 2 adults we are using 2000 gallons of water per month. This means that without conservation, we use an average of 32 ¼ gallons of water per person per day. With Georgia in severe drought conditions, we are looking at ways to conserve water, re-use grey water, and are now planning on storing a 30 day supply of drinking water.

Remember – if you stockpile a little at a time, then the impact (and effort) seems trivial, but the rewards will be enormous in the event of a disaster.

Don't wait until the disaster is announced before stockpiling goods. Be prepared well in advance.

That is the point of planning – to be prepared in advance. It can take days, weeks, even months to prepare and stockpile a shelter, develop and test evacuation plans, train and learn, and refine your procedures. You won't have this time once the disaster is imminent or upon you, so be sure to prepare in advance.

An hour spent in preparation is time you don't have to spend during an emergency. Preparation time is well spent, if you need to implement a disaster plan.

A disaster plan costs everything and is worth nothing to you – except perhaps easing your worries, unless there is a disaster. Then it is worth everything.

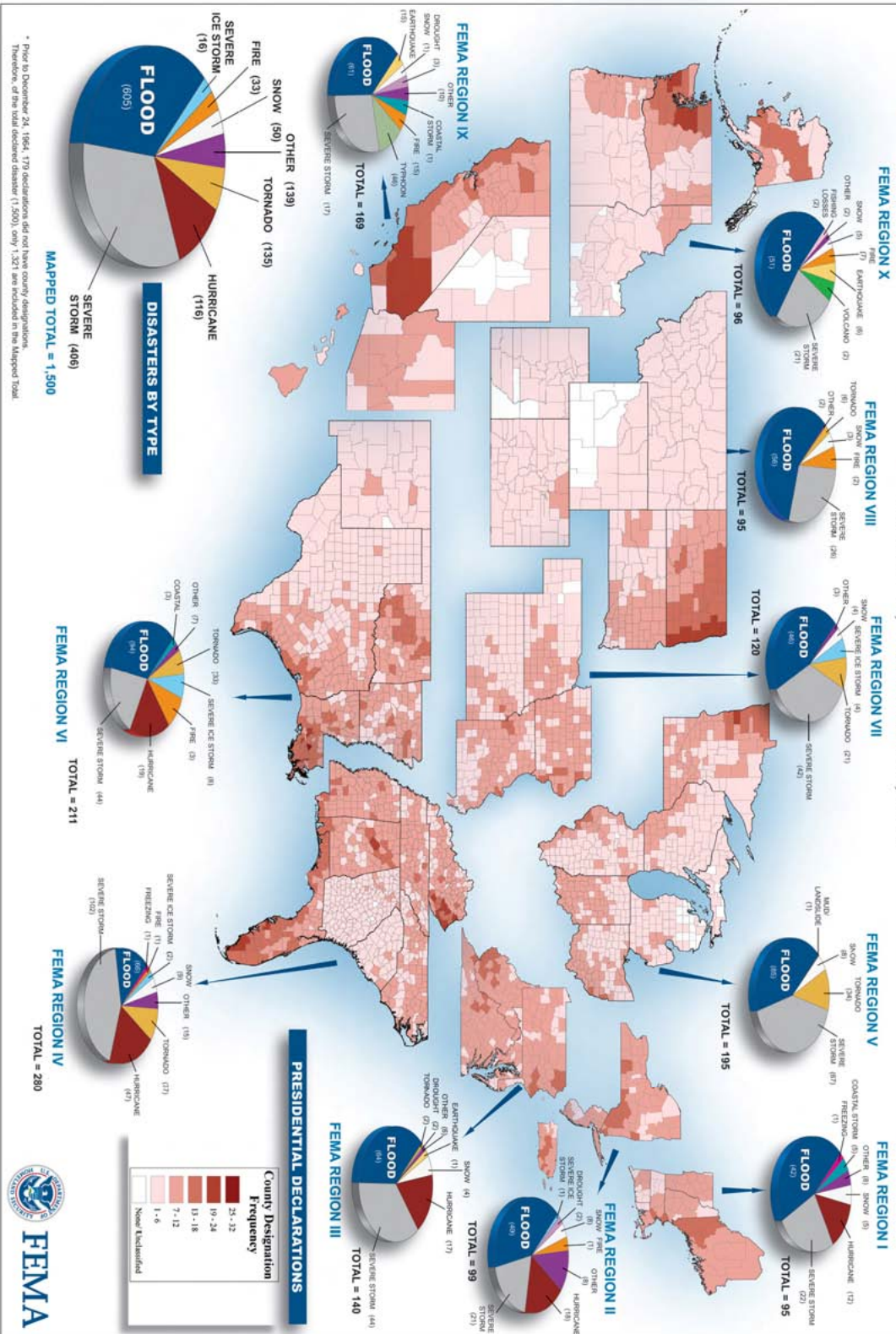
Businesses analyze their Disaster Recovery and Continuity plans by what are they willing to risk. In preparing your plan, you need to ask yourself what disasters you are preparing for. A good start is the FEMA Disaster Planning guide. It suggests you look at the chances of each kind of disaster in your area. Then plan according to those risks. If you don't have a risk of earthquakes or hurricanes in your area, then you don't need to spend your time preparing for them. The following chart of the United States shows the likelihood of a disaster of any kind, based on Federal disaster declarations.

Once a disaster strikes your area, you may only have moments to react to the immediate situation. If you already know what to do, have rehearsed it, and are prepared, then you will have a chance to do the right thing first. In some cases, such as nuclear blast or tornado, you will potentially have only moments to get to a safe refuge, and minutes if you hear the warning. For other types of disasters, such as a global pandemic, you may know it is coming days or even weeks in advance of it affecting your area. Being prepared for all of these possible disasters, in advance, will allow you to best protect yourself and your family.

The good thing (if anything's good about all this) is that the most likely disasters (according to the FEMA chart below) are weather related. These disasters are generally predictable, to some extent. We may not get warning of the extent of the danger, but we still generally know a few hours or days in advance of the weather impacting an area. Take this time to get ready.

PRESIDENTIAL DISASTER DECLARATIONS

December 24, 1964 to March 3, 2007



"Wild, dark times are rumbling toward us, and the prophet who wishes to write a new apocalypse will have to invent entirely new beasts, and beasts so terrible that the ancient animal symbols of Saint John will seem like cooing doves and cupids in comparison"

Heinrich Heine quotes (German Poet and Writer, 1797-1856)

Types of possible disasters:

Fire



In May-June 2007, The Bugaboo scrub fire raged for over 6 weeks in South Georgia (FEMA Disaster number 2693), burning well over a third of a million acres. Smoke caused visibility problems as far south as Miami, and as far north as North Carolina. Residents in the vicinity of the fire were asked to leave, sometimes with little or no notice.

The good news is that major fires, while very destructive of property, are generally localized. If there is a wildfire disaster in your area, you can expect to be asked to leave your home, with little or no notice, so be prepared to grab your Bug Out Bag and relocate to a shelter.

Generally this disaster is not accompanied by Civil Unrest (unless the fires are the result of Civil Unrest) – so your evacuation to a safe area is more assured, however your evacuation notice may be very short.

In the California wildfires of 2007, there was a report on one family who received a knock on the door by the Fire Department. They were informed that they had 5 minutes to evacuate their house. They grabbed a few things – family photo albums, passports, car keys, and as they were leaving (only 5 minutes later), turned to see their house already on fire.

Fire works fast on a structure. You may have little to no time to evacuate. In May of 2004, my neighbor's house was struck by lightning in the middle of the night. They were awakened by the sound of their alarm system blaring, but they couldn't see any fire, nor smell smoke. Cindy grabbed the kids and got them in the car and pulled the car out into the street, while

Chuck investigated. He pulled the cord on the drop-down stairs to the attic, only to find the entire attic consumed in flames. He ran out of the house and as he reached the street, the entire ceiling over the second floor (where the bedrooms are) collapsed and the whole floor was instantly consumed in flame. Minutes later the fire department arrived, only to find the house engulfed in fire through both floors. The total elapsed time from the lightning strike to the fire filling the sleeping areas was 8 minutes.

Being prepared to evacuate in case of a fire is critical. In a standard 6-story office building, the required "fire drill" evacuation time is 4 minutes to completely empty the building. If you can make it to a stairwell, the walls there are rated for 2 hours, so unless the fire is in the stairwell, you should be safe until the fire department gets to you. This, of course, assumes that it is a normal fire, and not a super-hot fire, like one caused by burning jet fuel or magnesium, and that the structure of the building has not been already damaged by impact or explosions.

Hazardous Materials Incidents Nuclear Emergency

Nuclear emergencies can take many forms:

- ❖ Reactor leak (but you should be able to know already if you are at risk for this – do you live near a reactor?)
- ❖ Nuclear Bomb (stolen, terrorist controlled, or launched by a foreign military)
- ❖ Dirty Bomb – a conventional bomb used to disburse radioactive material over an area.
- ❖ Nuclear accident – Nuclear material shipment accident.

After a release of radioactive materials, local authorities will monitor the levels of radiation and determine what protective actions to take.

The most appropriate action to take will depend on the situation. Tune your TV or radio to the local emergency response network or news station for information and instructions during any emergency.

If a radiation emergency involves the release of large amounts of radioactive materials, you may be advised to "shelter in place," which means to stay in your home or office; or you may be advised to move to another location. If you have to decide for yourself, it is critical to know how much radiation you are receiving where you are, whether the levels are increasing or decreasing, and what the levels are in your path to safety.

If you are advised to shelter in place, you should do the following:

- Close and lock all doors and windows.
- Turn off fans, air conditioners, and forced-air heating units that bring in fresh air from the outside. Only use units that recirculate air that is already in the building.
- Close fireplace dampers.
- Move to an inner room or basement.
- If possible, bring pets inside.
- Keep your radio tuned to the emergency response network or local news to find out what else you need to do.

If you have a Geiger counter or Kearney Fallout Meter (KFM), monitor and log the radiation levels. You can pick up surplus Geiger counters from the suppliers in Appendix 2. the construction of a KFM is included below.

If you are advised to evacuate, follow the directions that your local officials provide. Leave the area as quickly and orderly as possible. In addition –

- Take your Bug Out Bag, and make sure you have a flashlight, portable radio, batteries, first-aid kit, supply of sealed food and water, hand-operated can opener, essential medicines, and cash and credit cards.
 - Take pets only if you are using your own vehicle and going to a place you know will accept animals. Emergency vehicles and shelters usually will not accept animals.
1. Move to a low radiation area (underground) and stay there.
 2. When moving check the radiation level frequently and calculate accumulated dosage.
 3. Check the radiation levels of acquired water and food.
 4. When in exposed areas – do not eat or drink. You can ingest radioactive particles and bring radiation with you.

But what is the likelihood of a nuclear event? It's the one that most survivalists seem of think of first. Growing up in the 60's and 70's, we were all taught "duck and cover" and to fear the "Cold War". But what is the chance that anyone will actually launch nuclear devices now?

The US and Russia have not stepped down from their Cold War readiness state. Russia has restarted 24 hour bomber patrols – always keeping planes in the air. Norad and SAC are always on standby. We are only a hair trigger or a bad mistake away from a nuclear launch. The Doomsday Clock is currently set to five minutes to midnight, as of January 2007.

Unfortunately, it is a mathematical certainty that nuclear weapons will be used again – sometime. Somewhere.

So what do we do then? Is it all over?

Not really. Even if the current nuclear arsenals were all deployed in the threatened "Global Thermonuclear War" some people would survive the initial strikes. Probably a lot of them, in fact. Even in the United States, which is the expected target of many nuclear warheads, many large areas will be completely unharmed. The real issue then becomes what do the survivors do? How do they deal with the destruction, radiation, and nuclear fallout?

Nuclear Blast

It is extremely likely that one day, another nuclear bomb will be set off in anger. There are many nuclear weapons currently pointed at the United States and Europe, and a number of "missing" weapons from the breakup of the Soviet Union. A terrorist may be able to get their hands on a bomb, and set it off in a major city. A nuclear explosion has a special set of hazards that are specific to it. These are Blast, Flash Burns, Pulse Radiation, fallout, and EMP. Nuclear reactors don't explode like a military bomb. A military bomb involved in a plane crash won't explode. But both of these can disburse radioactive material. It takes a set of coordinated physical

actions to create the chain reaction that generates a nuclear explosion. It's much harder than Hollywood makes it look. So this means that nuclear explosions will come from a bomb. It will probably not be a homemade one, either, but a military device. It is too difficult to make a functional nuclear explosive that you would have to really worry about. So we'll focus on the effects of military nuclear explosives.

HAZARDS OF NUCLEAR EXPLOSIVE DEVICES

Blast

The Nuclear bomb was initially developed for its convenient delivery of a large amount of blast in a small container. Blast is the overpressure of an area, starting at the bomb, and decreasing as the distance from the bomb increases. At overpressures as little as 1 atmosphere, windows will be broken, flying glass will cause secondary injuries, and standard wood framed structures will be damaged. At 3 atmospheres of overpressure, an exposed person will experience severe eardrum damage.

Flash Burns (Firestorms)

The explosion of a nuclear bomb also generates intense heat. This can cause severe burns even at long distances. This thermal radiation travels in a straight line from the blast, until it encounters opaque objects, and decreases in intensity as the radius from the explosion increases. Primary fires can be ignited by the pulse, while secondary fires will be started by damage from the blast. The effect is instantaneous.

Pulse Radiation

The detonation of a nuclear bomb emits a pulse of high intensity (gamma) radiation. This pulse must be accounted for in your radiation dosage calculations, and can be used to estimate the effects of EMP to electronics.

Fallout

During Nuclear detonation-radioactive dust and debris is thrown miles into the atmosphere and transferred by prevailing winds hundreds or thousands of miles away. Fallout is the precipitation of radioactive particles from a nuclear blast. These particles continue to emit radiation as they decay. The various particles have different decay rates, but they can be represented as an average based on the total amount of radiation at time of fall. This is hard to imagine, but during the Bugaboo Creek fires of 2007, smoke (particulate contamination) was blown into Atlanta, a distance of over 250 miles, choking the air and causing visibility problems as if it were a thick fog. If this had been radioactive, most of Georgia would have been contaminated.

Fallout takes time to be transported by the wind. The farther you are from the blast, the more time you have before the fallout reaches you.

The graphs below are from the Bikini Atoll experiments and show the fallout levels and time to reach the destination.

Remember that inhalation of nuclear material is your largest risk, as the radioactive material will be trapped in your body, and your organs will absorb ALL of the radiation that is emitted.

Air bursts produce little to no fallout, while ground bursts can produce substantial amounts. The particulate fallout begins about 15 minutes after the blast, and continues for hours, depending on the distance from the actual blast. At this point it is at its maximum radioactivity. This radioactive material is made up of a number of sources – bomb casing, debris from blast crater, and a little fissionable material from the original bomb. Unlike Chernobyl, where the material was primarily stable fissionable material, the fallout from a nuclear explosion is primarily energized particles from other sources – which are very unstable radioactively. This means that they have a varied mix of half-lives.

A Half life is the time it takes for a radioactive sample to decay to half its original radiation value. Stable materials used in bombs have very long half-lives – usually measured in decades. The unstable materials in fallout have much shorter half-lives. These can be averaged (as an estimate) to about 7 days. If a given area is at a certain radiation level, it will decay to about half its value in 7 days. In 7 more days, it will decay to half again. This seven day half rule will be valid for about a year. After that the radioactive debris will be mostly the more stable elements with much longer half-lives. These decay of radioactive materials can be calculated by the following formula, if you want to get picky:

$$N_t = N_0 e^{-\lambda t}$$

N_t = remaining radiation levels

N_0 = initial radiation levels

$$\lambda = \ln 2 / \text{half life} = 0.69315 / \text{half life}$$

And this formula would have to be re-calculated for the half-life of each different particle. As you can see from the tables below, radiation hotspots will exist for months after the fallout occurs.

Because fallout is particulate matter (dust) – it can accumulate in higher concentrations that will give higher radiation levels. If the fallout from 1 square meter is removed and added to another square meter, the radiation is doubled. This becomes important in 2 situations: recovery and rainfall.

Rainfall will wash away the fallout, but then concentrates it into rivers streams and puddles, potentially creating severe hotspots. There is no quick and easy formula, but imagine if all the rain hitting your yard pooled into one spot. (an empty swimming pool for example) – this pool that is 20 meters by 10 meters for a total of 200 square meters, and the rain pools in the bottom and then evaporates – this will concentrate the radiation by as much as 200 times. This will continue to make some areas of high radiation unsafe for a very long time.

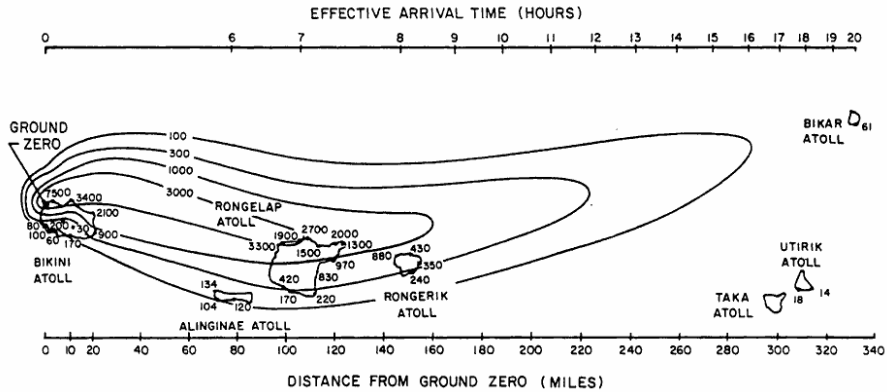
More worrisome is accumulated radiation dosages. Even low radiation levels add up very quickly, as the charts below show.

Blast Effects (number of atmospheres of overpressure)

Size of Bomb	Distance from Blast (miles)										
	0.4	0.8	1.1	1.5	2.2	3.2	3.6	5.8	7	8.7	12
200KT air	30	20	15	10	5	3	2	1	1	0	0
200KT Surface	30	20	15	10	3	2	2	1	0	0	0
500KT air	30	20	18	15	10	5	3	2	2	1	0
500KT Surface	50	30	20	10	5	3	2	1	0	0	0
1MT Air	40	30	20	17	13	10	6	4	2	2	1
1MT Surface	100	50	30	15	10	8	5	3	2	1	0

Radiation Pulse (instantaneous radiation dosage in Rads)

Size of Bomb	Distance from Blast (miles)									
	0.4	0.8	2.2	3.2	3.6	5.8	7	8.7	12	
200KT air		650	75	10	1	0	0	0	0	
200KT Surface		8100	2800	700	350	5	0	0	0	
500KT air		2600	80	25	10	0	0	0	0	
500KT Surface		14000	6200	1200	30	0	0	0	0	
1MT Air			250	50	2	0	0	0	0	
1MT Surface			4500	1200	250	90	5	1	0	



Medical care needed	Accumulated Radiation Exposures (R) over a period of			
	Instant	One week	One month	Four months
None, no deaths	100 R	150 R	200 R	300 R
Some, 5% may die	200 R	250 R	350 R	500 R
Most, 50% may die	400 R	450 R	600 R	

The above chart is from Richard C. Oster Sr.'s article in Journal of Civil Defense, Oct 1987, "Fallout Radiation: Levels and Effects". Modified for updated data

Fallout Radiation decay over weeks (estimated)

Initial Radiation	Weeks								
	1	2	3	4	5	6	7	8	9
4000 rads	2000r/hr	1000r/hr	500r/hr	250r/hr	125r/hr	63r/hr	31r/hr	16r/hr	8r/hr
1000 rads	500r/hr	250r/hr	125r/hr	63r/hr	31r/hr	16r/hr	8r/hr	4r/hr	2r/hr
500 rads	250r/hr	125r/hr	63r/hr	31r/hr	16r/hr	8r/hr	4r/hr	2r/hr	1r/hr
125 rads	63r/hr	31r/hr	16r/hr	8r/hr	4r/hr	2r/hr	1r/hr	.5r/hr	.25r/hr

Cumulative Dosage Calculator for fallout radiation

Week	Rads/Hr at start								
	2.5	2	1.5	1	0.75	0.5	0.25	0.1	0.05
1	348	279	209	139	104	70	35	14	7
2	522	418	313	209	157	104	52	21	10
3	697	558	418	279	209	139	70	28	14
4	872	697	523	349	261	174	87	35	17
5	1046	837	628	418	314	209	105	42	21
6	1221	977	732	488	366	244	122	49	24
7	1395	1116	837	558	419	279	140	56	28
8	1570	1256	942	628	471	314	157	63	31
9	1745	1745	1047	698	523	349	174	70	35

Shielding Material	Thickness to reduce radiation by 1/2	Thickness to reduce radiation by 1/8	Thickness to reduce radiation by 1/1024
Lead	1cm (0.4 in)	3cm	10cm (4 in)
Concrete	6cm (2.4 in)	18cm	60cm (24 in)
Dirt	9cm (3.6 in)	27cm	90cm (36 in)
Air	150m (500 ft)	450m	1500m (5000ft)
Sandbags	10cm (4 in)	30cm	1m (40 in)

Fallout Estimate (Rads of fallout, time before fallout hits)

	Distance from Blast (miles)								
	30 Mi	40 Mi	60 mi	140 mi	160 mi	210 mi	230 mi	280 mi	300 mi
Size of Bomb	3 hr	4 hr	6 hr	10 hr	12 hr	15 hr	16 hr	20 hr	22 hr
500KT Surface	50	75	50	5	2.5	0.5	0.4	0.1	0.05
200KT Surface	20	30	20	2	1	0.2	0.16	0.04	0.02
1MT Surface	100	150	100	10	5	1	0.8	0.2	0.1

Fallout Estimates are a worst case value, and assume a 15MPH windspeed and that the measurement is made in a direct line with the wind blowing the fallout directly at the measurement.

EMP

The nuclear blast also generates electromagnetic energy, called EMP (ElectroMagnetic Pulse) this radiation is not hazardous by itself to humans, but will damage solid state circuitry. The radiation causes extra electrical pulses across the microscopic transistors in a computer chip. This will cause strange behavior and can even cause short circuits and permanent damage to the chip. As little as 10 rads can temporarily scramble an unshielded circuit. If it receives a low dose, while unpowered, a solid state appliance may be able to "heal" itself after time. Doses over 100 rads in a short period of time will probably destroy any solid state device. The only way to prevent this is to shield the device from the pulse. Many books assume that EMP is transmitted through the antennas and wires. This is not EMP, but an inductive charge, and is similar to what happens when lightning strikes nearby.

An additional risk from EMP occurs in the upper atmosphere. A high altitude nuclear burst can energize the stratosphere and change the way that radio waves bounce off the upper atmosphere. This will disrupt long distance radio communications for a few days after the blast, limiting the targeted country's ability to react to the attack. The Soviet Union developed and produced 3 50 Megaton nuclear weapons with a delivery mechanism described as "orbital". Why orbital, and why only 3? These weapons seem to be best used to detonate in the near space range over the US and Europe. This will not only disrupt radio communications by charging the stratosphere, but will disable geosynchronous satellites. Geosynchronous satellites provide Weather monitoring, GPS, Cellular, and Long distance services, among others. This will prevent a large portion of the US military arsenal from being effective, as our soldiers and systems are heavily dependant on GPS locating and satellite tracking. After the breakup of the Soviet Union, Russia has kept these three missiles active and under current maintenance. For surface targets in the US, please see the appendix at the back of this book.

How long should I stay away? When will it be safe?

The prediction of the actual decay of radioactive materials involves some very complex mathematics, but because of the way radioactive fallout is produced, an average estimate can be formed. Nuclear bombs irradiate particles of matter (dirt, bomb casing, and buildings) and cause them to become radioactive. Many of these particles are unstable, with very short half-lives.

The most dangerous fallout has the consistency of sand or finely ground pumice. The bulk of the radioactivity in nuclear accident fallout is more long-lived than that in weapons fallout. For nuclear explosion fallout, unless there is rain to wash radioactive material into a concentrated area, the overall radiation in an area will decay at approximately a 7-day half-life period. This means that for every seven days since the blast, the radiation will reduce to 50% of its previous value. If there is rain during or after fallout, radioactive debris will wash into low lying areas and accumulate, creating "hotspots." These areas will generate higher levels of radiation, and will subsequently take longer to decay to safe levels.

Fallout Shelters

When I was a kid, we never had a fallout shelter. When I was old enough to ask, my dad said it was because they were useless. If you needed to be in one, then you would never leave. I didn't understand it at the time. Because radiation decays at 1/2 its value per period, the time to wait for the outside radiation to be safe (below .5r/hr for short exposures) is extremely long – and stocking that much food and water becomes problematic.

Shelter Habitation Times for 12 thicknesses of shielding

Expected outside radiation at entry into shelter	Duration of stay before external radiation safe (rad rate)	Final outside rad level	Accumulated dose for standard 3' earth shelter
4000r	13 weeks	.5r/hr	984r
4000r	15 weeks	.125r/hr	984r
2000r	12 weeks	.5r/hr	493r
2000r	14 weeks	.125r/hr	493r
1000r	11 weeks	.5r/hr	246r
1000r	13 weeks	.125r/hr	246r
500r	10 weeks	.5r/hr	123r
500r	12 weeks	.125r/hr	123r
250r	9 weeks	.5r/hr	62r
250r	11 weeks	.125r/hr	62r
125r	8 weeks	.5r/hr	31r
125r	10 weeks	.125r/hr	31r
65r	7 weeks	.5r/hr	16r
65r	9 weeks	.125r/hr	16r

A fallout shelter must be able to protect its occupants from blast, thermal pulse, pulse radiation, and lingering radiation from fallout. Fortunately, many of these challenges can be overcome by the same construction methods. Thick, fireproof, structural barriers will perform all of these tasks.

The shelter, if above the surface of the ground, should be supported on at least 2 sides by earthen embankments. First, this helps the structural stability during the blast overpressure. As the blast pressures reach the shelter, one side will be subjected to overpressure, while a differential under pressure will occur on the other side. This pressure differential, if stressing an unsupported structure, can cause catastrophic failure of the structure, resulting in breach of containment or structural collapse.

The second concern is that earth and concrete act as good shielding to both kinds of radiation, as well as being fireproof.

The best fallout shelters are therefore underground. These are also the most expensive to make.

If you have the luxury of having a root cellar on your property, this can be converted, but most people will have to build expedient shelters.

The thickness of materials to reduce radiation by ½ include 1 cm (0.4 inches) of lead, 6 cm (2.4 inches) of concrete, 9 cm (3.6 inches) of packed dirt or 150 m (500 ft) of air. When multiple thicknesses are built, the shielding multiplies. Thus, a minimum practical fallout shield is ten halving-thicknesses of packed dirt. This reduces gamma rays by a factor of 1024, which is 2 multiplied by itself ten times. This multiplies out to 90 cm (3 ft) of dirt.

But remember, the radiation goes down outside by only 50% per week, so the thicker the barriers, the longer the shelter is safe, but the longer you'll have to stay there.

For example, a shelter that makes a 4000r outside dose safe(ish) would need 12 thicknesses of shielding to reduce the radiation to 1r/hr (still pretty high, see cumulative doses above. 1r/hr at start = 123r/wk cumulative) and 20 thicknesses would reduce the radiation to negligible levels. But it would take nearly 20 weeks for the outside radiation to get to those same safe levels – so be prepared to stay in a shelter a long time, without leaving. Exiting and entering the shelter to gather supplies will bring radiation into the shelter, which increases the exposure of the occupants.

Remember cumulative doses: 1 rad/hour at the start of the week equals 123rads for the first week, 62 for the second, 31 for the third, 16 for the fourth, 8 for the fifth, 4 for the sixth, and so on, for a total dose over 20 weeks approaching 245 rads. This is at the upper limit of the safe dosage listed in the chart above.

Two expedient Fallout Shelters that were designed taught in the Cold War are the basement "lean to" shelter and the car trench shelter. The Lean To shelter is built in the basement of a home, by taking tables, bookcases, doors, or other structural supports and leaning them against a protected wall, forming a "lean to" this structure is then covered with dirt, sandbags, bricks, or other dense available materials.

The car trench shelter is made by digging a ditch approximately 3 feet deep, parking the car over it, and using the dirt to fill in the space between the car and the ground.

Either expedient shelter should be considered a "last resort" – it is much better to have a prepared (and stocked) shelter. Just imagine having to lie in a trench under your car for a week or two.

There are several companies across the US that will install a "drop-in" shelter in your backyard – basically a metal pipe about 12 feet in diameter, with sealed off ends and an access hole. The cost of one of these is approximately \$1000 per linear foot. (so a 20 foot long by 12 foot diameter would be \$20,000.) If planning this, please remember that a standard small bedroom in the US is 10 feet by 10 feet, and would be a pretty cozy place to house your whole family for 9 weeks.

Detecting Radiation - Kearney Fallout Meters

Since radiation is unseen, and it is critically important to know how much radiation is being received inside a shelter, it is possible to make a KFM (Kearney Fallout Meter), developed at Oakridge laboratories. This device measures radiation by detecting the amount of ionization accumulated on the aluminum foil leaves. The materials for the meter are readily available, and should be gathered and stored in the shelter, if not already assembled.

I suggest building one in advance, to make sure you understand the instructions.

Before building a KFM, people expecting a nuclear attack should first build a fallout shelter. Second, store as much water and food as possible – see shelter habitation times above. Third, build the KFM.

A KFM is a simple electroscope fallout meter, which will measure fallout radiation accurately. To use a KFM, an electrostatic charge must first be placed on two separate aluminum foil leaves. Being placed on separate, clean, dry, insulating threads, insulates these leaves.

To make accurate readings, the air inside a KFM must be kept very dry by means of drying agents such as dehydrated gypsum (sheetrock) or silica gel. Pieces of drying agent are placed on the bottom of the ionization chamber of the KFM.

The electrostatic charge is placed on the leaves via the charging wire that protrudes from the plastic cover of the KFM.

When the two leaves are charged, their like charges cause them to be forced apart. When fallout radiation strikes the air inside the KFM, it produces charged ions. These ions cause part or all of the charge on the leaves to be discharged. This will bring them together

To read the meter, place the KFM on a firm, level surface. To read the separation of the lower edges of the two leaves, with one eye, look straight down at the leaves through the plastic cover. Keep the reading eye 12 inches above the seat. You can use a 12-inch ruler resting on the seat to maintain this distance. Using a flashlight makes this more accurate.

If a KFM is made with the specified dimensions and of the

specified materials, its accuracy is automatically established. A KFM never needs to be calibrated or tested with a radiation source.

A millimeter scale is cut out and attached to the clear plastic cover of the KFM so that its zero mark is directly above the two leaves in their discharged position when the KFM is resting on a firm, level surface. The difference in mm of the bottom of the leaves is the KFM reading. This can be compared to the following chart to get the dosage rate.

Diff in readings (mm)	Time interval of exposure				
	15 sec R/HR	1 min R/HR	4 min R/HR	16 min R/HR	1 hr. R/HR
2	6.2	1.6	0.4	0.1	0.03
4	12	3.1	0.8	0.2	0.06
6	19	4.6	1.2	0.3	0.08
8	25	6.2	1.6	0.4	0.1
10	31	7.7	2.0	0.5	0.13
12	37	9.2	2.3	0.6	0.15
14	43	11	2.7	0.7	0.18

BUILDING THE KFM

Materials Needed:

KFM

- Any metal can, approx 2 9/16 inches in diameter inside and 2 7/8 inches high inside, washed clean with soap. (This is the size of a standard 8 oz. Can)
- Standard aluminum foil – 2 square feet. If Heavy Duty is used, make 5 ply leaves instead of 8 ply.
- Doorbell wire, or other single strand light insulated wire. (Cat 5 cable would be perfect) – 6 inches.
- Any type of lightweight thread. (Best is twisted nylon, or unwaxed nylon dental floss)
- A piece of clear plastic – 6 x 6 inch square. Strong plastic (4 mil) is best.
- Cloth Duct tape – about 10 square inches.
- Band-aid tape, or masking tape or Scotch tape. About 2 square inches.
- Gypsum wallboard (sheetrock) – about 1/2 square foot 1/2 inch thick.
- Glue – one-hour epoxy.
- An ordinary wooden pencil and a small toothpick.
- 2 strong rubber bands, or string.

Charging Device

- Hard plastic rubbed on smooth, dry paper
- Scotch transparent tape 3/4 inch wide

For reading

- Watch with a second hand, or a stopwatch
- A flashlight
- Pencil and paper – preferably the dosage log at the end of this book.

For the Dry bucket (for charging and storage)

- A large bucket with a top that is at least 11 inches in diameter
- Clear plastic (4 mil) to cover the bucket
- Cloth duct tape – 16 feet long
- Two plastic bags 14 to 16 inches in circumference – bread bags are a good choice.

- About 1 square foot of sheetrock
- Two 1 quart mason jars, one to store drying agent, and one to store the KFM charging devices.

Useful

- An airtight container to store the KFM.
- Commercial anhydrite with a color indicator

MAKING THE DRYING AGENT

- Take a piece of 1/2" gypsum wallboard (Sheetrock) about 12 inches by 6 inches.
- Do not use "moisture proof" or bathroom grade wallboard.
- Cut off the paper and glue, easiest done by wetting the paper. Since moisture contaminates a KFM, the drying agent should be made at least 2 days in advance of an attack, and stored in an airtight container.
- Break the white gypsum filling into small pieces and make sure the largest pieces are less than 1/2" across. All pieces should be approximately the same size.
- Spread the gypsum pieces in a single layer in a pan. Heat the gypsum in an oven at its highest temperature (which should be above 400 degrees F) for one hour.
- If sufficient time is available, measure out a batch of gypsum so that it covers the bottom of the KFM in a single layer. Place each batch in an aluminum foil "bowl", then roll the bowl into a ball and seal in an airtight container.
- Since anhydrite absorbs water from air very quickly, put it in a dry container while it is still hot. A Mason jar is excellent.
- To place anhydrite in a KFM, drop in the pieces one by one, being careful not to hit the leaves or the stop threads. The pieces should cover the bottom of the can, with no piece resting on top of another.
- To remove the anhydrite, use a pair of tweezers or scissors.

MAKING THE IONIZATION CHAMBER

- Remove the paper label of an 8 oz metal can from which the top has been smoothly cut and clean with soap. Dry the can thoroughly.
- Cut out the paper pattern to wrap around the KFM can. Glue or tape this to the can.
- Sharpen a small nail (or use a metal punch) to make 4 small holes for the stop threads. (The stop threads are insulators that keep the leaves from touching the sides of the can and being discharged.)
- Carefully punch the 4 holes, using a stick or wooden handle as a backstop. Make these holes just large enough to run a needle through them, and then move the needle in the holes to bend back the points of metal. Alternately, using a very small drill bit, you can drill the holes.
- The stop threads can be installed by using a needle to string a single clean nylon thread through all four holes. Do not touch the thread with your hands.
- Tie a small toggle to each end of the thread and tape to the sides of the can to pull the stop thread taut.
- Cover all four holes with tape to prevent air leakage.

MAKING THE ALUMINUM LEAVES

- Cut a piece of standard aluminum foil approximately 4 by 8 inches.

2. Fold the foil to make a 2-ply sheet approximately 4 by 4 inches.
3. Fold again to make a 4-ply sheet approximately 2 by 4 inches.
4. Fold again to make an 8-ply sheet, making sure the halves of the second fold edge are exactly together.
5. Cut out the finished leaf pattern, found on the following page.
6. Press flat the 8-ply sheet with fingers until they appear to be a single thin, flat sheet.
7. Hold the pattern on top of the 8-ply sheet, aligning the pattern's Third Fold Edge on top of the third-fold edge of the 8-ply aluminum sheet. Be sure that one lower corner of the pattern is on top of the exactly square corner of the 8-ply aluminum sheet.
8. While holding a straight edge along the thread line of the pattern press with a sharp pencil so as to make a shallow groove for the thread line on the 8-ply aluminum sheet. Also using a sharp pencil, trace around the top and side of the pattern, so as to groove the 8-ply foil.
9. Remove the pattern and cut out the 8-ply leaf.
10. While holding a straight edge along the indented thread line, lift up the open edge of the 8-ply sheet (keeping all 8 plies together) until this edge is vertical, making a 90 degree angle with the main ply. Remove the straightedge and fold this flap flat.
11. Tape the flap closed and the edges of the ply closed with band-aid tape or epoxy glue.
12. Cut an 8 ½ inch piece of fine, unwaxed, very clean thread.
13. Cut out Pattern "C", then tape pattern "C" to the top of the worktable. Cover the two "Tape Here" rectangles with pieces of tape, each piece the size of the rectangle. Then cut two other pieces of tape, each piece the same size as and use then to tape the thread onto the guide sheet, on top of the "tape here" rectangles. Be very careful not to touch the two 1-inch parts of the thread next to the outline of the finished leaf, since oil and dirt even on clean fingers will reduce the insulating value of the thread. Unpowdered latex gloves can help.
14. While keeping the thread straight between the two taped-down ends, lower the thread so that it sticks to the two plastic strips. Then press the thread against the plastic strips.
15. With the point of the knife hold down the center of the thread against the center of the "Thread line" of the leaf. Then, with two fingers, fold over the hem and press it almost flat. Be sure that the thread comes out of the corners of the hem. Remove the knife, and press the hem down completely flat against the rest of the leaf.
16. Make small marks on the thread at the two points of the pattern page, with a ballpoint pen.
17. Loosen the second two small pieces of tape from the pattern paper, but leave these tapes stuck to the thread.
18. Cut 5 pieces of band-aid tape, each approximately 1/8" by ¼". Use them to secure the centers of the ply edges.
19. Repeat steps 1-18 for the other leaf.

INSTALL THE TWO ALUMINUM LEAVES

1. Use the two small pieces of tape stuck to the ends of the thread to attach the thread to the outside of the can. Attach the tapes on opposite sides of the can, so as to suspend the leaf inside the can. Each of the two marks on the attached thread must rest exactly on the top of the

rim of the can, preferably in two small notches filed in the edge of the top rim of the can. Each of these two marks should be positioned exactly above one of the two points shown on the pattern wrapped around the can. Be sure that the hem-side of the leaves face outward.

2. Next, the suspending thread of the first leaf should be taped to the top of the rim. Use a piece of Band-aid tape only about 1/8" by ¼", sticking it to the rim of the can so as to barely cover the thread on the side where the second leaf will be suspended. Make sure no parts of the tape are inside the can.
3. Position and secure the second leaf, ensuring that:
 - The smooth sides of the two leaves are smooth (not bent) and face each other and are flush when not charged.
 - The upper edges of the two leaves are suspended side by side and at the same distance below the top of the can.
 - The leaf-suspending threads are taped to the top of the rim, so that putting the lid on will not move the threads.
 - No parts of the threads inside the can are taped or restricted in any way.
 - The leaf-suspending parts of the threads are not entangled or cross over each other.
 - The threads come together on the top of the rim of the can, and that the leaves are flat and hang together.
4. Cover with tape the parts of the threads that are outside the can, and also cover with more tape the ends of the thread outside the can.
5. To make the seat, cut a piece of wooden pencil, about one inch long, and tape it securely to the side of the can along the centerline marked SEAT on the stencil. Be sure the upper end is at the same position as the top of the location for the seat outlined in the pattern. The top of the seat is ¾" below the top of the can.
6. Cut out one of the "reminders for operators" and glue or tape it to the outside of the KFM. Then cover all the sides of the KFM with clear plastic tape or varnish. This will keep sticky-tape on the end of an adjustment thread or other moisture from damaging the "reminders" of the table.

MAKE THE PLASTIC COVER

1. Cut out the paper pattern for the cover from the pattern page B
2. From a piece of clear, strong plastic, cut a circle approximately the same size as the paper pattern.
3. Stretch the center of the circle of plastic over the center of the can, and pull it down close to the sides of the can, making small folds on the sides so that there are no wrinkles in the top cover. Hold the lower part of the skirt in place with a strong rubber band.
4. Just below the top of the can, bind the cover with a piece of ¼" wide strong tape. (Duct tape)
5. Keep vertical the small part of the tape that presses against the rim of the can – to keep the lower edge from pressing too tight on the can.
6. With scissors, trim the plastic so that it extends only about one inch below the top of the can.
7. Make a notch in the "skirt" about one inch wide, where it fits over the pencil SEAT attached to the can. The "skirt" in this area should be only about 5/8" from the top of the can.
8. Remove the plastic cover, and tape the lower edges of the "skirt", inside and out, using short lengths of ¼" tape. Before securing each piece of tape, slightly flare the flaps

so that the skirt flares slightly outward at the bottom edge.

9. Place the plastic cover on the KFM. From the pattern page, cut out the scale, and position it on top of the cover, in the position shown on the pattern. Do not tape within 2 cm of the center of the scale.
10. Make the charging wire by following the pattern below, which is exactly the right size.
11. With a needle or pin, make a small hole in the cover, about 1/2" from the rim of the can and directly above the upper end of the centerline between the two leaves. Carefully push the charging wire through this hole, until all of the wire below the stop is inside the can.

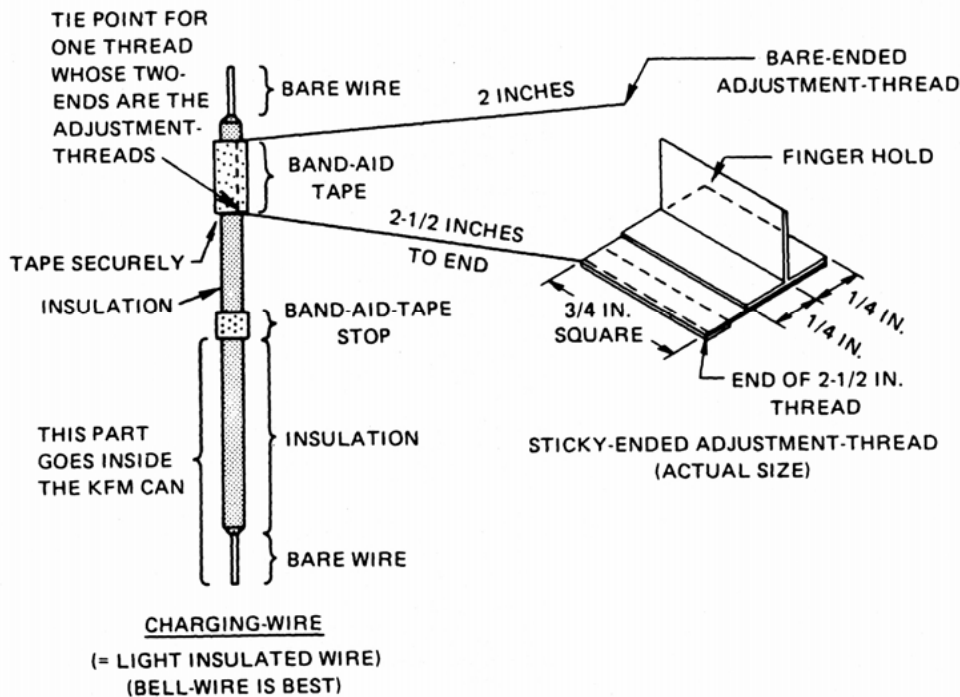
the square.

4. Move this edge of the plastic rather slowly past the end of the charging wire, while looking straight down on the KFM. Keep the hard plastic approximately perpendicular to the charging wire, and about 1/4" to 1/2" away from its upper end. The charge jumps the spark gaps and charges the KFM.
5. Pull down on an insulating adjustment thread to raise and lower the end of the charging wire. Do not touch the charging wire.
6. Put the charging paper and plastic into a container where they will be kept dry.

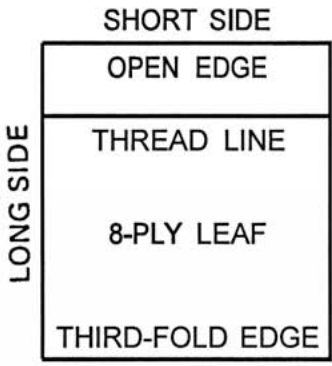
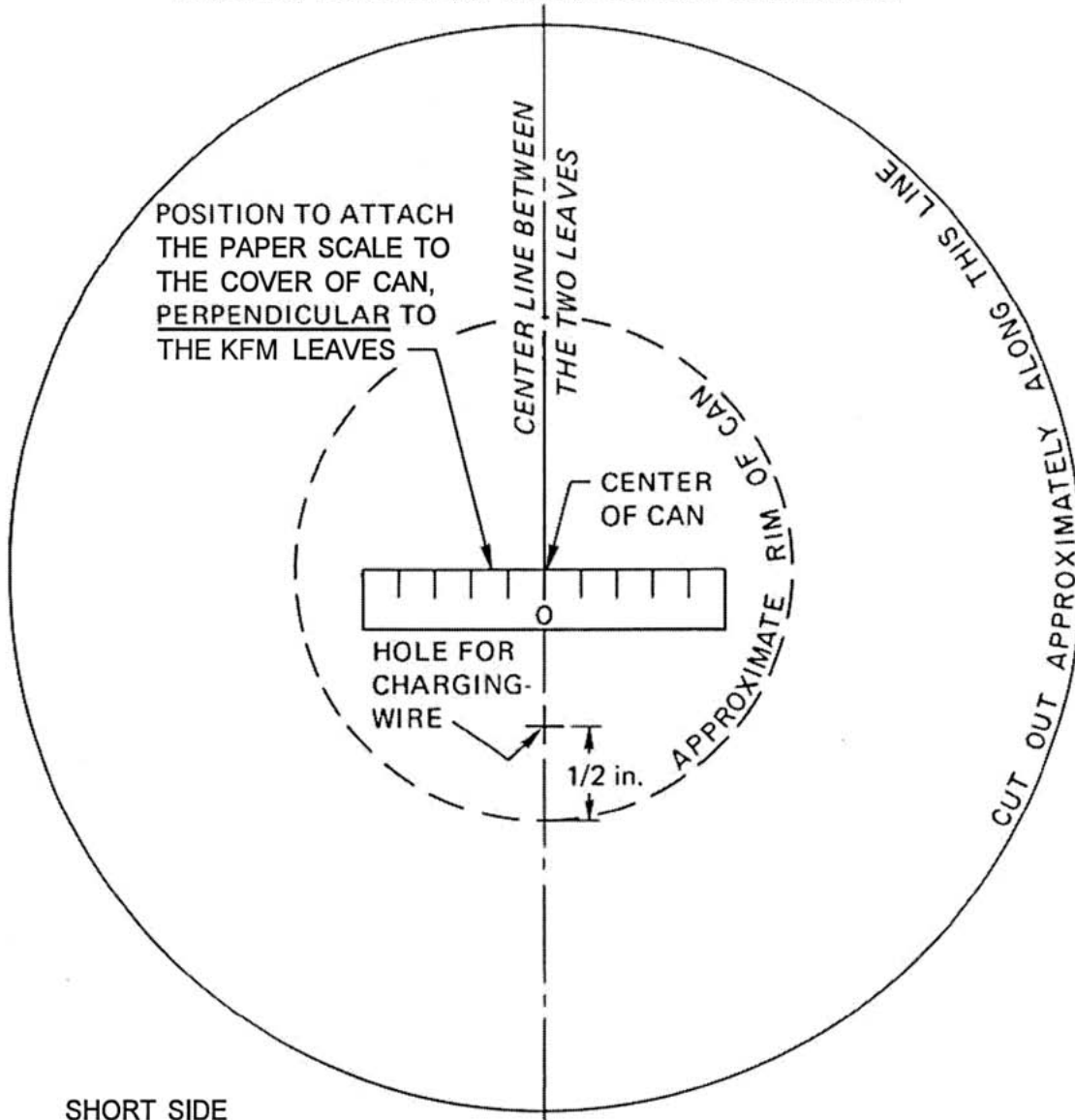
CHARGING A KFM

1. Adjust the charging wire so that its lower end is about 1/16" above the upper edges of the aluminum foil leaves.
2. Select a piece of hard dry plastic – Plexiglas, plastic draftsman's triangle, etc. fold dry, smooth printer paper to make a square about 4 inches on a side and about 20 sheets thick.
3. Fold the square in the middle, and move the hard plastic back and forth vigorously on the paper in the middle of

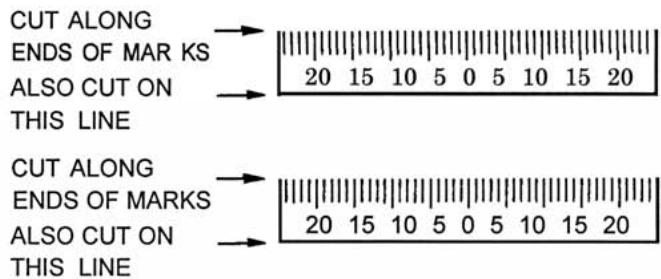
EXACT SIZE



PATTERN FOR CLEAR-PLASTIC COVER FOR KFM CAN



FINISHED-LEAF PATTERN
(CUT OUT EXACTLY ON SIDE LINES)



PAPER SCALE (TO BE CUT OUT)

*"Bring me my Bow of burning gold:
Bring me my Arrows of desire:
Bring me my Spear: O clouds unfold!
Bring me my Chariot of fire!*

*I will not cease from Mental Fight,
Nor shall my Sword sleep in my hand,
Till we have built Jerusalem
In England's green & pleasant Land."*

Author: Blake, William

Milton (Plate 1, l. 9–16). . .

The Complete Poems [William Blake]. Alicia Ostriker, ed. (1977) Penguin Books.

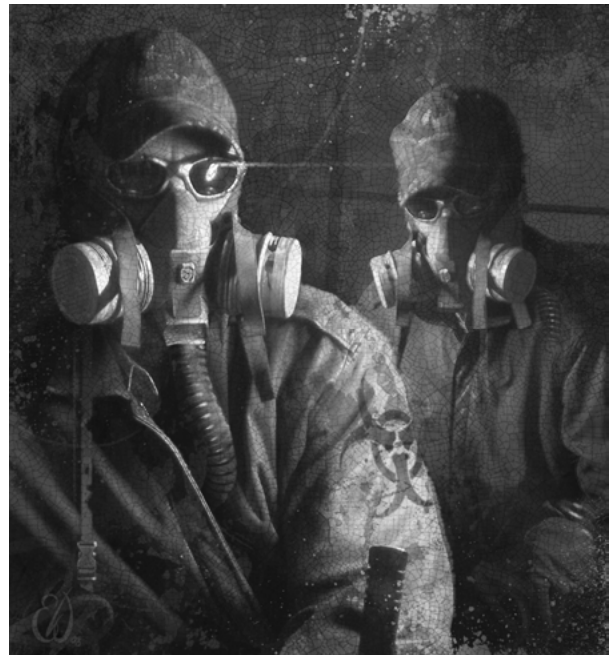
Biological Threats

On August 23, 2007, the World Health Organization issued a report that stated that stated diseases were spreading more rapidly than before, were becoming more difficult to treat, and were emerging faster than previously. The United Nations agency warned there was a good possibility that another major disease like AIDS, SARS or Ebola would appear in the coming years. With the increase in air travel by a large number of people, the open borders among many nations, and "personal privacy" laws prohibiting governments from screening and tracking documented contagious individuals, the likelihood of an outbreak remains high. The "TB Traveler" is a prime example of this (while fortunately, he was not actually very contagious). After he was examined in Atlanta by agents of the CDC, he was advised not to travel, but the CDC guidelines and laws prevented them from *prohibiting* him from traveling, so they could only suggest that he not travel. He then flew internationally, exposing hundreds of fellow passengers, and ultimately flew to Canada and snuck across the Canada-U.S. border, (showing he knew he was doing something wrong, in my mind), to get back to the States – all without being stopped or challenged – even *after* he was on the "watch list". If he had been carrying a nasty bug with a longer incubation time – Pneumonic Plague, for example, he could have infected all of the people on the plane, and they would have infected all their contacts, and so on. It's the geometric progression of this that makes it so frightening. Think of it this way. If the person infected (patient Zero) comes in contact with 10 people (and only 10) and infects them all, then they do the same, and we take it 6 degrees of separation, then that one person (Patient Zero) has indirectly infected a million people. Now the next time you leave your house – try to count all of the people that you come within 10 feet of. It'll probably be a lot more than 10. Even with social interaction circles overlapping, a highly contagious disease has a good chance of infecting tens of millions of people before it even gets detected. Even with antibiotics and medical treatment, the impact to the world economy of a global pandemic will be staggering. And it probably will happen. One of the main requirements for a pandemic flu is the ability of the virus to spread easily. The 1918 flu pandemic killed a half million people in the US alone, and as many as 50 million worldwide. This was right before the Great Depression. The current strain of avian flu, while not currently transmissible between humans, has a 50% death rate among those infected. The CDC estimates a global financial

impact of a pandemic of this size at between \$71.3 billion and \$166.5 billion.

Most times, biological threats are best dealt with by sheltering in place, and protecting yourself when you do have to go outside. Avoid contact with others as much as possible. Learn how the disease is transmitted, and protect against those vectors.

Most times when there is a virus or flu going around, people are in denial about getting it. They claim to be fine, and even deny that they are having symptoms. They continue to go to work, interact with people, and will even refuse treatment or diagnosis. This denial of the facts is quite dangerous, and leads to the spread of the disease even further. This fall, I was amazed at the spread of a nasty cold virus. Everyone I know seemed to get it at the same time, within a week of each other, even though there was no traceable common contact.



Pandemic Levels

The World Health Organization believes that the world is now closer to another influenza pandemic than at any time since 1968, when the last major pandemic occurred. The World Health Organization uses a series of six phases of pandemic alert as a system for informing the world of the seriousness of the threat and of the need to launch progressively more intense preparedness activities. As the pandemic level changes, affected regions will automatically implement their response plans, whether they are directly affected or not. The WHO alert system defines the scope of an outbreak, and suggests a level of pre-planned responses based on the threat level and contagion zones. Currently, with Bird Flu (Avian influenza), we are at Global Pandemic Level 3. It is of interest to note that discussions at the WHO are underway to eliminate phases 5-6 in the current international travel climate in place of a single Phase 4 to define pandemic.

Phase	Name	Description
1	Inter-Pandemic	Low risk of human cases
2	Phase New virus in animals, no human cases	Higher risk of human cases
3	Pandemic Alert	No or very limited human-to-human transmission
4	New virus causes human cases	Evidence of increased human-to-human transmission
5		Evidence of significant human-to-human transmission
6	Pandemic	Efficient and sustained human-to-human transmission

It is important to know that the DHS and other agencies have very specific response plans at certain pandemic levels. For example, at pandemic level 4, the sales of antiviral medications will be restricted to government only. At pandemic level 6, the government may confiscate antiviral medications.

If an influenza pandemic appears, we could expect the following:

- o Given the high level of global traffic, the pandemic virus may spread rapidly, leaving little or no time to prepare.
- o Vaccines, antiviral agents and antibiotics to treat secondary infections will be in short supply and will be unequally distributed. It will take several months before any vaccine becomes available.
- o Medical facilities will be overwhelmed.
- o Widespread illness may result in sudden and potentially significant shortages of personnel to provide essential community services.
- o The effect of influenza on individual communities will be relatively prolonged when compared to other natural disasters, as it is expected that outbreaks will reoccur.

The World Health Organization has developed a global influenza preparedness plan, which defines the responsibilities of The World Health Organization and national authorities in case of an influenza pandemic. This plan incorporates new scientific data and experience obtained during recent outbreaks that had pandemic potential. This plan can be viewed at: http://www.who.int/csr/resources/publications/influenza/WHO_CDS_CSR_GIP_2005_5/en/

A global pandemic is a rule changer – with an estimated 40% infection rate, and a 50% mortality rate, this will affect all services. The secondary disasters – power outages, supply shortages, businesses unable to continue operations, the impact to the economy and the livelihood of you and your family is dramatic. The expected timeline is as follows:

October

Outbreaks of severe respiratory illness are discovered in various parts of China. The CDC and WHO identify the cause as a strain of H5N1 Bird Flu. WHO Declares Pandemic Level 4.

Late October

Outbreaks spread through SouthEast Asia in Hong Kong, Malaysia, and Thailand. Cases also appear in Iraq, Iran and Afghanistan. WHO elevates pandemic level to 5.

November 1

WHO investigations indicate extensive person-to-person contagion. WHO elevates to pandemic level 6.

Early November

Outbreaks occur in California, Illinois, and Florida. Some schools are closing. The National Guard is called out to secure hospitals and clinics.

Mid November

People in major cities begin to panic, pack up belongings and head to the country, stopping wherever they run out of gas. Small communities are overwhelmed with refugees.

December

The outbreak continues to spread. Early reports indicate a 25% infection rate, and a 54% mortality rate. International travel is curtailed. Non-US Citizen and permanent residents are turned away at the border.

January

The cold weather in the United States causes a higher infection rate, as people are forced to be in closer proximity. Trucking distribution of foods breaks down. Many supermarkets run out of food, or have limited supplies. Riots and theft are commonplace.

February

Death rates rise as secondary infections occur in people who are not able to sustain sufficient nutrition. FEMA begins distribution of rations to needy people. "Freelance Socialists" redistribute the food as they see fit, sometimes overwhelming FEMA trucks.

March

National Stockpiles of food and medicines are exhausted. Food rationing is set up in densely populated areas.

Reinfections and waves of outbreak last for the next 12 months.

Bioterrorism Agents/Diseases

Category A Diseases/Agents (Highest Priority)

The U.S. public health system and primary healthcare providers must be prepared to address various biological agents, including pathogens that are rarely seen in the United States. High-priority agents include organisms that pose a risk to national security because they

- can be easily disseminated or transmitted from person to person;
- result in high mortality rates and have the potential for major public health impact;
- might cause public panic and social disruption; and
- require special action for public health preparedness.

Category B Diseases/Agents

Second highest priority agents include those that

- are moderately easy to disseminate;
- result in moderate morbidity rates and low mortality rates; and
- require specific enhancements of CDC's diagnostic capacity and enhanced disease surveillance.

Category C Diseases/Agents

Third highest priority agents include emerging pathogens that could be engineered for mass dissemination in the future because of

- availability;
- ease of production and dissemination; and
- the potential for high morbidity and mortality rates and major health impact.

A listing of possible diseases and their effects is in Appendix 4.

The real concern is not how to treat these diseases, but how to keep from getting them in the first place. For a disease to take hold and cause infection, three things are required: A sufficient quantity of the pathogen, a way into the body, and a susceptibility to the disease. If you stop any one of these things, then the disease won't take hold. Immunization reduces the susceptibility of a subject to a specific disease, but the other two are the ones that are easiest to address on a more general level.

There are 2 ways that a disease gets to the body – direct contact and indirect contact. Direct contact is when the disease is transmitted directly from person to person, or from vector (bite, etc.) to person. Indirect transmission comes from touching or handling contaminated items, such as towels, bandages, knives, cleaning spills and bodily fluids. To reduce the risk of direct transmission, barriers are commonly used – surgical gloves, masks, gowns, and other physical barriers to the disease being transmitted. These items then become carriers for indirect transmission. Blood spills and other bodily fluids should be cleaned with a sanitizing solution.

To clean bodily fluids and sanitize surfaces from biological contamination, mix ¼ cup Clorox bleach per gallon of water. Wash the area with sanitizer, and let stand for 2-3 minutes, then rinse. Dispose of all porous items that have been in contact with infected fluids in a biohazard or other plastic bag.

Preventing bite vector transmission means reducing contact with the carriers of the disease. Common carriers are mosquitoes, fleas, ticks, and other insects. Mosquitoes lay around 250 eggs in standing pools of water, which will hatch in 7 to 10 days. To keep mosquitoes down, eliminate or treat standing pools of water. If no commercial mosquito insecticide is available, sanitize the water with chlorine. Garlic oil sprayed on the grass, trees, shrubs and other plants around your yard will repel mosquitoes from your property for up to 4 weeks.

Preventing fleas and ticks is harder. The best bet is to avoid contact with animals, and to use a DEET based insect repellent.

Once bitten by a flea or tick, sanitize the wound. Use a multi-spectrum antibiotic cream. Remove a tick with tweezers to avoid having the head break off and stay imbedded in the skin.

Keep an eye on each other and don't ignore symptoms. Denial of the onset of a disease is more dangerous to yourself and those around you.

The radiance was that of the full, setting, and blood-red moon, which now shone vividly through that once barely-discernible fissure,... extending from the roof of the building, in a zigzag direction, to the base. While I gazed, this fissure rapidly widened.

Author: Poe, Edgar Allan "The Fall of the House of Usher," Burton's Gentleman's Magazine (1839).

Chemical Threats

What chemical emergencies are

A chemical emergency occurs when a hazardous chemical has been released and the release has the potential for harming people's health. Chemical releases can be unintentional, as in the case of an industrial accident, or intentional, as in the case of a terrorist attack. In most cases, emergency personnel will be able to communicate critical information to you about the risk and issues of the chemical.

Where hazardous chemicals come from

Some chemicals that are hazardous have been developed by military organizations for use in warfare. Examples are nerve agents such as sarin and VX, mustards such as sulfur mustards and nitrogen mustards, and choking agents such as phosgene. It might be possible for terrorists to get these chemical warfare agents and use them to harm people. This was done in the Tokyo subway system in March, 1995, in five separate attacks. The effects of this terrorist attack are interesting, though, as only 12 people were killed and 50 seriously affected, and just under 1000 experienced mild vision problems, in what should have been a perfect target zone – confined space, high density of victims, restricted access and escape routes. This attack shows the low risk of even well planned terrorist chemical attacks using military agents.

Many hazardous chemicals are used in industry (for example, chlorine, ammonia, and benzene). Others are found in nature (for example, poisonous plants). Some could be made from everyday items such as household cleaners. These types of hazardous chemicals also could be obtained and used to harm people, or they could be accidentally released.

Types and categories of hazardous chemicals

Scientists often categorize hazardous chemicals by the type of chemical or by the effects a chemical would have on people exposed to it. The categories/types used by the Centers for Disease Control and Prevention are as follows:

- Biotoxins—poisons that come from plants or animals
- Blister agents/vesicants—chemicals that severely blister the eyes, respiratory tract, and skin on contact

- Blood agents—poisons that affect the body by being absorbed into the blood
- Caustics (acids)—chemicals that burn or corrode people’s skin, eyes, and mucus membranes (lining of the nose, mouth, throat, and lungs) on contact
- Choking/lung/pulmonary agents—chemicals that cause severe irritation or swelling of the respiratory tract (lining of the nose and throat, lungs)
- Incapacitating agents—drugs that make people unable to think clearly or that cause an altered state of consciousness (possibly unconsciousness)
- Long-acting anticoagulants—poisons that prevent blood from clotting properly, which can lead to uncontrolled bleeding
- Metals—agents that consist of metallic poisons
- Nerve agents—highly poisonous chemicals that work by preventing the nervous system from working properly
- Organic solvents—agents that damage the tissues of living things by dissolving fats and oils
- Riot control agents/tear gas—highly irritating agents normally used by law enforcement for crowd control or by individuals for protection (for example, mace)
- Toxic alcohols—poisonous alcohols that can damage the heart, kidneys, and nervous system
- Vomiting agents—chemicals that cause nausea and vomiting

Chemical agents are detailed in Appendix 4.

Chemical Agents: What to do?

Shelter in place

Some kinds of chemical accidents or attacks may make going outdoors dangerous. Leaving the area might take too long or put you in harm’s way. In such a case it may be safer for you to stay indoors than to go outside. Military chemical agents are usually heavier than air, so they tend to concentrate in lower areas. They also are designed to be colorless and odorless. This means that travel can be extremely hazardous.

“Shelter in place” means to make a shelter out of the place you are in. It is a way for you to make the building or room as safe as possible to protect yourself until help arrives. You should not try to shelter in a vehicle unless you have no other choice. Vehicles are not airtight enough to give you adequate protection from chemical attacks.

How to prepare a home chemical shelter

Choose a room in your house or apartment for the shelter. The best room to use for the shelter is a room with as few windows and doors as possible. A large room with a water supply is best—something like a master bedroom that is connected to a bathroom. For most chemical events, this room should be as high in the structure as possible to avoid vapors (gases) that sink. Vapors that rise will dissipate quickly and be less of a risk. This guideline is different from the sheltering-in-place technique used in tornadoes and other severe weather and for nuclear or radiological events, when the shelter should be low in the home.

Keep the following items in your shelter room:

- First aid kit

- Flashlight, battery-powered radio, and extra batteries for both.
- A working telephone.
- Food and bottled water. Store 1 gallon of water per person in plastic bottles as well as ready-to-eat foods that will keep without refrigeration in the shelter-in-place room. If you do not have bottled water, or if you run out, you can drink water from a toilet tank (not from a toilet bowl). Do not drink water from the tap.
- Duct tape and scissors.
- Towels and plastic sheeting. You may wish to cut your plastic sheeting to fit your windows and doors before any emergency occurs.

How to know if you need to shelter in place

Most likely you will only need to shelter for a few hours. Chemical emergencies tend to dissipate quickly and cover small areas.

- If there is a “code red” or “severe” terror alert, you should pay attention to news broadcasts to know right away whether a shelter-in-place alert is announced for your area.

Some kinds of chemical accidents or attacks, such as an industrial accident, train derailment or a terrorist incident, may make staying put dangerous. In such cases, it may be safer for you to evacuate, or leave the immediate area. You may need to go to an emergency shelter after you leave the immediate area.

How to know if you need to evacuate

You will hear from the local police, emergency coordinators, or government on the radio and/or television emergency broadcast system if you need to evacuate. The evacuation alert usually announces a grid by streets.

What to do if sheltering in place

Act quickly and follow the instructions of your local emergency coordinators such as law enforcement personnel, fire departments, or local elected leaders. Every situation can be different, so local emergency coordinators might have special instructions for you to follow. In general, do the following:

- Go inside as quickly as possible. Bring any outdoor pets indoors.
- If there is time, shut and lock all outside doors and windows. Locking them may pull the door or window tighter and make a better seal against the chemical. Turn off the air conditioner or heater. Turn off all fans, too. Close the fireplace damper and any other place that air can come in from outside.
- Go in the shelter-in-place room and shut the door.
- Turn on the radio. Keep a telephone close at hand, but **don’t use it** unless there is a serious emergency.
- Sink and toilet drain traps should have water in them (you can use the sink and toilet as you normally would). If it is necessary to drink water, drink stored water, not water from the tap.
- Tape plastic over any windows in the room. Use duct tape around the windows and doors and make an unbroken seal. Use the tape over any vents into the room and seal any electrical outlets or other openings.

- If you are away from your shelter-in-place location when a chemical event occurs, follow the instructions of emergency coordinators to find the nearest shelter. If your children are at school, they will be sheltered there. Unless you are instructed to do so, do not try to get to the school to bring your children home. Transporting them from the school will put them, and you, at increased risk.
- Listen to the radio for an announcement indicating that it is safe to leave the shelter.
- When you leave the shelter, follow instructions from local emergency coordinators to avoid any contaminants outside. After you come out of the shelter, emergency coordinators may have additional instructions on how to make the rest of the building safe again.

What to do if evacuating

Act quickly and follow the instructions of local emergency coordinators, such as law enforcement personnel, fire departments, or local elected leaders. Every situation can be different, so local coordinators could give you special instructions to follow for a particular situation.

Local emergency coordinators may direct people to evacuate homes or offices and go to an emergency shelter. If so, emergency coordinators will tell you how to get to the shelter. If you have children in school, they may be sheltered at the school. You should not try to get to the school if the children are being sheltered there. Transporting them from the school will put them, and you, at increased risk.

The emergency shelter will have most supplies that people need. The emergency coordinators will tell you which supplies to bring with you, but you should also bring your Bug Out Bag. Be sure to bring any medications you are taking.

If you have time, call a friend or relative in another state to tell them where you are going and that you are safe. Local telephone lines may be jammed in an emergency, so you should plan ahead to have an out-of-state contact with whom to leave messages. If you do not have private transportation, make plans in advance of an emergency to identify people who can give you a ride.

Evacuating and sheltering in this way should keep you safer than if you stayed at home or at your workplace. You will most likely not be in the shelter for more than a few hours. Emergency coordinators will let you know when it is safe to leave the shelter and anything you may need to do to make sure it is safe to re-enter your home.

Chemical Agents: Personal Cleaning and Disposal of Contaminated Clothing

Some kinds of chemical accidents or attacks may cause you to come in contact with dangerous chemicals. Coming in contact with a dangerous chemical may make it necessary for you to remove and dispose of your clothing right away and then wash yourself. Removing your clothing and washing your body will reduce or remove the chemical so that it is no longer a hazard. This process is called decontamination.

People are decontaminated for two primary reasons:

1. to prevent the chemical from being further absorbed by their body or from spreading on their body, and
2. to prevent the chemical from spreading to other people, including medical personnel, who must handle or who might come in contact with the person who is contaminated with the chemical.

Most chemical agents can penetrate clothing and are absorbed rapidly through the skin. Therefore, the most important and most effective decontamination for any chemical exposure is decontamination done within the first minute or two after exposure.

How to know if you need to wash yourself and dispose of your clothing

In most cases, emergency coordinators will let you know if a dangerous chemical has been released and will tell you what to do.

In general, exposure to a chemical in its liquid or solid form will require you to remove your clothing and then thoroughly wash your exposed skin. Exposure to a chemical in its vapor (gas) form generally requires you only to remove your clothing and the source of the toxic vapor.

If you think you have been exposed to a chemical release, but you have not heard from emergency coordinators, you can follow the washing and clothing disposal advice in the next section.

What if you need to be decontaminated?

Act quickly and follow the instructions of local emergency coordinators. Every situation can be different, so local emergency coordinators might have special instructions for you to follow. The three most important things to do if you think you may have been exposed to a dangerous chemical are to (1) quickly remove your clothing, (2) wash yourself, and (3) dispose of your clothing. Here's how:

1. *Removing your clothing:*
 - Quickly take off any clothing that has a chemical on it. Any clothing that has to be pulled over your head should be cut off instead of being pulled over your head.
 - If you are helping other people remove their clothing, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.
 - **DO NOT BE SHY OR EMBARRASSED.** Your feelings will heal faster than your body.
2. *Washing yourself:*
 - As quickly as possible, wash any chemicals from your skin with large amounts of soap and water. Washing with soap and water will help protect you from any chemicals on your body.
 - If your eyes are burning or your vision is blurred, rinse your eyes with plain water for 10 to 15 minutes. If you wear contacts, remove them and put them with the contaminated clothing. Do not put the contacts back in your eyes (even if they are not disposable contacts). If you wear eyeglasses, wash them with soap and water. You can put your eyeglasses back on after you wash them.
3. *Disposing of your clothes:*

- After you have washed yourself, place your clothing inside a plastic bag. Avoid touching contaminated areas of the clothing. If you can't avoid touching contaminated areas, or you aren't sure where the contaminated areas are, wear rubber gloves or put the clothing in the bag using tongs, tool handles, sticks, or similar objects. Anything that touches the contaminated clothing should also be placed in the bag. If you wear contacts, put them in the plastic bag, too.
- Seal the bag, and then seal that bag inside another plastic bag. Disposing of your clothing in this way will help protect you and other people from any chemicals that might be on your clothes.
- When the local or state health department or emergency personnel arrive, tell them what you did with your clothes. The health department or emergency personnel will arrange for further disposal. Do not handle the plastic bags yourself.

After you have removed your clothing, washed yourself, and disposed of your clothing, you should dress in clothing that is not contaminated. Clothing that has been stored in drawers or closets is unlikely to be contaminated, so it would be a good choice for you to wear.

You should avoid coming in contact with other people who may have been exposed but who have not yet changed their clothes or washed. Move away from the area where the chemical was released when emergency coordinators tell you to do so.

A note on Gas Masks:

Gas masks use filters that lose their efficiency over time – most filters are rated for 4-8 hours, but may work in a low saturation environment for longer.

In a high saturation environment (during the actual nuclear fallout, for example,) the particles can block and clog the filters. This will prevent their proper function, and reduce the amount of time the mask can be worn without changing them. Gas masks also require a good mask-to-face seal – this means no facial hair.

There are a number of surplus gas mask dealers out there selling "military" gas masks for \$50 or under. Many of these were only designed for riot functions, and will not stop military chemical agents, and are potentially worse than useless in a nuclear environment. So what are these cheap gas masks really good for?

Cooking!



Gas Mask Steak Recipe

- ½ tsp salt
- 3 cloves garlic
- 1 TBSP black peppercorns
- ½ to 2 tsp cayenne pepper
- 2 tsp paprika
- ½ tsp white pepper
- ½ tsp chili powder
- ¼ tsp oregano
- ¼ tsp thyme
- 1 ½ tsp crushed red pepper
- ¼ tsp curry powder
- ½ stick butter, melted
- 1 thick sirloin steak.

In a blender or food processor, place seasonings and process until granular. Spread melted butter on both sides of steak. Rub seasoning mix on both sides of steak. Let stand for 15 minutes.

Open outside kitchen doors (or better yet –cook in an outside kitchen). Turn on exhaust fan over stove. Close all doors from kitchen leading into house.

Heat iron frying pan over high heat dry until smoking. Put on gas mask. Slap steak on skillet. At this point, the cayenne and butter vaporize to form pepper spray. It will produce voluminous amounts of pepper spray smoke. Cook for 5 minutes per side over high heat. Remove to warm platter.

When smoke clears, serve steak with French bread, salad, and plenty to drink. The juice left in the pan will be extremely potent, but the steak will have absorbed the pepper flavors.

When my mom and I first made this, we were unaware of the side effects of the heat/butter/cayenne combo, and Mom caught a faceful of pepper spray. As my sister and I dragged her outside to administer first aid, she looked at me and said "Save the steak!" I dashed inside, grabbed a Russian surplus gas mask that I had just bought for a Halloween costume, and proceeded to finish cooking.

In conclusion, while most chemical threats are contained to small areas and last for a short period of time, usually hours or days, there are a few notable exceptions. The Dioxin contamination in Seveso, Italy in 1976 caused the permanent evacuation of a whole town, as the dioxin is unable to be easily rendered safe and breaks down over a very long time. Times Beach, Missouri was completely evacuated in the mid 1980's due to dioxin contamination from hazardous waste oil used to keep dust down on dirt roads. In France, along the remains of the trench lines from the battles of World War I, there are still today pockets of Mustard gas and other military gases found, unfortunately usually by children playing. Then there is the Love Canal contamination in 1978, where over 21,000 tons of buried chemical waste contaminated an entire community.

*"The place became crater on each side,
sank down to its first skull,
shedding forests, oceans, dried
bones and neons, as it fell through
time like a forgotten pitted stone."*

Author: Sexton, Anne

Attribution: Anne Sexton (1928–1974), U.S. poet. "Venus and the Ark."

Terrorism and Civil Unrest

As we learned from the events of September 11, 2001, the following things can happen after a terrorist attack:

- There can be significant numbers of casualties and/or damage to buildings and surrounding areas. Roads, subways, rail and bridges may be damaged or closed.
- Employers need to be able to contact families of missing employees.
- Local, State and Federal Emergency Services and Law enforcement levels increase dramatically following a terrorist attack due to the event's criminal nature, and likelihood of a secondary target strike.
- Health Care resources in the affected area can be overwhelmed.
- Extensive media coverage, strong public fear and international implications and consequences can continue for a prolonged period.
- Workplaces and schools may be closed.
- There may be restrictions on domestic and international travel.
- You and your family or household may have to evacuate.
- Clean-up may take many months or even years.

Terrorism achieves its power by causing hysteria and fear largely disproportionate to the actual damage done by the attack.

Civil Unrest

This broad category covers many kinds of incidents, including riots, widespread gang activity, and looting during another disaster. In some cases, thankfully rare, the rioting causes the other disasters as emergency personnel are pulled from the area, and fires and power outages ensue. In this case, a personal judgment must be made – are you safer sheltering where you are, or is there an assured safe passage out of the violence. This depends completely on where you live.

If able, this is one of the situations where arming your neighbors may come in handy as a survival tool. Riots generally will burn themselves out within 2-3 days at the most.

Another issue that may come into this category is invasion, revolution, coup d'état, or other military conflicts. These are less of a concern within the United States, but if you happen to live in other countries, this can be a real issue.

In 2007, in a series of military actions, the civilian populace of Lebanon was the victim of just such a disaster. First, the Israeli military sent artillery and missile attacks north into suspected Hezbollah areas, trying to stop the Hezbollah attacks against northern Israel. After much damage to the civilian buildings and infrastructure, a truce was declared. After that, Lebanese

government controlled military units began raids on Hezbollah strongholds, some within refugee camps. As of the writing of this book, the 2 sides are on the brink of a civil war.

And the people of Lebanon are caught in the middle with a choice – do they find shelter locally, or do they pack up their belongings and leave the country. Foreigners in Lebanon had an easier choice, though potentially harder to implement. U.S. Citizens and dependants were evacuated, but according to strict NEO rules, and there were even rumors that they would be charged as much as \$10,000 per person by the U.S. government for this service. (though that rumor later turned out to be false, it could be true.)

Hostile Occupation

A similar issue to Civil Unrest is the concept of hostile occupation – when a hostile force has taken control of the area. This can be an invading foreign army, a large criminal gang or enterprise, a corrupt police or military presence, alien invasion, or other similar situations. These occupations present special challenges. Many times, the occupying forces will put in place restrictions on movement and activity of civilians. So called Death Squads may be roaming the neighborhoods looking for "risky individuals" to eliminate as a threat.

In Serbia in the late 1990's, during the war, a group of "soldiers" in uniform entered a small village in the middle of the night. They roused all of the inhabitants out of their beds and lined them up in the streets and the open areas. They took all of the attractive girls between the ages of 14 and 22 and loaded them up on trucks. They informed these girls that if they didn't cooperate, their families would be executed. After the trucks left, the soldiers forced the families to write a series of letters to each of the girls, to provide the illusion that their families were still alive until they were under control. The families were then led off into the fields, executed, and placed into mass graves, while the young ladies were transported to various foreign countries, and forced to work as prostitutes. They would receive one of the "letters" from their family every few months, telling them that their family was fine, until they were so entrenched in the life of prostitution that the lack of letters from their family no longer mattered. These "soldiers" were just organized criminals who put on the uniforms of the forces they wanted to have blamed for their actions. As one aid worker described it, "Anyone can wear a uniform."

Risks like these make it critical that you understand the situation during an invasion or occupation scenario. Accurate and timely information will save your life. This is why invaders will try to restrict the flow of information, and detain or kill people providing dissenting opinions.

TERRORISM THREAT LEVELS

About the Homeland Security Advisory System

The Homeland Security Advisory System is designed to guide our protective measures when specific information to a particular sector or geographic region is received. It combines

threat information with vulnerability assessments and provides communications to public safety officials and the public.

- **Homeland Security Threat Advisories** contain actionable information about an incident involving, or a threat targeting, critical national networks or infrastructures or key assets. They could, for example, relay newly developed procedures that, when implemented, would significantly improve security or protection. They could also suggest a change in readiness posture, protective actions, or response. This category includes products formerly named alerts, advisories, and sector notifications. Advisories are targeted to Federal, state, and local governments, private sector organizations, and international partners.
- **Homeland Security Information Bulletins** communicate information of interest to the nation's critical infrastructures that do not meet the timeliness, specificity, or significance thresholds of warning messages. Such information may include statistical reports, periodic summaries, incident response or reporting guidelines, common vulnerabilities and patches, and configuration standards or tools. It also may include preliminary requests for information. Bulletins are targeted to Federal, state, and local governments, private sector organizations, and international partners.
- **Color-coded Threat Level System** is used to communicate with public safety officials and the public at-large through a threat-based, color-coded system so that protective measures can be implemented to reduce the likelihood or impact of an attack. Raising the threat condition has economic, physical, and psychological effects on the nation; so, the Homeland Security Advisory System can place specific geographic regions or industry sectors on a higher alert status than other regions or industries, based on specific threat information.



Hostile Occupation and Civil War

In some areas, there is a high risk of a foreign invasion or internal military conflict. Surviving these events can be quite difficult for civilians, especially with the great destructive power of modern weaponry. It has been taught in many military academies through the last century that the key to taking over an urban area is not to be concerned with property damage. Any time an invader has been concerned about protecting the property of the area, they have taken severe losses, and probably lost the battle, even when they had superior forces. Surprise is another key to an invasion. The invading forces will generally strike quickly, before emergency services and the news media are able to get the word out. Civilians are usually the last to know. Some invasions (Operation Desert Storm) specifically targeted the communications infrastructure first, to keep detailed reports of the invasion's progress from being disseminated.

In September and October of 2007, the military government in Myanmar was the target of massive civilian protests about their treatment of dissidents, among other things. The government responded with military force against the civilian population, disconnected the global Internet link, started midnight roundups of civilians, and executed top dissident leaders, all to try to silence the protests.

As a survivor, you have to decide whether it is best to hole up in your home or other place of refuge and hope you don't get noticed, or whether you should bug out to a remote area, away from other people, or even to another country or safe region. In the movie "Red Dawn", the teenagers escaped to the mountains and fought a guerilla war against the invaders from there. History teaches us that an invader's response to guerilla activities is to respond with overwhelming force – either against the region that the guerillas are operating from, against those thought to be supporting their efforts, or even against random innocent civilians for emotional leverage. In World War II, the Nazi forces in the Ukraine adopted a "rule of ten" response to guerilla activities. For every German soldier killed, they would execute ten random civilians in the area. While this tactic seems historically to have little success, as the partisans feel those executed become martyrs, it still continues in some fashion to this day by forces not beholden to the Geneva Convention.

And what of this great Convention? It holds civilians exempt from military action, prohibits the direct targeting of civilian life and infrastructure, and prohibits the wanton destruction of property. When the bullets start flying, though, the convention is more often than not ignored until the "after action reports." The Blackwater security company incidents in Iraq show what happens to that convention. The Blackwater teams are successful because they "shoot first and ask questions later."

So as a survivor, getting caught by a military force armed means you are an opponent, and getting caught unarmed means you are a victim.

Not a lot of good choices there.

The best choice is to “get out of dodge” to a safe place, but barring that, hole up in a safe(ish) place, and read “The Diary of Anne Frank.”

Weather

The hurricane season of 2007 was the worst on record for numbers of simultaneous disasters declared by businesses. What the Disaster recovery plans of most of these businesses left out was their employees. They could recover the facilities and Data Centers, but had nobody available to work. The employees were all victims of the disaster too, and were focused on saving and protecting their loved ones, family, pets, homes, etc. Some employers had facilities set up and had no way of communicating the new location to the employees – so they ran ads in newspapers, on the radio, and just hoped the employees would hear and show up. Disaster Recovery vendors were overwhelmed. Disaster recovery services were allocated on a “community need” basis.

Regional neighbors sent assistance, but it took 3 days for them to mobilize trained personnel, and provide their own people with the logistics support (food, shelter, medical) to avoid them becoming victims themselves.

Even minor weather disturbances can cause major transportation issues. On July 20, 2007, a heavy rainstorm in London caused flooding of some roads including the M25, and train lines, and caused redirection of hundreds of flights from Heathrow and Gatwick airports. The London underground had large sections closed due to flooded tunnels. Train tunnels in Reading and other locations were flooded. Travelers trying to get to their destination were rerouted (if lucky) onto other overloaded transports, and some were forced to wait in the airport for a day until things could be sorted for them. The overload of the road system and the closing of key junctions trapped even those who were able to obtain transportation by car. It took the average traveler 12 hours to drive from Gatwick airport to St. Austell, a trip that normally takes only 3-4 hours. Most of this time was taken in the beginning – trying to clear the London area. During that portion of the trip, the average speed was 4.3 MPH. (walking speed). At one point, one couple traveling from London to St. Austell had ended up at Paddington station. The line to get a train stretched around the building – twice. While they were waiting, they overheard that there was a train on the platform going to Exeter, which was closer to their destination. As they boarded the train, they were informed that while they could buy a ticket, this was the first train to *attempt* to try to get through the Reading tunnel, and there was no guarantee that they would arrive at their destination. The train services were not sure whether or not the water had gone down enough for a train to get through, so they were going to try by sending a train through. Fortunately,

it did get through, but there was a chance that they could have been stuck on the train, in a flooded tunnel.

The floodwaters in Tewkesbury, England (near the path of the train of the aforementioned couple) left 350,000 people without fresh water even 4 days after the rain. On July 24, 2007, the fifth day after the rain, rising floodwaters were entering the Tewkesbury abbey for the first time since 1760. If this had been a major storm, regional effects would cascade, making it difficult to evacuate or to bring supplies into the region.

HURRICANES AND CYCLONES

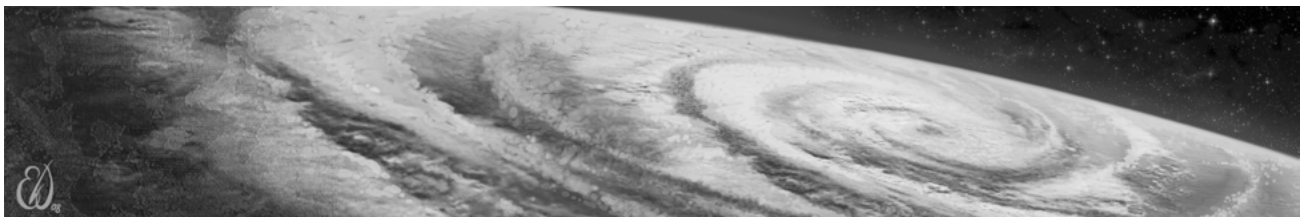
Tropical Cyclone Classification (From the National Weather Service)

Tropical cyclones with an organized system of clouds and thunderstorms with a defined circulation, and maximum sustained winds of 38 mph (61 kph) or less are called “tropical depressions”. Once the tropical cyclone reaches winds of at least 39 mph (63 kph) they are typically called a “tropical storm” and assigned a name.

If maximum sustained winds reach 74 mph (119 kph), the cyclone is called:

- a hurricane in the North Atlantic Ocean, the Northeast Pacific Ocean east of the dateline, and the South Pacific Ocean east of 160°E, (The word hurricane comes from the Carib Indians of the West Indies, who called this storm a huracan. Supposedly, the ancient Tainos tribe of Central America called their god of evil “Huracan”. Spanish colonists modified the word to hurricane.),
- a typhoon in the Northwest Pacific Ocean west of the dateline (super typhoon if the maximum sustained winds are at least 150 mph / 241 kph)
- a severe tropical cyclone in the Southwest Pacific Ocean west of 160°E or Southeast Indian Ocean east of 90°E,
- a severe cyclonic storm in the North Indian Ocean, and
- just a tropical cyclone in the Southwest Indian Ocean.

Hurricanes are further classified according to their wind speed. The Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane’s present intensity. This is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale, as storm surge values are highly dependent on the slope of the continental shelf in the landfall region. Note: all winds are using the U.S. 1-minute average.



HURRICANE CLASS CHART

Category	Class	Sustained Winds	Damage	Effect	Storm Surge
Tropical Depression		<38 mph	Minimal		
Tropical Storm		39 to 73 mph	Minimal		
Hurricane, Category 1	Minimal	74 to 95 mph	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Some damage to poorly constructed signs.	Low-lying coastal roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings.	4 to 5 feet
Hurricane, Category 2	Moderate	96 to 110 mph	Some roofing material, door, and window damage of buildings. Considerable damage to shrubbery and trees with some trees blown down. Considerable damage to mobile homes, poorly constructed signs, and piers.	Coastal roads and low-lying escape routes inland cut by rising water 2 to 4 hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying areas required.	6 to 8 feet
Hurricane, Category 3	Extensive	111 to 130 mph	Some structural damage to small residences and utility buildings with a minor amount of curtain wall failures. Damage to shrubbery and trees with foliage blown off trees and large trees blown down. Mobile homes and poorly constructed signs are destroyed.	Low-lying escape routes are cut by rising water 3-5 hours before arrival of the hurricane center. Flooding near the coast destroys smaller structures with larger structures damaged by battering of floating debris. Terrain continuously lower than 5 ft above mean sea level may be flooded inland 8 miles (13 km) or more. Evacuation of low-lying residences within several blocks of the shoreline may be required.	9 to 12 feet
Hurricane, Category 4	Extreme	131 to 155 mph	More extensive curtain wall failures with some complete roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Extensive damage to doors and windows.	Low-lying escape routes may be cut by rising water 3-5 hours before arrival of the hurricane center. Major damage to lower floors of structures near the shore. Terrain lower than 10 ft above sea level may be flooded requiring massive evacuation of residential areas as far inland as 6 miles (10 km).	13 to 18 feet
Hurricane, Category 5	Catastrophic	156 or greater	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes. Severe and extensive window and door damage.	Low-lying escape routes are cut by rising water 3-5 hours before arrival of the hurricane center. Major damage to lower floors of all structures located less than 15 ft above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5-10 miles (8-16 km) of the shoreline may be required.	18 feet or greater

The main parts of a tropical cyclone are the rain bands, the eye, and the eye wall. Air spirals in toward the center in a counter-clockwise pattern in the Northern Hemisphere (clockwise in the Southern Hemisphere), and out the top in the opposite direction. In the very center of the storm, air sinks, forming an "eye" that is mostly cloud-free.

The Eye

The hurricane's center is a relatively calm, generally clear area of sinking air and light winds that usually doesn't exceed 15 mph and is typically 20-40 miles across. An eye will usually develop when the maximum sustained wind speeds go above 74 mph and is the calmest part of the storm.

This sinking air suppresses cloud formation, creating a pocket of generally clear air in the center. People experiencing an eye passage at night often see stars. Trapped birds are sometimes seen circling in the eye, and ships trapped in a hurricane report hundreds of exhausted birds resting on their decks. The landfall of hurricane Gloria (1985) on southern New England was accompanied by thousands of birds in the eye.

The sudden change of very strong winds to a near calm state is a dangerous situation for people ignorant about a hurricane's structure. Some people experiencing the light wind and fair weather of an eye may think the hurricane has passed, when in fact the storm is only half over with dangerous eye wall winds returning, this time from the opposite direction within a few minutes.

The Eye Wall

Where the strong wind gets as close as it can is the eye wall. The eye wall consists of a ring of tall thunderstorms that produce heavy rains and usually the strongest winds. Changes in the structure of the eye and eye wall can cause changes in the wind speed, which is an indicator of the storm's intensity. The eye can grow or shrink in size, and double (concentric) eye walls can form.

Rain Bands

Rain Bands are the curved bands of clouds and thunderstorms that trail away from the eye wall in a spiral fashion. These bands are capable of producing heavy bursts of rain and wind, as well as tornadoes. There are sometimes gaps in between spiral rain bands where no rain or wind is found.

In fact, if one were to travel between the outer edge of a hurricane to its center, one would normally progress from light rain and wind, to dry and weak breeze, then back to increasingly heavier rainfall and stronger wind, over and over again with each period of rainfall and wind being more intense and lasting longer.

Tropical Cyclone Size

Typical hurricane strength tropical cyclones are about 300 miles wide although they can vary considerably, as shown in the two enhanced satellite images below. Size is not necessarily an indication of hurricane intensity. Hurricane Andrew (1992), the second most devastating hurricane to hit

the United States, next to Katrina in 2005, was a relatively small hurricane.

Typhoon Tip (1979) was the largest storm on record, with gale force winds (39 mph) that extended out for 675 miles in radius in the Northwest Pacific on 12 October, 1979. The smallest storm was Tropical Cyclone Tracy with gale force winds that only extended 30 miles radius when it struck Darwin, Australia, on December 24, 1974.

However, the hurricane's destructive winds and rains cover a wide swath. Hurricane-force winds can extend outward more than 150 miles for a large one. The area over which tropical storm-force winds occur is even greater, ranging as far out as almost 300 miles from the eye of a large hurricane.

The strongest hurricane on record for the Atlantic Basin is Hurricane Wilma (2005). With a central pressure of 882 mb (26.05"), Wilma produced sustained winds of 175 mph.

Tropical Cyclone Hazards

Each year beginning around June 1st, the Gulf and East Coast states are at great risk for tropical cyclones. While most people know that tropical cyclones can contain damaging wind, many do not realize that they also produce several other hazards, both directly and indirectly. Following is vital information you need to help minimize the impact of tropical cyclones on you and your loved ones. This is your call to action.



Storm Surge

Storm surge is simply water that is pushed toward the shore by the force of the winds swirling around the storm. This advancing surge combines with the normal tides to create the hurricane storm tide, which can increase the average water level 15 feet (4.5 m) or more.

In addition, wind driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides. Because much of the United States' densely populated Atlantic and Gulf Coast coastlines lie less than 10 feet above mean sea level, the danger from storm tides is tremendous.

The slope of the continental shelf also determines the level of surge in a particular area. A shallow slope off the coast will allow a greater surge to inundate coastal communities. Communities with a steeper continental shelf will not see as much surge inundation, although large breaking waves can still present major problems. Storm tides, waves, and currents in confined harbors severely damage ships, marinas, and pleasure boats.

Wind and Squalls

Hurricanes are known for their damaging wind. They are rated in strength by their wind also. However, when the National Weather Service's National Hurricane Center issues a statement concerning the wind and category, that value is for sustained wind only. This hurricane scale does not include gusts or squalls.

Gusts are short but rapid bursts in wind speed and are primarily caused by turbulence over land mixing faster air aloft to the surface. Squalls, on the other hand, are longer periods of increased wind speeds and are generally associated with the bands of thunderstorms which make-up the spiral bands around the hurricane.

A tropical cyclone's wind damages and destroys structures two ways. First, many homes are damaged or destroyed when the high wind simply lifts the roof off of the dwellings. The process involved is called Bernoulli's Principle which implies the faster the air moves the lower the pressure within the air becomes. The high wind moving over the top of the roof creates lower pressure on the exposed side of the roof relative to the attic side.

The higher pressure in the attic helps lift the roof. Once lifted, the roof acts as a sail and is blown clear of the dwelling. With the roof gone, the walls are much easier to be blown down by the hurricane's wind.

The second way the wind destroys buildings can also be a result of the roof becoming airborne. The wind picks up the debris (i.e. wood, metal siding, toys, trash cans, tree branches, etc.) and sends them hurling at high speeds into other structures. Based on observations made during damage investigations conducted by the Wind Science and Engineering Research Center at Texas Tech University, researchers realized that flying debris causes much of the damage in windstorms.

They found, based on damage investigations, sections of wooden planks are the most typical type of debris observed due to tornado. A 15-lb 2x4 timber plank in a 250 mph wind would travel at 100 mph. While 250 mph is considerably more than even the strongest hurricane's sustained wind, the wind in squalls and tornadoes, could easily reach that speed.

Inland Flooding

In addition to the storm surge and high winds, tropical cyclones threaten the United States with their torrential rains and flooding. Even after the wind has diminished, the flooding potential of these storms remains for several days.

Since 1970, nearly 60% of the 600 deaths due to floods associated with tropical cyclones occurred inland from the storm's landfall. Of that 60%, almost a fourth (23%) of U.S. tropical cyclone deaths occur to people who drown in, or attempting to abandon, their cars.

Also, 78% of children killed by tropical cyclones drowned in freshwater floods. In fact, floods kill more people than any other weather-related cause. Most of these fatalities occur because people underestimate the power of moving water.

It is common to think the stronger the storm the greater the potential for flooding. However, this is not always the case. A weak, slow moving tropical storm can cause more damage due to flooding than a more powerful fast moving hurricane. This was very evident with Tropical Storm Allison in June 2001.

Allison, the first named storm of the 2001 Atlantic Hurricane Season, devastated portions of Southeast Texas, including the Houston Metro area and surrounding communities, with severe flooding. Allison spent five days over Southeast and East Texas and dumped record amounts of rainfall across the area. Allison deposited up to three feet of rain to the east and northeast of Houston, Texas during a 5-day period.

In addition to the storm surge, tropical cyclones can, and usually do, cause several types of flooding.

Flash flooding

Flash floods are rapid occurring events. This type of flood can begin within a few minutes or hours of excessive rainfall. The rapidly rising water can reach heights of 30 feet or more and can roll boulders, rip trees from the ground, and destroy buildings and bridges.

Urban/Area floods

Urban/Area floods are also rapid events although not quite as severe as a flash flood. Still, streets can become swift-moving rivers and basements can become death traps as they fill with water. The primary cause is due to the conversion of fields or woodlands to roads and parking lots. About 10% of the land in the United States is paved roads. So, water that would have been absorbed into the ground now runs into storm drains and sewers.

River flooding

River floods are longer-term events and occur when the runoff from torrential rains, brought on by decaying hurricanes or tropical storms, reach the rivers. A lot of the excessive water in river floods may have began as flash floods. River floods can occur in just a few hours and also last a week or longer.

Tornadoes from Hurricanes

Tropical cyclones can also produce tornadoes that add to the storm's destructive power. Tornadoes are most likely to occur in the right-front quadrant of the hurricane relative to its motion. However, they are also often found elsewhere embedded in the Rain bands, well away from the center of the tropical cyclones.

Tornadoes are thought responsible for the uneven damage seen in a hurricane's aftermath. The added strength of wind combined with the tornadoes twisting motion greatly intensifies the destruction.

Some tropical cyclones seem to produce no tornadoes, while others develop multiple ones. Studies have shown that more than half of the land falling hurricanes produce at least one tornado; Hurricane Buelah (1967) spawned 141 according to one study. In general, tornadoes associated with hurricanes are less intense than those that occur in the Great Plains. Nonetheless, the effects of tornadoes, added to the larger area of hurricane-force winds, can produce substantial damage.

When associated with hurricanes, tornadoes are not usually accompanied by hail or a lot of lightning. Tornadoes can occur for days after landfall when the tropical cyclone remnants maintain an identifiable low-pressure circulation. They can also develop at any time of the day or night during landfall. However, by 12 hours after landfall, tornadoes tend to occur mainly during daytime hours. A tornado watch is usually issued when a tropical cyclone is about to move onshore. The watch box is generally to the right of the tropical cyclones path.

TORNADOES

A tornado is a violently rotating (usually counterclockwise in the Northern Hemisphere) column of air descending from a thunderstorm and in contact with the ground. Although tornadoes are usually brief, lasting only a few minutes, they can sometimes last for more than an hour and travel several miles causing considerable damage.

In a typical year about 1000 tornadoes will strike the United States. The peak of the tornado season is April through June and more tornadoes strike the central United States than any other place in the world. This area has been nicknamed "tornado alley."

Most tornadoes are spawned from supercell thunderstorms. Supercell thunderstorms are characterized by a persistent rotating updraft and form in environments of strong vertical wind shear. Wind shear is the change in wind speed and/or direction with height.

The updraft lifts the rotating column of air created by the speed shear. This provides two different rotations to the supercell; cyclonic or counter clockwise rotation and an anti-cyclonic or clockwise rotation. The directional shear amplifies the cyclonic rotation and diminishes the anti-cyclonic rotation. All that remains is the cyclonic rotation called a mesocyclone. By definition a supercell is a rotating thunderstorm.

When viewed from the top, the counter-clockwise rotation of the mesocyclone gives the supercell its classic "hook" appearance when seen by radar. As the air rises in the storm, it becomes stretched and narrower with time.

The funnel cloud of a tornado consists of moist air. As the funnel descends the water vapor within it condenses into liquid droplets. The liquid droplets are identical to cloud droplets yet

are not considered part of the cloud since they form within the funnel. The descending funnel is made visible because of the water droplets. The funnel takes on the color of the cloud droplets, which is white. Due to the air movement, dust and debris on the ground will begin rotating, often becoming several feet high and hundreds of yards wide.

After the funnel touches the ground and becomes a tornado, the color of the funnel will change. The color often depends upon the type of dirt and debris it moves over (red dirt produces a red tornado, black dirt a black tornado, etc.). At the center of the tornado, the vortex is open and the air is clear, not too unlike a hurricane.

Tornadoes can last from several seconds to more than an hour but most last less than 10 minutes. The size and/or shape of a tornado is no measure of its strength. Occasionally, small tornadoes do major damage and some very large tornadoes, over a quarter-mile wide, have produced only light damage.

The tornado will gradually lose intensity. The condensation funnel decreases in size, the tornado becomes tilted with height, and it takes on a contorted, rope-like appearance before it completely dissipates.

The Enhanced F-Scale

EF Scale	Class	Wind (MPH)	Speed	Description
F0	Weak	65-85		Gale
F1	Weak	86-110		Moderate
F2	Strong	111-135		Significant
F3	Strong	136-165		Severe
F4	Violent	166-200		Devastating
F5	Violent	> 200		Incredible

The Fujita (F) Scale was originally developed by Dr. Tetsuya Theodore Fujita to estimate tornado wind speeds based on damage left behind by a tornado. An Enhanced Fujita (EF) Scale, developed by a forum of nationally renowned meteorologists and wind engineers, makes improvements to the original F scale. This EF Scale has replaced the original F scale, which has been used to assign tornado ratings since 1971.

The original F scale had limitations, such as a lack of damage indicators, no account for construction quality and variability, and no definitive correlation between damage and wind speed. These limitations may have led to some tornadoes being rated in an inconsistent manner and, in some cases, an overestimate of tornado wind speeds.

The EF Scale takes into account more variables than the original F Scale did when assigning a wind speed rating to a tornado. The EF Scale incorporates 28 damage indicators (DIs) such as building type, structures, and trees. For each damage indicator, there are 8 degrees of damage (DOD) ranging from the beginning of visible damage to complete destruction of the damage indicator. The original F Scale did not take these details into account.

For example, with the EF Scale, an F3 tornado will have estimated wind speeds between 136 and 165 mph, whereas

with the original F Scale, an F3 tornado has winds estimated between 162-209 mph. The wind speeds necessary to cause "F3" damage are not as high as once thought and this may have led to an overestimation of some tornado wind speeds.

There is still some uncertainty as to the upper limits of the strongest tornadoes so F5 ratings do not have a wind speed range. Wind speed estimations for F5 tornadoes will be left open ended and assigned wind speeds greater than 200 mph.

Floods

Except for heat related fatalities, more deaths occur from flooding than any other weather hazard. This is because most people fail to realize the power of water. For example, six inches of fast-moving floodwater can knock you off your feet.

While the number of fatalities can vary dramatically with weather conditions from year to year, the national 30-year average for flood deaths is 127. That compares with a 30-year average of 73 deaths for lightning, 68 for tornadoes and 16 for hurricanes. National Weather Service data also shows:

- Nearly half of all flash flood fatalities are vehicle-related,
- The majority of victims are males, and
- Flood deaths affect all age groups.

Most flash floods are caused by slow moving thunderstorms, thunderstorms that move repeatedly over the same area or heavy rains from tropical storms and hurricanes. These floods can develop within minutes or hours depending on the intensity and duration of the rain, the topography, soil conditions and ground cover.

Flash floods can roll boulders, tear out trees, destroy buildings and bridges, and scour out new channels. Rapidly rising water can reach heights of 30 feet or more. Furthermore, flash flood-producing rains can also trigger catastrophic mudslides.

Occasionally, floating debris or ice can accumulate at a natural or man-made obstruction and restrict the flow of water. Water held back by the ice jam or debris dam can cause flooding upstream. Subsequent flash flooding can occur downstream if the obstruction should suddenly release.

Downstream, the flood levels peak at delayed times – sometimes 4 or 5 days after the rain.

TURN AROUND, DON'T DROWN

Each year, more deaths occur due to flooding than from any other thunderstorm-related hazard. Why? The main reason is people underestimate the force and power of water. Many of the deaths occur in automobiles as they are swept downstream. Of these drownings, many are preventable, but foolish people drive around the barriers in place that warn you the road is flooded.

Whether you are driving or walking, if you come to a flooded road, Turn Around...Don't Drown!. You will not know the depth of the water nor will you know the condition of the road under the water.

Of the three deaths that occurred as a result of the Fort Worth tornado, March 28, 2000, one death was due to flooding. The

man who drowned was a passenger in a car with his girlfriend, the driver. They approached a low spot with water flowing over the road due to very heavy rain. Flooding is a common occurrence at this location with heavy rains and the danger was well marked.

As the driver drove her car into the water she became frightened as the water rose higher and higher around her vehicle. She backed out to higher ground. The passenger said the water was NOT too deep and he would prove it by walking across to the other side. He never made it.

Follow these safety rules.

- Monitor the NOAA Weather Radio, or your favorite news source for vital weather related information.
- If flooding occurs, get to higher ground. Get out of areas subject to flooding. This includes dips, low spots, canyons, washes etc.
- Avoid already flooded and high velocity flow areas. Do not attempt to cross-flowing streams. If you enter a flowing stream and the water gets above your knee, TURN AROUND, DON'T DROWN.
- If driving, be aware that the roadbed may not be intact under floodwaters. Turn around and go another way. NEVER drive through flooded roadways! If your vehicle stalls, leave it immediately and seek higher ground. Rapidly rising water may engulf the vehicle and sweep you and your occupants away.
- Do not camp or park your vehicle along streams and washes, particularly during threatening conditions.
- Be especially cautious at night when it is harder to recognize flood dangers.

WINTER WEATHER

Freezing Rain Advisory

Issued when freezing rain or freezing drizzle is forecast but a significant accumulation is not expected. However, even small amounts of freezing rain or freezing drizzle may cause significant travel problems.

Freezing Drizzle Advisory

Issued when freezing rain or freezing drizzle is forecast but a significant accumulation is not expected. However, even small amounts of freezing rain or freezing drizzle may cause significant travel problems.

Freeze Warning

Issued during the growing season when surface temperatures are expected to drop below freezing over a large area for an extended period of time, regardless whether or not frost develops.

Heavy Snow

This generally means...

- snowfall accumulating to 4" or more in depth in 12 hours or less; or
- snowfall accumulating to 6" or more in depth in 24 hours or less

In forecasts, snowfall amounts are expressed as a range of values, e.g., "8 to 12 inches." However, in heavy snow situations where there is considerable uncertainty concerning

the range of values, more appropriate phrases are used, such as "...up to 12 inches..." or alternatively "...8 inches or more...".

Heavy Snow Warning

Issued by the National Weather Service when snowfall of 6 inches (15 cm) or more in 12 hours or 8 inches (20 cm) or more in 24 hours is imminent or occurring. These criteria are specific for the Midwest and may vary regionally.

Winter Storm Watch

The National Weather Service issues a Winter Storm Watch when there is a potential for heavy snow or significant ice accumulations, usually at least 24 to 36 hours in advance. The criteria for this watch can vary from place to place.

Winter Storm Warning

The National Weather Service issues a Winter Storm Warning when a winter storm is producing or is forecast to produce heavy snow or significant ice accumulations. The criteria for this warning can vary from place to place.

Blizzard Warning

Issued for winter storms with sustained or frequent winds of 35 mph or higher with considerable falling and/or blowing snow that frequently reduces visibility to 1/4 of a mile or less. These conditions are expected to prevail for a minimum of 3 hours.

Wind Chill

Air Temperature (°F)

	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
W	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
I	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
N	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
D	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
S	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
P	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
E	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
E	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
D	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

What is important about the wind chill besides feeling colder than the actual air temperature? The lower the wind chill temperature, the greater you are at risk for developing frostbite and/or hypothermia.

Frostbite occurs when your body tissue freezes. The most susceptible parts of the body are fingers, toes, ear lobes, and the tip of the nose. The frozen tissue may be permanently destroyed. Hypothermia occurs when body core temperature, normally around 98.6°F (37°C) falls below 95°F(35°C). The following table shows how fast frostbite can occur at various wind chill temperatures.

The best way to avoid hypothermia and frostbite is to stay warm and dry indoors. When you must go outside, dress appropriately. Wear several layers of loose-fitting, lightweight, warm clothing. Trapped air between the layers will insulate you. Remove layers to avoid sweating and subsequent chill.

Outer garments should be tightly woven, water repellent, and

The wind chill is the effect of the wind on people and animals. The wind chill temperature is based on the rate of heat loss from exposed skin caused by wind and cold and is to give you an approximation of how cold the air feels on your body.

As the wind increases, it removes heat from the body, driving down skin temperature and eventually the internal body temperature. Therefore, the wind makes it FEEL much colder. If the temperature is 0°F and the wind is blowing at 15 mph, the wind chill temperature is -19°F. At this level, exposed skin can freeze in just a few minutes.

The only effect wind chill has on inanimate objects, such as car radiators and water pipes, is to shorten the amount of time for the object to cool. The inanimate object will not cool below the actual air temperature. For example, if the temperature outside is -5°F and the wind chill temperature is -31°F, then your car's radiator temperature will be no lower than the air temperature of -5°F.

The Wind Chill Chart

To determine the wind chill temperature, find the value closest to your outside air temperature. Find the value that most closely represents your present wind speed. Your wind chill temperature is the value where lines drawn from the air temperature and wind cross.

hooded. Wear a hat, because half of your body heat can be lost from your head. Cover your mouth to protect your lungs from extreme cold. Mittens, snug at the wrist, are better than gloves. The added surface area exposure of the gloves acts as a radiator and chills your fingers. Try to stay dry and out of the wind.

Wind Chill	Cold Threat
21°F to 40°F	COLD. Unpleasant.
1°F to 20°F	VERY COLD. Very unpleasant.
-19°F to 0°F	BITTER COLD. Frostbite possible. Exposed skin can freeze within 5 minutes.
-20°F to -69°F	EXTREMELY COLD. Frostbite likely. Exposed skin can freeze within 1 minute. Outdoor activity becomes dangerous.
-70°F and lower	FRIGIDLY COLD. Exposed skin can freeze in 30 seconds.

What to do and when?

Evacuate

You should evacuate the area and move to a safer location when instructed to by public officials. This is great – but what if you have to decide for yourself? You should evacuate when:

- The danger is a regional or geographically contained event.
- You can **safely** move to a **safe** refuge or shelter.
- Be sure your entire route is clear and you have appropriate transportation
- You have time to make it to the shelter before the event happens.



Shelter in Place

In general, sheltering in place is easier – you just stay where you are. This is the disaster plan most of us have experienced (even if we haven't realized it) We are told to stay in our homes, travel only when necessary, and whatever else is appropriate to the disaster. Usually this is a winter storm, tornado, or other weather disturbance.

How to make a shelter in your home

You must decide the disasters that will keep you in your home, that you plan to prepare for. Preparations for one disaster will overlap with the preparations for another disaster. If you have a multi-story home with a basement, then you should prepare 2 shelter rooms, one on the top floor for chemical emergencies and floods, and one in the basement for all the other disasters.

A home shelter should include the following items at a minimum:

- Water
- Food for the duration of expected use, plus some.
- Communications equipment.

- Lighting gear
- Comfort items – sleeping bags, etc.
- Security items
- Your Bug out bag.

Preparing a home shelter

Choose a room in your house or apartment for the shelter. The best room to use for the shelter is a room with as few windows and doors as possible. A large room with a water supply is best—something like a master bedroom that is connected to a bathroom. For most chemical events, this room should be as high in the structure as possible to avoid vapors (gases) that sink. Vapors that rise will dissipate quickly and be less of a risk. This guideline is different from the sheltering-in-place technique used in tornadoes and other severe weather and for nuclear or radiological events, when the shelter should be low in the home.

Keep the following items in your chemical shelter room:

- First aid kit
- Flashlight, battery-powered radio, and extra batteries for both.
- A working telephone. Get one that doesn't require an AC adapter.
- Food and bottled water. Store 1 gallon of water per person in plastic bottles as well as ready-to-eat foods that will keep without refrigeration in the shelter-in-place room. If you do not have bottled water, or if you run out, you can drink water from a toilet tank (not from a toilet bowl). Do not use tank water if you use the colored sanitizing tablets. Do not drink water from the tap.
- Duct tape and scissors.
- Towels and plastic sheeting. You may wish to cut your plastic sheeting to fit your windows and doors before any emergency occurs.

Prepare your basement shelter roughly the same way. Pick the room that is the most secure. Usually, this will be in one corner of the basement. This corner should have no windows, and should be the deepest underground possible. Fortify the ceiling with the densest materials that the structure will support. Fortify the non-earthen walls with dense material as well.

Stockpile both rooms with supplies.

Fortress Home – fortifying and defending your home

If you're sheltering in place, you may have to defend your home. Other people may not have prepared as well, and may want to take the things you have. You may want to include defense plans in your shelter preparation. To fortify your home (or shelter), to hold what you have, you should do the following:

- Prepare a list of supplies and resources you already have.
- Make a resource map of the area surrounding your house. This map should show the locations of sources of supplies, and various distances to these locations. Include grocery and convenient stores, gas stations, and other sources of supplies. Make a (general) list of the materials and stocking levels of each of these locations.
- Make a tactical map of your neighborhood. This is best based on a high resolution topographical map. Add the locations of buildings and other obstructions in the area.

Include sewer and storm drain access points, speed bumps, traffic signs and lights, electrical and phone junction boxes, water and gas meter locations, propane and fuel storage tanks, and any other pertinent information.

- Using your tactical map, mark the thicknesses of your walls. Indicate in color the views from your windows (fields of fire). Indicate on your map any blind spots (areas you can't see from your home).
- Fill the blind spot areas around your home (and on your property, of course) with bushes, thorn bushes, fencing, or other obstacles to deny people access to these zones that you can't protect.
- If your budget allows, security cameras can supplement the monitoring of the areas around your home. Use concealable cameras with motion detection capabilities if possible.
- Install a cellular monitored alarm system. Test it regularly. Make sure you know how to convert it to emergency power.
- Set up a mini kitchen in the shelter room. Make sure you have some means of disposing of waste.

Fortifying your home also implies the use of firearms. Make sure everyone in your family that is old enough to hold a firearm has been trained in their use and function. Anyone unable to properly use a firearm should be tasked with other functions. These include:

- First Aid
- Ammunition distribution and reloading
- Spotting and observation

Drought

Drought conditions are a possible concern, and while they usually will not result in the collapse of society, drought conditions can be a secondary disaster in conjunction with another collapse. In all collapse scenarios, as well, water is a problem. Less than 1% of the water in the world is drinkable. This means that the collection, storage, purification, and transportation of water is critical to survival.

Water Treatment and sources

White Water

White water is pure, drinkable water – usually bottled or from a certified source.

Grey Water

Grey Water is water that has been contaminated by washing, bathing, or dish washing. Grey water is good for non-drinking applications, and can be re-used multiple times. Saltwater also is useable as grey water for some applications.

Collected Water

Collected water is water from questionable sources, such as local streams, rainfall, or condensate from air conditioner or dehumidifier. Dehumidifiers are rated by the number of pints of water it can remove from the air per day. A 40 pt dehumidifier

can remove up to 40 pints (19 liters) of water from the air per day. Collected water can then be distilled to make white water.

Black Water

Black water is water that is thoroughly contaminated, either by human waste or feces or by industrial chemicals.

Red Water

Red water is water that is contaminated by radioactive waste or nuclear fallout. Red water should not be used, and must be disposed of properly.

Distillation Methods

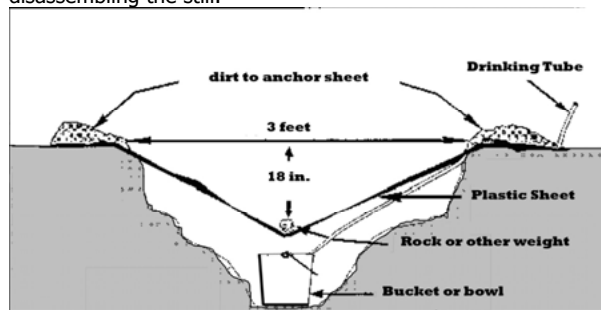
Collected water can be purified by distilling. Distillation removes biological and microbial contamination as well as dissolved salts and minerals. One simple distillation method commonly used for purifying collected rainwater is using a solar still. An improvised 1 meter square solar still can purify 1 quart of water per day. A 1 meter square prefabricated still can purify 2-6 quarts per day. A solar still requires 3 times as much water as input as it purifies, with the excess used to flush the still to prevent salt buildup. A solar still requires no energy to operate other than the energy from the sun.

If a heat buildup and fuel usage are not a concern, a boiling still can be constructed. This form of still can process a larger amount of purified water. A boiling still only needs 2 times the output water as supply to flush salt buildup.

Using a combination of collection and distillation, it is easy to gather enough water for a small family with materials available around the house, or at a local hardware store. Of course, in an emergency, it would be best to already have all the materials prepared and assembled.

Survival Solar Still

You can easily make an expedient survival still by digging a hole in the ground, about 3 feet across, and 3 feet deep, placing a cup or bucket (2-4 quart capacity) in the center, and cover it with a clear plastic sheet with a few pebbles to lower the center. Lower the sheet so that the angle of the sheet is about 45 degrees. Pour grey water around the cup and the sun's energy will evaporate the water. When the water evaporates, only pure water vapor rises, and condenses on the plastic, leaving any contaminants behind and draining into the bucket. You can improve the efficiency of the still by inserting a tube into the cup so you can drink the water without disassembling the still.



A solar still can also be used to purify tainted water. Even urine can be used and purified by the still. Radiator water should never be used, as the antifreeze will evaporate with the water and collect in the cup.

Stills should not be used as a primary water source, but instead as a supplement to your stored water. You should always store a minimum of one gallon of water per person per day.

You can use grey water to flush a standard flush toilet by either simply pouring it into the toilet bowl, or you can fill the tank with collected water and flush as usual. If you watch the overflow, you can even use the tank as a reservoir for the collected water, pumping it directly into the tank. Putting a filled 1 liter plastic bottle in the tank will reduce the water used per flush by 1 liter.

Remember – there are three times you should be drinking water:

- When you are thirsty
- When you are not thirsty
- In between the above to stay hydrated.

During the 2007-2008 drought in Atlanta, people are re-plumbing their homes to utilize grey water. The basic theory is that collected rainwater, condensate from the air conditioner, and other non-drinkable water is used to flush toilets and wash clothes. The cold water taps from these fixtures are connected to a reservoir, usually in the attic, that is filled by collected grey water, and then supplies the facility. If the water in the reservoir gets too low, then a valve is opened (automatically or manually) and the reservoir can be filled with standard tap water.

A toilet only needs to be flushed in an emergency situation when there is solid waste in it. If you keep filling the bowl of a standard flush toilet with only liquid, it will actually flush itself as the liquid forces the siphon effect of the toilet bowl.

In extreme water restricted areas, using buckets or building a trench latrine is a better way to handle human waste. A trench latrine should be at least 3 feet deep, and have a cover of some kind. If using buckets, get plastic bags or waste disposal bags to line the bucket. It will make for easier cleaning and disposal of the waste.

Camping toilets are also an option – there are basically 2 kinds – chemical and disposal. Disposal toilets use plastic bags to store and contain the waste. Chemical toilets use chemicals to neutralize some of the smell and waste, but still have to be emptied regularly.

Remember that grey water can be used for many purposes – cleaning, cooling, washing clothes, and other non-drinking applications. It can then be used again and again, until it becomes too contaminated to do much else but flush the toilet.

Backpackers learn quickly that water management is critical to survival and comfort while on a packing trip. They know the following:

- Water is heavy.
- You need water to drink.
- You also need water to wash dishes

As a backpacker washes dishes, they conserve every drop of water, using the least possible amount, and capturing their runoff to be used again. This conservation methodology and philosophy can help extend the life of your water supply.

Your water supply will come from the following:

- Water you have stored
- Water you have to collect
- Water that you have purified

For survival, you can go days without food and not suffer permanent damage to the body, but only three days without water can result in severe damage to your internal organs.

Never waste drinkable water if supplies are restricted.

If you already have water, and you re-use the water just 3 times, you can reduce your consumption of water as a family by 66%. This means that you have effectively tripled your available water. Supplementing this with collection of grey water gives you a much larger supply of water.

Conserve water instead of rationing water.

If the temperature is above 92 degrees Fahrenheit, your body will cool itself through perspiration. The amount of sweat produced to cool the body increases with temperature and physical activity levels (see chart below).

Make sure to replace fluid losses due to perspiration.



"And I knew my vision of the garden of savage beauty had been a true vision. There was meaning in the world, yes, and laws, and inevitability, but they had only to do with the aesthetic and in this Savage Garden, these innocent ones belonged in the vampire's arms. A thousand other things can be said about the world, but only aesthetic principles can be verified, and these things alone remain the same." – Anne Rice

Inconvenient Truths

There are forces at work in the universe that we don't understand. Even here, we continue to find new species of animals, and some thought long-extinct. This section deals with the probabilities that our myths come to life and how to deal with them.

Vampires

What is a vampire

A vampire is the victim of the "Vampire Virus" – a virus that attacks and changes the vampire's physiology. If a vampire bites a victim, and the victim survives, there is a chance that they will become a vampire as well. The virus is actually spread by the blood and saliva of the vampire. Within a few hours of when a victim is bitten, the virus will most likely take hold, unless the victim dies (or is cured) first. They then become a vampire. Once the virus has taken effect, it takes a few days for the victim to transform, but once complete, the virus sustains the body, repairing damage quickly, preventing aging, and extending life.

Feeding Cycle

Vampires need to feed on human blood at least once per day. As the virus is a disease, and the vampire can effectively choose who to turn into a vampire (by not completely draining them), vampires can control (somewhat) the progression of the disease through the herd.

Vampire Propaganda

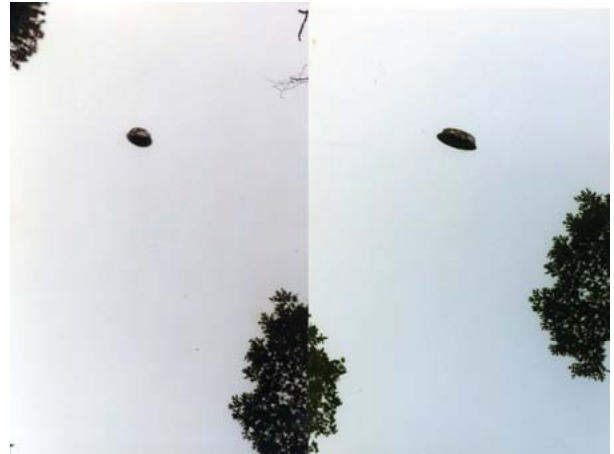
Hollywood and folklore have given us many weaknesses of vampires: garlic, crosses, holy water, sunlight, wooden stakes, fire, salt in the doorway, not able to enter unless invited, etc. Most of these are simply false, and even have been spread by vampires themselves as protective propaganda. (crosses and holy water, for example). Vampires, being intelligent hunters have placed misdirection and false information among humans to prevent their own extinction. This is akin to a deer hunter using decoys, feeders, musk, and scent eliminators. It is even likely that some of the more outrageous myths propagated by Hollywood (sunlight for example) were initiated by vampires. The sunlight myth appeared suddenly in the mythology after the 1922 silent movie "Nosferatu", in which the vampire is destroyed by sunlight. This movie was also an representation of the vampire as an ugly and deformed creature, as opposed to the suave seductive Dracula representation.

Vampire weaknesses

Vampires are really only susceptible to severing the heart/mind relationship. As long as the heart, neck, and head are intact

and connected, the vampire will still be alive. You can destroy a vampire through the following methods:

- Decapitation
- Burning (complete cremation)
- Destroying the heart (stake) or head
- Massive amounts of physical damage to the head and upper torso.



Aliens

We are not alone. What if those "little green men" that everyone has been talking about really are the forerunners of an invasion of Earth by a superior technology? What do we do then?

How would you prepare for a hostile takeover of the planet by an advanced alien force?

A true invasion by aliens is hard to plan for, since we don't know their characteristics and technical abilities, but the general procedures are those of hostile occupation listed above. The biggest danger in this scenario isn't the risk from the aliens, but from militant religious groups. For millennia, humankind has been taught that we are alone, that we are made in God's image, and that we are special in the universe. If an alien, non-human civilization comes along, proving their superiority through advanced space faring technology, then the religious extremists would go bananas. We can only guess at the excesses that would occur as each group tried to exert their dominance over their fellow man, by the sword or by the bullet, not to mention the reaction of the aliens when groups try to convert them.

Possible alien abilities and technologies

- Invisibility
- Advanced Technology
- Mind reading/Telepathy
- Telekinesis
- Flight
- Carnivorous Tendencies
- Acidic Blood

And how would our governments react? Hollywood has shown us the spectrum of possible reactions, from organized (or disorganized) defense, through capitulation, and down to squabbling over the remaining crumbs.

Overall, the arrival of aliens, and the proof that we are not alone will cause existing tensions to explode, new alliances to be made, and of course people weaseling around to try to find a way to better themselves by stepping on the bodies of their neighbors.

Lycanthropes (Werewolves and others)

A Lycanthrope is a creature that can transform between human and animal form. The myths surrounding lycanthropy go back thousands of years, and suddenly we find that they have basis in reality. Like Vampires and Zombies, Lycanthropy is a disease spread by the bite of the Lycanthrope. If the victim is not killed outright before the virus takes hold, they will probably become a Lycanthrope. Lycanthropy is a genetic virus, and the cure is strain specific. Each time a victim is infected, the virus bonds with their DNA, creating a new strain. To make an antidote, one must have the blood of the creature that infected the victim.

Lycanthropes are generally believed to transform to animal form on the full moon, until they have adapted fully to the virus. They can also spontaneously change under periods of extreme stress. Once their body has adapted to the changes that the virus causes, they can even transform at will. It takes approximately 1-2 minutes for the transformation to occur. Lycanthropes feed roughly once when they transform. Apparently the transformation into animal form makes them require large amounts of food – and they prefer fresh meat. In the wild, they often attack cattle, or other passive game. It is in metropolitan areas that the best available game is people.

Lycanthropes can survive enormous amounts of damage to their body, are apparently immune to the effects of shock, and have great strength and endurance. They are apparently allergic to silver, and wounds that are caused by silver weapons are not able to be rapidly healed.

Dinosaur Island

There still could be an isolated island, where dinosaurs still exist, or are recreated from fossilized genetic material or experiment. These creatures have never co-existed with humankind, and many of them are terribly vicious hunters. Dinosaurs, by their very size, are hard to kill. If we look at common examples of tough creatures to hunt, crocodiles, and large predatory mammals, it becomes obvious that the risk to people is high. Dinosaurs, in addition, developed armor plates and thick skin to protect them from each other. This makes them even more difficult to kill with a firearm than an elephant or rhino. Most medium caliber rifles will just make them angry. Even large bore rifles will require an expertly placed shot. While modern mammals have learned to be afraid of humans, dinosaurs will never have acquired this trait, and will simply see humans as food. Remember, your two risks of an animal attack are either if you are food (or mistaken for food), or if you surprise or threaten the animal. And we're not food to most modern animals.

Don't look or act like food!



Meteor Strike

Astronomers, governments, and scientists are monitoring around 15% of the sky for projectiles heading our way. Asteroids, comets, and meteors are a continuing risk to life on Earth as we know it. There are many instances in geological history of "planet killer" asteroid impacts that cause mass extinction. The last mass extinction event was the Yucatan impact that killed off the large dinosaurs at the end of the cretaceous period. In 1908, an object struck in Tungusk, Russia, causing an impact and explosion likened to a 50 Megaton nuclear bomb. If the next one comes, it can cause mass cooling and crop failures, as the dust blocks sunlight, and we can only speculate as to the chemical composition of it. It is theorized that a high percentage of selenium in the atmosphere contributed to the extinction of the large dinosaurs, a result of the Yucatan impact throwing billions of tons of dust into the air.

Portals to another dimension

With physicists now examining the theory of wormholes and other tunnels through space and time, the actual existence of one of these from the surface (or near surface) of earth to another earth-like planet in another dimension offers some extremely interesting possibilities. The people there could be alien. Elves and dwarves could be real. M-theory (the current big winner in the race for the unified theory of everything) shows that this is possible. The rules could be different there. M-theory also supposes that there are an infinite number of parallel dimensions existing right on top of each other. What if there was a way to move between these dimensions.

According to the theory, there is.

You effectively determine which dimension you are in by your observations. If there is no observable difference in the observed dimensions, then you haven't moved, and at that point the dimensions are the same. It is the difference that makes them split and move apart. The "grandfather paradox" is commonly used to illustrate this in the single dimension thinking when talking about time travel. If we assume time travel can exist, then you could go back in time and prevent your grandfather from ever meeting your grandmother, before your parents were conceived. Therefore your parent doesn't

exist, and therefore you couldn't exist, and then you couldn't go back in time to interfere with your grandfather. Hence the paradox. M-theory explains this easily. There is no paradox. Until the change in the past where you interfered with your grandfather, there was one timeline. Once you made that change, that observable (by you) act created two timelines. From that point on, there are two universes – one in which you were born, and one you weren't. But now you're stuck in the one you weren't born. This creates another issue. How do you get home to your original universe? Simply, you go back to before the split, and then move forward again. But how can you ensure that you don't make another change and simply create another universe? The universe takes care of it for you.

The set of universes, while infinite, has some rules, and the one that helps us here is explained best as the law of conservation of matter and energy. Simplified, it means that you had to get the energy to create that alternate universe (where you weren't born) from somewhere. Ultimately, you have to borrow it from another dimension or universe. But since it's borrowed, the universe wants it back. This force results in "Temporal Inertia". Temporal inertia is the force the universe puts on you to try to stay the same and avoid the change. At some point, it wishes to revert to its original, observable state.

What does this mean from a survival and continuity standpoint? While localized changes in time/space can occur, massive observable changes require the destruction of another universe. (and localized can take thousands of years to reunite.) Remember that mankind has only existed for the last few fractions of a second of the first year of the universe since the Big Bang. So you'll just have to deal with the changes as they come. Be flexible. Adapt to the changing environment.

Be aware of your surroundings at all times.



Zombies

One of the most fearful myths is that of the flesh-eating zombie – the unforgiving dead coming back to life and ravaging mankind for brains. The reality is that the potential exists for a "zombie virus" to attack and devastate mankind. This is more frightening because of the geometric progression of the disease – for each victim attacked by the zombie, the human population is reduced by 1, and there is a chance that the person is turned into a zombie, increasing the zombie population. If a zombie must feed (attack) once per period, we can calculate the theoretical destruction of humanity by this.

$$N_i = N_0 e^{-\lambda t}$$

$$N_c = N_0 (1 - e^{-\lambda t})$$

N_i = Number Infected

N_c = Number Remaining

$\lambda = \ln 2 / \text{time for } 1/2 \text{ to be converted (half life)} = 0.69315 / \text{half life}$

So if we assume that in any given set of people, the zombies will convert 1/2 of them in 7 days, the zombie plague will consume most (80%) of the world in

$$(100-80) = 100 (1 - e^{-\lambda t})$$

$$.20 = (1 - e^{-\lambda t})$$

$$.8 = e^{-\lambda t}$$

$$\ln(0.8) = -\lambda t$$

$$0.22314 = -\lambda t$$

$$0.22314 / (0.69315/7) = t$$

$$t = 2.235 \text{ weeks}$$

This of course assumes that the zombies can get to their victims, and are not contained by natural or artificial barriers. In real life, the zombie virus would spread like a pandemic, and probably infect 80% of the world in 6-8 weeks.

How to prevent the Zombie Virus

The only way to prevent contracting the Zombie Virus is to avoid contact with the blood of a victim. Standard bloodborne pathogen procedures should be followed.

How to kill a zombie

- Shoot for the head.
- Shoot some more.
- Shoot again if it's still moving.
- Reload.
- Look behind you for his friends (more zombies).
- Ask if anyone has been bitten (or has questions).

Zombie defense tactics

- A zombie outbreak is what military folks call a "target rich environment" – based on the speed of the spread of the disease, the violence associated with infection, and the "cure".
- Work out a plan of what to do if a member of your team is infected. Implement it. Babysitting a team member because you don't *want* them to be infected is suicidal.

- ❑ Close combat with a zombie is suicide.
- ❑ Range is your friend, but work in teams to make sure you have your back covered.
- ❑ Always have 2 (or more) routes of escape in your mind from any defensive position.
- ❑ When moving, if you can avoid detection by the zombies, it is better, but if you have to “fight your way out” then use the covering fire principle. One person or team kills zombies (from range) while the other moves to the next position of cover. The two teams then switch roles, leapfrogging past each other until the destination is reached. This is standard military maneuvering procedure.

Friends or Family that become infected are no longer friendly.

Disaster Plan Test

An untested plan is a wish – a hope that things will work. But the plan itself is actually the acceptance that sometimes things go wrong.

The question to remember is not **if** an incident will occur, but **when and what**. Being prepared for multiple contingencies, and practicing the plan is what makes you a survivor and not a statistic.

There are different types of tests of a Disaster Plan – Scheduled and unscheduled; Tabletop and actual; announced and spontaneous.

Here is how to assemble the portions of the test:

1. Is it scheduled or unscheduled?

A scheduled test is run when everyone knows that it is coming. Pick a convenient date and time (weekend is usually good) and plan for the event. If testing a “bug out” scenario – plan a destination location – reserve a spot at a State Park, hotel, etc. An unscheduled test happens at a random date and time. A person designated as the coordinator should choose and communicate the event.

To select a random time, the coordinator should grab a die – roll it 3 times and record the numbers in sequence. This will be the hour.

First Roll

Even – 1st half (base 0)

Odd – 2nd half (base 6)

Second Roll

Add the number to the first Roll.

Third Roll

Even – AM

Odd – PM

For example, if the rolls are 3,4,2 then the event occurs at 10 (6 for odd, plus 4) AM (even)

For the minute, roll the die and treat 6 as 0 for the tens place, then roll the die twice, add them together and subtract 2 for the ones place.

If the next set of rolls was 5,4,3 then the minutes would be 55. (50 plus 4+3-2)

So the time of the “event” would be 10:55 am.

Once the time of the unscheduled event is chosen, the coordinator should set up some kind of alert based on the kind of event.

2. Is it Tabletop or actual?

A tabletop test is where you talk through the scenario, with one person acting as the coordinator. (Gamemaster in Aftermath!) An Actual Test is where you actually put the pieces of the plan into place, and actually move into the shelter room or bug out. If doing an actual test, you should time all of the different steps so you can work on optimizing those that are taking too long.

3. Is it announced or spontaneous?

A announced test is when you tell the group that sometime in the next time period (weeks or days) there will be a test of a specific disaster scenario. A spontaneous test is when you suddenly tell them that there is a disaster event, and that they need to move quickly. The details of the event are then relayed to them as part of a narrative as they perform actions. This requires a separate coordinator, storyteller, or Gamemaster to manage the test.

After the test, you should sit down with the group and discuss what happened – what went wrong? What items are missing? What took too long? Then you can take some time to optimize these things. Perhaps you just need to buy another container to store some extra stuff in. Perhaps the BOB is too heavy for your daughter and you need to lighten her load. Everyone should agree on the next steps.

Always be thinking of ways to improve your plan.

Your Disaster Plan is a fluid work. It will always be changing as you learn, and as your life changes.

Once you feel comfortable with the plan, you should try it with things going wrong:

- ❑ Your daughter is staying at a friend’s house.
- ❑ The car won’t start/is out of gas.
- ❑ You or your spouse is/becomes sick or injured and can’t assist.
- ❑ The disaster is compound (tornado and flood) and you encounter a secondary issue.
- ❑ You have friends over for dinner.
- ❑ You just came back from a trip and everything is in suitcases in the living room.

You’ll never think of all the possible contingencies, and it’s really not possible to be prepared for everything, but thinking about these things in advance will help you when there’s a real disaster.

Give everybody in your family a written copy of the Disaster Plan, and have them own a section. Have them work on improving their area.

Evacuation Kit – Bug Out Bag

Traditionally, a BOB was whatever people could do – multiple layers of clothes, etc. During nearly every modern conflict and

catastrophe, people were forced to evacuate from major cities to safer locations. These evacuations are problematic at best. During the hurricane evacuations of Houston in 2005, it took nearly 3 days for the roads and highways to carry the load of people leaving the city – and only about a third of the residents even tried. Many films of evacuations of wartime civilians show most of them relegated to pedestrian locomotion – walking. Even if you have a car, it could become trapped in traffic, run out of gas, overheat, or break down, and the average speed of evacuations of metropolitan areas during a crisis seems to average about 4 mph – walking speed. People ended up walking – carrying whatever possessions seemed the most critical at the time, if they ended up with any possessions at all. During these evacuations, criminals have separated people from their more valuable possessions, through violence, coercion, or trade. Criminals offer trade for assistance with transportation to safety in exchange for whatever they think they can get from you. Even during the Katrina evacuations, gas stations raised prices on fuel to as much as \$9 per gallon, cash only. This practice, known as “price gouging” has been declared a crime by many governments, but is enforced after the fact. In addition, credit card machines and ATMs need both electricity and data communications to function. This means that your BOB should include cash.

Many companies now are offering commercial 72 hour emergency kits. One of these I used to analyze to see whether it was a deal to buy a “ready kit” or build your own.

This 2 person kit contained 6 8.45oz water boxes, 2 survival blankets, 2 emergency ponchos, 2 pairs nitrile gloves, 1 12-hour light sticks, 2 2400 calorie food bars, whistle, pack of tissues, 2 dust masks, and a mini first aid kit, all in a small backpack – for the low price of \$49.99. I priced all the components separately, and the total came to \$29.00. I was able to tune the kit, using a backpack I already had, and doubled the contents, for the same price. On this one simple test, building your own is cheaper, and has other merits:

- Customization – tune the contents to your preferences. Add things you might need.
- Familiarization – you are familiar with the kit, since you build it, and know where all the pieces are stored.
- Updates – since you individually obtain all the components, you can refresh just one component.

I’ve designed this BOB system as a Modular system – you grab the pieces you need and strap them on based on the type of disaster. The system consists of:

- ❑ Survival Backpack – everything you need to survive for 72 hours.
- ❑ Pocket Survival kit – mini kit of survival items.
- ❑ Weapons Kit – a basic combat loading, including weapons, ammo, and Load Bearing Equipment (“LBE”).
- ❑ Clothing kit – a set of spare clothing.
- ❑ Camping Kit – Camping supplies and equipment for a rural escape.
- ❑ Travel Kit – A kit for when you’re traveling.
- ❑ NBC kit – specialty protection and detection equipment for Nuclear, Biological or Chemical emergencies.
- ❑ Optional Gear – Optional items that are added to the other kits.

The kit modules are described in more detail on the following pages. A checklist is provided in Appendix 8 for your convenience.

A kit of all new equipment is nearly as useless as no equipment at all. Take your kit out for a weekend and try it out. Make sure you are familiar with all the items in the kit and how they work. If you have items that require special tools or gear, make sure you include them. Remember – you will need to spend your energy and effort on surviving, not on figuring out how to light the stove.

Make sure you include flavors of food that you like. Try the food beforehand, and eat it at least once a year. The best thing would be to run a drill and use up your consumables then.

Keep a checklist with the expiration dates of any consumables (including medicine and batteries) – make sure that you keep the items in the kit fresh and up to date.

You should be able to carry everything at once without being unduly encumbered. Practice putting the gear on. Many of the things mentioned here are common sense, but the idea is to think about all of them before the emergency, when you have time to plan and prepare. Advance planning and preparation will give you the added edge you will need when it comes time to Bug Out.

You should remember that the BOB is probably your only reliable source of supplies for the first 72 hours after a disaster. So don’t make assumptions about what you’ll be able to grab or find. It may not be there anymore. Where possible, items should be multi-functional. This saves space and weight. Remember to pack for everyone in your family. Shared loading is OK, and everyone should carry some of the burden, but remember that you may not all be together during an evacuation. Each person should carry a minimum set of gear for their own personal survival.

Plan your Bug Out Bag to match your evacuation route and methods. Make sure you have maps of the area, and plan where you will stop to rest if you are on foot. This is less of a concern if you are able to evacuate by car. Mark these locations on your maps and in your GPS. They can also be used as rally or meeting places for your family.

SHELF-LIFE OF FOODS FOR STORAGE

The following provides some general guidelines for replacement of common emergency foods.

Use within six months:

- Powdered milk - boxed
- Dried fruit
- Dry, crisp crackers
- Potatoes

Use within one year, or before the date indicated on the label:

- Canned condensed meat and vegetable soups
- Canned fruits, fruit juices, and vegetables
- Ready-to-eat cereals and uncooked instant cereals
- Peanut butter & Jelly
- Hard candy and canned nuts
- Vitamins

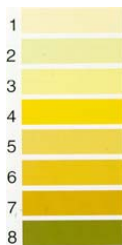
May be stored indefinitely (in proper containers and conditions):

- Wheat
- Vegetable oils
- Dried corn
- Baking powder
- Soybeans
- Instant coffee, tea, and cocoa
- Salt
- Noncarbonated soft drinks
- White rice
- Bouillon products
- Dry pasta
- Powdered milk – in nitrogen-packed cans
- The processing techniques utilized by Hormel Foods makes the canned product safe for use indefinitely if the product seal remains intact, unbroken and securely attached to a can that has been well maintained. It is suggested that all canned products be stored in a cool and dry environment to keep the flavor adequately preserved. For maximum flavor it is recommended that the product be used within three years of the manufacturing date. After that period of time, the product is still safe to use however, the flavor gradually declines. <http://www.hormelfoods.com/faqs.aspx#can4>

NUTRITION TIPS

During and after a disaster, it is vital that you maintain your strength. Remember the following:

- Eat at least one well-balanced meal each day.
- Drink enough liquid to enable your body to function properly (two quarts or a half gallon per day minimum). Remember – water requirements increase based on temperature and physical activity level. (see chart below)
- In extreme heat, you will not feel thirsty when it is time to drink. You can be dehydrated and not even know it. A guideline to follow is –
 1. If you are not urinating about every 2 hours, you are not drinking enough.
 2. When you urinate, if it is a dark color, you are not drinking enough.
 3. If your urine is the color of 1,2, or 3, you are drinking plenty of fluids. If your urine is the color of 4-8, then you are dehydrated.



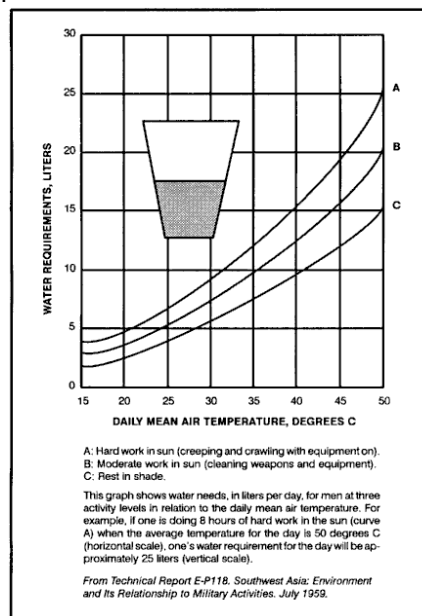
- Alcoholic beverages and caffeine drinks actually can dehydrate you. Avoid these.
- When the ambient temperature is above skin temperature (about 92 degrees F) then the only method of cooling to the body is by perspiration (sweat). Make sure to replace fluid losses due to perspiration.

- If you are drinking more than 1 liter of water in an hour, make sure to eat some salty foods to help replenish the salts your body is losing through perspiration.
- Beware of drinks containing Aspartame. The following symptoms are listed on the Aspartame Consumer Safety Network Fact Sheet:

headaches, nausea, vertigo, insomnia, numbness, blurred vision, blindness and other eye problems, memory loss, slurred speech, depression, personality changes, hyperactivity, stomach disorders, seizures, skin lesions, rashes, anxiety attacks, muscle cramping and joint pain, loss of energy, symptoms mimicking heart attacks, hearing loss and ear ringing, and loss or change of taste.

- According to an article in Technology Review, "aspartame may actually stimulate appetite and bring on a craving for carbohydrates" (Farber 52).

Water consumption is critical to sustained life and activity. Sports therapists know this intimately, as an average athlete can sweat 4-8 pounds of water in a single game. Water requirements increase based on ambient temperature and activity levels, as the chart below shows. This chart was developed during the US wars in Southeast Asia in Korea and Vietnam.



- Take in enough calories to enable you to do any necessary work.
- The minimum caloric intake is based on the activity level you expect to sustain. Adult women should aim for at least a 1,200 calorie diet at minimum activity. Men being more muscular need a minimum of about 1,500 calories per day in caloric intake. This number is based on minimal physical activity. For normal activity levels, see the chart below. In severe cold situations, more calories per day are recommended to help sustain body heat. The minimum survival level for adults is 700 calories per day (roughly half rations).

In 100+ degree desert temperatures, a person can hope to survive only 3 days without water. Water must be pure before ingesting. Many contaminants are possible in water, and in the United States, water goes through extensive purification processes including filtration and chlorination. In an emergency, questionable water (not radioactive) may be purified as follows, if other, more reliable methods are not available.

If you don't have available a very high-quality water filter, boiling is the most reliable method for killing microbes and parasites. Bring the water to a rolling boil and keep it simmering for at least ten minutes. Add one minute of boiling to the initial 10 minutes for every 1,000 feet above sea level. Keep the pot covered to shorten boiling time and conserve fuel.

In an emergency, regular household chlorine bleach can be used to sterilize water. One gallon of regular Clorox bleach will

purify 3800 gallons of drinking water. For each gallon of water, add 8 drops of Clorox bleach. Wait ten minutes, and check the water. If it is still cloudy, add 8 more drops of bleach. If the water is still cloudy, do not use it for drinking. (It can still be added to the tank of a toilet to allow for flushing.)

Don't pour purified water into contaminated containers. Sanitize them first by using dish sanitizing solution.

To make dish sanitizing solution, add one tablespoon of Clorox Bleach to one gallon of water. Wash and rinse items first, then soak in Clorox solution for 2 minutes. Drain and allow to air dry.

To clean bodily fluids and sanitize surfaces from biological contamination, mix ¼ cup Clorox bleach per gallon of water.

FOOD

Caloric content of common foods			
Food	Serving size	Weight (grams)	Calories
Beer	12 fl. oz.	356	146
Cheddar cheese	1 oz.	28	114
Margarine	1 Tbsp.	14	50
Apple	²³ / ₄ in. diameter	138	80
White bread	1 slice	25	65
Doughnut, cake plain	³¹ / ₄ in. diameter	50	210
Rice, white	1 cup cooked	205	264
Beef patty	3 in. X ⁵ / ₈ in., 21 percent fat	85	236
Chicken breast, fried	1 piece batter dipped	140	364
Broccoli	1 cup cooked	180	50
Corn	On cob, 5 in. long	77	83

Recommended dietary allowances for activity energy	
Age (year)	Energy (kcal)
Infants	
0.0–0.5	650
0.5–1.6	850
Children	
1–3	1,300
4–6	1,800
7–10	2,000
Males	
11–14	2,500
15–18	3,000
19–24	2,900
25–50	2,900
51+	2,300
Females	
11–14	2,200
15–18	2,200
19–24	2,200
25–50	2,200
51+	1,900
Pregnant	+300
Lactating	
1st 6 mo.	+500
2nd 6 mo.	+500

- Include vitamin, mineral, and protein supplements in your stockpile to ensure adequate nutrition.

Containers

You'll need to get a container to keep and/or carry it in. In case you have to move fast, some kind of backpack is probably the best choice. There are different types and models available. You'll have to choose what's best for you. Placement of items when packing and storing is very important. Pockets should be used to segregate like items. External pockets should be used for items probably needed in an extreme hurry, like first aid, fire starting, navigation tools, ponchos, and water purification.

Memorize the locations of all the items in your kit. Include an inventory with storage locations and expiration dates with your kit. Make sure to keep the items in the kit rotated to prevent spoilage.

Pack Choice

ALICE

The traditional US Military load bearing system. The US Army's All-purpose Lightweight Individual Carrying Equipment or "ALICE" was introduced in 1974. As this is being replaced by the military with Molle gear, it is common on the surplus market. This means that it has a lower price point, while

meeting the needs of reliable and durable modular carrying functionality.

MOLLE

The newest US Military load bearing system, introduced in 1997 – MOLLE stands for MODular Lightweight Load-carrying Equipment. This modular design allows for more extensive customization of the loadout. This has the value of being exactly what you need, at additional cost.

Commercial

Commercial backpacks and gear are fine, and you may have some of them already around the house. The benefit of using commercial and consumer carrying gear is that in an urban environment, you will not present a military profile. This will allow you to blend in and not be a target as much for people trying to increase their power by taking other's equipment.



Survival Backpack

PACK

Something to carry it in. It should be small and modular, because it is part of all the other kits.

Being able to attach the survival kit to the LBE will help when it is needed to bug out quick.

FOOD

3 day supply of high calorie, high energy, non-perishable food.

- Keep food in a dry, cool spot—a dark area if possible.
- Open food boxes and other re-sealable containers carefully so that you can close them tightly after each use.
- Wrap perishable foods, such as cookies and crackers, in plastic bags and keep them in sealed containers.
- Empty open packages of sugar, dried fruits, and nuts into screw-top jars or airtight canisters for protection from pests.
- Inspect all food for signs of spoilage before use.
- Throw out canned goods that become swollen, dented, or corroded.
- Use foods before they go bad, and replace them with fresh supplies, dated with ink or marker. Place new items at the back of the storage area and older ones in front.

MRE

MRE's (Meal, Ready to Eat) are tasty, can be cooked without a fire (using the military heaters) and are readily portable, as well as having a long storage life.

FSR

An alternative to the MRE is the US military's new FSR, or First Strike Ration. This 72 hour, high calorie ration is designed to be eaten by soldiers by hand, on the move, without preparation during the first 72 hours of deployment. Each days ration is lightweight, but contains about 2900 calories.

Coast Guard Rations

Coast Guard rations are bricks of nutritious sawdust. They require a lot of water to wash down, but are much lighter than MRE's.

Eating Utensils

You'd be surprised how valuable a fork, knife and spoon set are when you don't have one available.

Tea Bags

Easier and healthier than coffee, and double as first aid for insect bites and stings.

WATER

You should have a minimum 3 day supply of drinking water. Remember water is heavy.

Water purification

Tablets or a good portable filter are mandatory. Even in urban areas with good city water – you may not be able to get to guaranteed clean water. As an alternative, you can use household liquid bleach to kill microorganisms. Use only regular household liquid bleach that contains 5.25 to 6.0 percent sodium hypochlorite. Do not use scented bleaches, color safe bleaches, or bleaches with added cleaners. Because the potency of bleach diminishes with time, use bleach from a newly opened or unopened bottle. Put 16 drops per gallon of water, stir and let stand for 30 minutes. If there is not a noticeable chlorine smell, repeat. If it still does not smell of bleach, discard it and find another source of water.

Extra collapsible storage containers for collecting water.

Gatorade Mix

You'll be active, and losing those vital salts as you perspire. – add this to your water for a little extra oomph. Packets are available that are sized for a canteen. Try to drink Gatorade 50/50 with water – it'll generally do you better in the long run.

SHELTER

Poncho

A military poncho has many uses – an improvised blanket, tent, stretcher, ground cloth, or cover over your hammock.

Pack Hammock

A small backpacker's hammock is ideal – they are hard to find, but you can get one that rolls up small, without spreader bars, and weighs around 18 ounces. If you can find something to tie it to – it will keep you off the ground (especially valuable when the ground is soaking wet), is quite comfortable, and can also be used for gear and food storage to get it away from marauding animals. We used one when camping in the Okefenokee swamp to hold our food away from where the raccoons would be able to get to it.

TOOLS

E-tool

Get the modern tri-fold shovel and cover – these can be had reasonably, are very light and quite sturdy.

GPS

Extremely useful for finding your way. Get one that uses topographic maps and upload the maps of your area. Mark out waypoints for rest areas in case you have to evacuate on foot.

Compass

Useful for what the GPS isn't good at – or in case the GPS batteries die, the old fashioned compass is still a primary navigation tool. Get a good orienteering compass. Learn how to use it.

Flashlight

A small flashlight, preferably with red lens inserts for nighttime.

First Aid Kit

Use chewable or quick dissolve strip medicines where possible, because there is no water needed to take them. Make sure you have the following items, at a minimum:

- Advil
- Benadryl
- Bandages
- Antibiotics
- Antibiotic cream
- Moleskin (for blisters)
- Thermometer
- Tweezers
- Pepto-Bismol
- EMT Shears
- Fire starting tools
- Matches
- Fire sticks/tinder
- Flint/steel
- Lighter and fuel
- Duct Tape

A small roll of duct tape can be a lifesaver.

Fishing Line

A small spool of fishing line – go for 25lb test, it'll have more uses.

550 cord

50-100 feet of 550 cord, again a great multitasker.

Super Glue

Not just for gluing things, it can be used to seal small cuts quickly.

COMMUNICATIONS

- Cell Phone
- Satellite Phone
- FRS/GMRS Radios
- Private Frequency Radios
- Police or multi-band scanner
- Radio (am/fm plus walkie-talkie)
- An am/fm radio will let you know what is going on around you (hopefully).
- Spare Batteries
- Non- AC charger (car, solar, etc)

DOCUMENTS

Carry a physical copy, plus an electronic one (jump drive, CD, etc). Buy a USB jump drive with a high quality, sturdy keychain loop on the drive – not the cap – put images of all Ids on it, as well as a video walkthrough inventory of all your stuff. A 2-4 gb drive should be good enough. Use a U3 drive with password security. Keep it all in a waterproof container or zip top bag.

The electronic copy should be encrypted, to help avoid identity theft if it is lost or stolen.

Copy of Ids

Drivers License

Passport

Visas and other travel documents

Birth Certificates

Marriage License

Recent Photos of all family members

If traveling abroad, prepare a NEOKIT

Noncombatant Evacuation Operations (NEOs) are conducted to evacuate civilian noncombatants and nonessential military personnel from locations in a foreign nation during time of endangerment to a designated safe haven. NEOs are normally conducted to evacuate United States (US) citizens whose lives are in danger from a hostile environment or natural disaster. NEOs may also include the evacuation of US military personnel and dependents, selected citizens of the host nation (HN), and third country nationals. These forms can be obtained here: <http://www.nsa.naples.navy.mil/disasterprep/neokit.htm>

NEOKIT Required Forms

- ID Card
- Passport
- NEO Registration (NEO Census Form)
(Replaces Evacuee Database Information Form)
- DD Form 1337 (for military)
- DD Form 2461 (for civilians)
- DD Form 1701 (or other Household goods record)
- DA Form 4986 (or other Household goods record)
- DOD Form 2585
- Copy of Vehicle Registration
(Replaces Vehicle Control Form)

Copy of Title to House

Copy of Insurance policies

Inventory of household goods (see appendix)

Wills and contracts

Copies of recent tax returns

Copy of weapons paperwork and permits

Disaster Plan

Survival guide

This Book!!!

Phone and address list of Family and friends

Emergency Manuals

Extra house keys

Extra Cash

Checkbook and credit cards

List of all bank and credit card accounts.

List of all investments.

Contact information for your employer, boss, and HR department.

Indelible Marker

Notepad and waterproof pen

Disposable camera with flash

Maps of the area with pre-selected shelter locations and travel routes.

Ziptop bags.

HYGIENE KIT

Toothbrush, toothpaste

Razor/Shaving Cream

Soap

Soap – both liquid and bar is extremely important. Being clean prevents secondary diseases and irritation, and makes you happier (and those around you too)

Deodorant

Deodorant isn't for you as much as those around you. An anti-perspirant will help reduce sweat contamination of your clothes, increasing your comfort levels.

Sunscreen

Sunburn can take you out of action quickly, and it takes effect long before you notice. During the emergency, you'll probably not have the benefit of quality shelter while on the move, so protect that skin!

Bug Spray

Nothing will "bug" you more than having to hike through the swarms of insects after an emergency. A liberal dose of bug spray will reduce your stress and fatigue with dealing with these critters, and help keep you healthy and safe.

Sewing repair kit

A small kit with needle and thread and some buttons and safety-pins is all you need.

Condoms

Not just for their manufactured use, they can also be used to keep the wet out of your firearm's barrel, as improvised waterproof containers of small things, etc. Make sure to get the unlubricated kind.

N-95 Masks

These dust and biological protection masks can save your life if there are dangerous airborne particles in the area you have to evacuate through. Make sure to have a couple and know how to use them.

Rubber gloves

The most basic protection, a few pairs will help you from picking up any contamination from things you touch and handle. As they are not very durable, pack a few pairs. Learn how to change them without contaminating yourself. The Red Cross teaches this in First Aid and CPR Class.

Pocket Survival Kit

You can make your own pocket kit inexpensively by picking up a few simple items and put it together yourself.

- Altoids tin (holds everything)
- 15 strike anywhere matches
- 3 Bullion Cubes
- X-Acto #11 blade
- P-38 Can Opener
- Magnesium Fire Starter
- 8 fish hooks, 5 sinkers, cigar float.
- 100' 10lb fishing line
- Fire stick
- Sewing repair kit

Dip the matches in hot wax to make them waterproof. Glue the striker from the box to the inside of the lid of the Altoids tin. Chuck a match stick in a drill and use it as a spool to wind the fishing line. Secure one end of the line on the stick with Scotch tape. Use the drill to wind it, and tape it down with more scotch tape to secure it. Break the fire stick to fit. If you don't have fire stick, use cotton twine. Everything will fit in the Altoids tin. Seal the whole tin in a zip top bag.



Weapons kit

"A fear of weapons is a sign of a retarded sexual and emotional development." - Sigmund Freud

Firearms can be a great asset in a disaster, if you need to defend yourself, your family, or your property. It can also be a liability, as it gives a lethal solution to arguments, and can be a legal issue. If you decide to include firearms in your kit, then make sure everyone knows about firearms safety. This kit should be assembled to match the environment of your area, your own abilities, and your proficiency. Practice with the weapon until you are completely familiar with it. If you have to resort to using a weapon to defend yourself or your family, then things have really fallen apart in your area, and you better be able to hit what you are shooting at. In addition, research the local laws in your area. In some states, you will be better off not having a weapon at all, as you are treated as more of a criminal than the actual villains you are trying to defend your family against. Learn the firearms and self defense laws for your community and possible escape routes. Keep a copy of any weapons permits and paperwork with your weapons kit.

Many survival authors recommend specific weapons for use in a survival situation. I have chosen to teach you how to make your own choices. The options today are simply too varied, and there are many good choices, depending on your skill, body size, experience, supplies, budget, preconceptions, local laws, and technical prowess. A rifle that is good for a practicing marksman and hunter may not be a good choice for his manicured wife.

Pack/Bag/case

Just enough to contain the weapons kit for storage.

Everything should fit in the LBE except for the rifle.

If a locking case is used (good for the rifle and pistol) – then use a combination lock instead of a key lock. It is easier to remember a combination than rummage for a key. Don't use an electronic lock. The EMP during a Nuclear Event might scramble it.

Rifle

RIFLE SELECTION

Caliber

Stick to the most common calibers. This makes resupply easier when you are in a disaster situation, as distribution may be restricted or nonexistent.

The best choices for a battle rifle caliber, based on availability are:

- ☐ 5.56 Nato/.223

- ❑ 7.62 Nato/.308
- ❑ 7.62 x 39 (AK-47)

The best choices for a hunting or sniper rifle caliber are:

- ❑ 5.56 Nato/.223
- ❑ 7.62 Nato/.308
- ❑ .30-06

While the larger calibers pack more punch, they also have more recoil, and are heavier (making it harder to carry as much ammunition). If you can't use it effectively, then it isn't going to do you much good. If you run out of ammunition, then you have a very heavy club.

Type of combat

Think about the area around your home and office. What kinds of things do you have to face? Is it sparsely or densely populated?

Urban

Encounter ranges in urban environments are usually going to be less than 250 meters. It is hard to find open areas larger than this in most cities, other than straight down key streets. Most encounters will probably be between 50 and 100 meters.

Suburban

Suburban areas are a hybrid between the urban density of cities and the open possibility of rural areas. Most subdivisions are restricted in size. In my area, the longest line of sight is 400 meters down the street.

Rural

Rural encounter ranges depend entirely on the terrain. Wooded and mountainous areas generally have the same range restrictions as urban environments, and only in the desert do you get to the longer ranges.

A rifle you can use.

Whatever rifle you pick, you should be able to use it. I was on a hunting trip with a man who had to have the biggest rifle around. He carried a monstrous 475 Weatherby Magnum bolt action. When challenged by a Russian Boar (~50 meter range) he managed to get off 4 shots (hitting the boar twice in non-critical areas) then switched to his .44 Magnum revolver – firing 6 shots before the boar chased him into the bed of his pickup truck. While he hit the boar multiple times, none of the hits were accurate enough to cause a fatal wound. He would have been much better off with a .308. A .308 was used on the same boar a few hours later, and killed the boar with a single shot (while the boar was running) at 132 meters.

Magazines

Standard load for any rifle should be 6 full magazines, plus 1 (or 2 if a Jungle Clip is used) in the weapon.

One magazine should be labeled as "last resort" – this magazine should not be used until last, and then only upon dire emergencies. A rifle without ammo is useless, and when you get to this point, your focus should begin conserving ammo, replenishing your supplies, and reloading what you have. Storing loaded magazines can induce spring fatigue, which can interfere with the reliable functioning of the weapon. The one notable exception to this in auto loading rifles is the M1 Garand, It's magazine is an en-bloc clip that holds the rounds in place, and the operating rod spring provides the force to elevate the rounds toward the chamber. M1 Garand clips can be stored loaded for decades, if in a moisture free environment. You can buy Korean surplus ammunition in loaded clips that is dated 1970 today – 37 years later, and it will feed flawlessly. (though some of the primers will no longer

ignite, and it is mildly corrosive.) My father keeps one in his display cabinet from World War II – and I'm sure it would feed as well. The other long storing clip is the stripper clip – popular in military bolt action rifles from World War II and earlier, such as the Mauser, Mosin-Nagant, and Springfield 1903 and 1903a3.

Pistol

PISTOL SELECTION

Caliber

Stick to the most common calibers that have knockdown power – 9mm, .40 or .45. Sales of ammunition at a local gun store show the commonality of these calibers: (centerfire pistol ammunition sales)

37%	9mm
32%	.40 S&W
24%	.45 ACP
8%	Other Calibers

Manufacturer

A pistol should be reliable – remember, you get what you pay for. If you stick with the top military and police contractors, and military and police models, then you'll do fine. Beretta, Colt, Glock, S&W, and Taurus all make fine weapons.

Magazines

Standard sidearm load is between 3 and 5 full magazines, and one in the weapon.

Knife

Fixed Blade

A 6" blade knife with a fixed blade is considered a minimum. The M-9 Bayonet (or clones) is a good choice, if sharpened properly. A sharpening tool should be included in the kit.

Multi-tool

A good multi-tool should be included in the kit, especially one that has the tools required for proper weapon maintenance.

I use an M-9 Bayonet with the magazine/tool pouch on the sheath holding the multi-tool. The multi-tool has a bit attachment for 1/4" bits, allowing me to carry the bits required for weapon maintenance.

Ammo

Rifle Loadout

A minimum of 200 rounds or the quantity to load all magazines, whichever is greater.

Pistol Loadout

A minimum of 100 rounds or the quantity to load all magazines, whichever is greater.

Load Bearing Equipment

LBE Selection

ALICE

The US Military standard from the 1960's through the first Gulf war.

MOLLE

The new US Military equipment standard.

Tactical Vest

In this case, I'm using a tactical vest, as it has all the pouches I need, plus Molle and Alice add-ons.

Ammo Pouches

Enough pouches should be attached to the LBE to carry the magazine load for both the rifle and pistol.

Water (2 canteens or hydration system)

Holsters

A secure retention pistol holster is mandatory, drop down rigs are common.

Sheaths for the knife and multitool.

First Aid Kit

A small first aid kit should be attached to the LBE

Weapon Cleaning Kit

A clean weapon is a happy weapon. A field cleaning kit should be carried with the LBE. Pull through bore cleaners and gun oil are a minimum.

Protective Gear

Earplugs

Goggles or shooting glasses

Gloves – Nomex or tactical gloves

Have your LBE kept fully assembled, with the stuff in the pouches. Time is going to be critical, so don't waste it putting everything together. Also, make sure it is adjusted in advance so you can just throw it on and go. Memorize where everything is kept, and rehearse it in your mind, when not wearing the LBE. While rehearsing, close your eyes and put your hand on each item. Then repeat this drill with the LBE on. This will train your mind to remember where things are – a critical point during times of stress.

Clothing

Pack/Bag

A small duffel bag or sack is sufficient to hold a change of clothing, and be thrown into another pack.

BDUs

Military BDUs or similar durable clothing are a must to have. You probably won't be changing clothes much, so get something that will hold up to abuse. Also, BDUs have large cargo pockets to help you carry extra "stuff".

Boots

Rule number one about boots – don't skimp. The US military has spent amazing amounts of money making sure their soldiers have quality foot protection, and your needs will be very similar to theirs. Buy a good pair of military boots or high end hiking boots, and break them in. (this means wear them) – don't buy substandard knockoffs. In the emergency to come, you will probably have to rely on your feet to move you out of harms way and transport you to safety. Be ready for the walk. This is not the time to break in a new pair of boots.

Hat

Something to keep the rain and sun off your head when on the move. During hot weather, it can keep you from experiencing as much heat effects, and during cold weather will help prevent heat loss. I suggest a boonie type hat for warm weather and a knit hat for cold weather.

Field Jacket

Get an appropriate jacket for your climate. In the South, where I live, an M-65 field jacket with liner is a good all-around choice. It will keep you warm, doubles as an improvised blanket or pillow, and will keep some of the rain off. I suggest you coat it annually with silicone repellent, as this will improve the water resistance.

Thermal Underwear

Under your clothes, this will keep you warm, at the cost of not much space and weight.

Extra Socks

Not only useful for your feet (3 pairs, by the way) but also can be used for improvised mittens or bandages. A simple multitasker.

Camping Kit

Container (Pack)

A large backpack is perfect here.

You should choose a correctly sized, comfortable to carry backpack. Camping and expedition packs are perfect here. Military packs allow connection to LBE and attachment of accessories and modular accessory packs. Packs come in various sizes – usually measured with carrying capacity and wearer size. Get one that fits your frame. Practice wearing it with other modules to make sure it all works together. The day to figure this out is before the crisis.

Make sure it will fit over the LBE and has a space for the survival kit.

Tent

Ground Cloth

Cooking Equipment

Frying pan, folding

Cook set, nesting

Can opener

Eating utensil set

Matches, water proof

Pack stove

Fuel bottles

Condiments

Salt & Pepper

Sugar

Honey

Milk, dry, instant

Spices (Tabasco, Cayenne, etc.)

Scouring pads, soap filled

Small bottle of dish soap

Dish rag

Sleeping Bag



Water Filtration System

This will allow you to replenish your water supply from questionable sources. This is easier to carry than more water.

Night vision Gear

The night is a dangerous time because your observation radius diminishes greatly. If you have night vision equipment, it will give you an advantage of movement and combat effectiveness.

Spare parts for firearms

A broken firearm is also known as a club or paperweight. Common spare parts for the firearms you carry can be extremely worthwhile. Know how to install them and also carry any required tools.

Extra food

More days of rations

Extra Water

As much as you can carry.

Extra Ammo

As much as you can carry. A firearm without ammo becomes a club or a paperweight.

Shelter In Place Kit

While a BOB is useful for evacuations, a Shelter In Place room can be a valuable asset if you need to stay put. A low room (basement preferred) should be prepared for many emergencies, and an upper floor room should be ready for Hazardous Materials events. A windowless room or closet in the core of the building is best. Both rooms should contain more of the Bug Out Bag contents (and you should bring your BOB there too) plus some special things: (if you have space)

Food for 7 days

Water for 7 days

Pre-cut plastic sheeting to seal openings in the room. (labeled if there are multiple openings)

Large roll of Duct Tape

Sleeping bags and inflatable beds

Pillows

Spare Clothes

Hygiene items

Make sure to include waterless sanitizer, deodorant, toothbrushes, toothpaste, and toilet paper.

Black plastic garbage bags

A multitasker – can be used for sealing leaks in the room, transporting water, and disposing of waste, among other things.

Some form of waste disposal

It is exceptionally important that you manage the proper disposal and containment of your waste. If you are holed up in your SIP room for 7 days with your family, all of your waste – including wrappers from food, but mostly biological waste – will be trapped in there with you. This not only presents a hazard to comfort from the smell, but can also represent a health risk. If it is a permanent room, you can rig a toilet with a manual sump pump – as long as there is a good vapor lock to prevent any gases from the outside from entering. However, this method uses a lot of water. A portable chemical toilet may be a better choice, but it depends on the location and space you have.

Snacks (energy bars, beef jerky)

Bucket

Extra batteries (rechargeable)

Battery Charger

Power Strip

Cell Phone Charger(s)

Wire it for a telephone jack, and use a wired, non AC powered analog phone in there.

Wire it for electrical power and cable or satellite TV (if you have it)

A small portable TV or laptop with TV Input adapter.

Internet access (if you have the laptop) – broadband is best but dial-up will do.

Comfort items – books, games

You can use this room as the storage for these things as well.

Implementation

When the Disaster happens, information is critical to your survival. Timely and accurate information will allow you to make the decisions required to survive the situation. Often, early reactions will make the critical difference.

Disaster Alert

If you hear a Disaster Alert or siren, listen to a battery powered radio for instructions and information. This will let you decide whether you should (or must) evacuate or Shelter In Place.

Keep Calm. Rational decisions are easier when you are calm. If you live in a major city, and you wait for the order to evacuate, then it's probably too late – the roads will be clogged with other evacuees. You need to be prepared to make a decision about what to do, then implement that decision, before everybody else panics and interferes with it. Fear and misinformation will be rampant – especially with police when things fall outside their training and understanding. They may order people to do things that seem crazy to an outsider, evaluating from the safety of their armchair. Police are trained to respond certain ways under given situations – to override the instinctual reactions that occur when the adrenaline is flowing and the intensity is high. This training can potentially be a detriment in certain extremely unusual situations.

Timing of disasters

Each type of disaster has a different timeline to take it from onset to full collapse. Weather events are the easiest to predict, as we have reports of their advance from the news agencies. An invasion by a foreign military can take place in a day. A disease can spread slowly or quickly, depending on its detectability while dormant, incubation time, degree of debilitating symptoms, and their speed of onset.

Here are some example timelines for some sample disasters:

Nuclear Strike

We probably won't have much warning as civilians, as the "surprise attack" is one key to the nuclear strike strategy. In a "best case" scenario, the government will detect the launch. This is hour 0. With this in mind, here is the timeline:

Hour	Event
0:00	Launch of hostile missiles
0:01	Military detects launch
0:03	Launch confirmed. Norad and Joint Chiefs notified.
0:04	President alerted – response choices made
0:05	Retaliatory strike launched.
0:06	President and Cabinet decide whether to alert public.
0:07	EBS Activated
0:08	First warnings go out
0:15	First missiles strike

So if you hear the first warning, and everyone reacts as quickly as described, you will have up to 8 minutes to react to the alert and get to shelter before the bombs begin to go off. This is if you are in front of a TV or radio and not listening to your mp3 player.

Biological Event

If a biological event occurs, the timing really depends on if it is an engineered attack, or a random pandemic. In an engineered attack, the outbreak will occur many places at once, confusing tracking and creating many “Patient Zero’s”

“Patient Zero” is the term used to describe the first person who catches a disease, and is used to describe the tracking of the source of the pandemic.

If we assume a random pandemic, the timeline goes something like this, for a disease with a 3 day incubation time:

Day	Event
0	Patient Zero catches disease
1-3	Patient Zero exposes everyone he comes in contact with to the disease. If we assume a global traveler, the spread is faster.
3	Patient Zero starts showing symptoms
6	Second set of patients start showing symptoms. With our global traveler, this now starts showing up in other countries.
14	Outbreaks begin in major transportation hubs around the world.

In the 1900s, pandemics traveled from continent to continent along the sea lanes, with full global spread complete within six to eight months. The 1957 pandemic, during an era with much less globalization, spread to the US within 4-5 months of its detection in China, and the 1968 pandemic spread to the US from Hong Kong within 2-3 months. As was amply demonstrated by the SARS outbreak, modern travel patterns may significantly reduce the time needed for pandemic influenza viruses to spread globally to a few months or even weeks. The major implication of such rapid spread of an infectious disease is that there will be only minimal time to implement preparations and responses once pandemic viruses have begun to spread. The speed of international spread has no direct effect on mortality, but could compromise response capacity should large parts of the world experience almost simultaneous outbreaks. Many of the public health interventions that successfully contained SARS will not be effective against a disease that is far more contagious, has a very short incubation period, and can be transmitted prior to the onset of symptoms.

Most experts believe that there will be one to six months between the identification of a novel influenza virus and the

time that widespread outbreaks begin to occur in the US. Outbreaks are expected to occur simultaneously throughout much of the US, preventing relocation of human and material resources. Because populations will be fully susceptible to an H5N1-like virus, rates of illness could peak fairly rapidly within a given community. The effect of influenza on individual communities will be relatively prolonged - six to eight weeks, though possibly up to twelve weeks.

Viruses with a very short infection to lethality timeline, such as Ebola and the Zombie virus will tend to be contained. If you watch your favorite Zombie movie, then imagine if the outbreak occurred on an airplane, you’ll understand how the transport of the virus will then be limited.

Hard Choices

Sometimes in the immediate aftermath of a disaster – you may have to make hard choices. Do you invite your neighbors or friends into your shelter? If you do, do you have enough to feed them? Will they overload your sanitation system? Will they bring disease or radiation with them? What about defending yourself? Are you prepared to “Shoot to Kill”? Failure to comply with laws during a crisis can possibly result in real issues for you long term. In addition, police may react to lawlessness with lethal force.

Communication

Contact your remote designated contact to let them know where you are, how you are doing, and your plans. Contact each family member and inform them of the plans. Your remote contact should know they are a contact. Calls should be brief – but convey the following information:

- ❖ Current location
- ❖ Current Condition
 - Medical issues – are you injured?
 - Supply status
- ❖ Number of companions, and medical conditions of them as well
- ❖ Shelter in place or bugging out?
- ❖ If Bugging Out – what is your destination and next check-in? Are any of your companions impaired in travel?

Your remote contact should then tell you the status of all other family members. If one family member doesn’t check in within an hour after the disaster, the remote contact should attempt to contact them.

During the events of 9/11, my family’s communication plan was put to the test. We had long had the rule in place that in case of emergency, everyone should contact my parent’s house for coordination. I was working on a systems problem at my office, and had closed my door to keep distractions out. I overheard someone talk about a plane crash into a building in New York, and hopped on cnn.com to check it out. The website didn’t respond, so I simply assumed that it was an internet connectivity issue at the office (which was common at the time), and continued working. A little while later, (after the second plane had impacted the World Trade Center, and it was

known it was a terrorist incident), my cell phone rang. It was my father – asking why I hadn't checked in, and if I was OK. My response was that I was fine, and why was there a need for me to check in. At this time, he informed me of the situation (attack on the WTC), status and whereabouts of all family members (I had a sister working in building 5 – who was out of town for a conference). I then gave my status, and the call was ended. In all it took about 3 minutes.

The message here is – know who to call, and who should be calling you. If you are part of a large group (a large family, or a business, for example), then a "calling tree" should be implemented. You should be called by any people you are responsible for – and call to verify the status of any who don't respond. Each member of the group should know their responsibility.

You should also have multiple means of communication ready – landline, cell phone, pager, internet, in case one or more doesn't work. In more generalized catastrophes, they all may not work.

Stress and help

During an emergency, people are stressed. They react instinctively, and sometimes do strange things. In a crisis, without training, your mind will fixate on minutia, remembered things or random things will be assigned importance. In 2006, when a severe tornado struck Norcross, Georgia, my brother's apartment was directly in the path of the tornado. He and his fiancé were sitting on the porch, watching the rain and the sky, when the sky began to "look wrong" – Jon had recognized that a tornado was coming. Since they were on the second floor, they determined that the safest place was in the bathroom (interior room with no windows) in the bathtub (to protect against debris). He got his fiancé into the tub, and she kept trying to get out. Her mind was fixated on trivia – she had heard that you should be under a blanket (to reduce injuries from flying glass), that she needed to grab her purse, that she needed to call somebody. None of these reactions made very much sense, but she was very insistent. My brother did the right thing. He assumed control, and ordered her in a "drill instructor voice" to get into the tub, and then lay down on top of her.

They were lucky. The tornado knocked over a giant tree that took the porch off the building, and exposed the living room to the sky. My brother's brand new Shelby Cobra Mustang was not so lucky.



When the disaster strikes, training and practice allow you to remain calm, assess the situation, and assume control. You will still make mistakes and forget things, but ultimately you will make better choices, and these will allow you to better help yourself and your family.

In 2004, my wife experienced her first tornado. It was 2am, and I was awoken by the tornado warning siren. I woke up my wife and made her go down to the basement, where we turned on the TV to get a report of where tornados had been sighted and how close they were. There was a tornado only 2 miles from my house. My wife had no clue as to what was going on, and even less about what to do. Fortunately, she never truly woke up, and simply trusted me to tell her to do the right thing.

For your disaster survival group, there should be a strict hierarchy of command. There should be one person chosen in advance as the group leader. The group leader should then appoint other people specific roles befitting their skills. The leader should also be responsible for keeping the stress levels down, reassuring other members of the group, and making sure the tasks get done. Every task or assignment that the team has to perform, even menial ones takes time. This time is at a premium if you are evacuating, and is time that you don't have to fill if you are sheltering in place.

Shelter in Place

Immediate Steps

Act quickly
Do not Panic
Move to shelter room.

If you have time

Fill any available containers with water. (While it is still safe)
Close and Lock all doors and windows.
Close curtains.
If Hurricane is approaching, barricade doors and windows with Plywood.

Evacuation

Immediate steps

Act quickly
Implement communications plan.
Take your BOB
Wear sturdy shoes and clothing.

If you have time

Let others know where you planned to go. Leave a note telling when you left and where you are going.
Close and lock all doors and windows.
Close Curtains.
Arm alarm system.
Shut off water, gas, and electricity, if instructed to do so.
Unplug electrical appliances.



Situational Awareness

Whether you are evacuating or sheltering in place, awareness of your surroundings is as important as timely media communication, if not more so. Knowing that a gang of looters is headed your way, that the area ahead is unsafe, or that things are better "over there" can make a huge difference in your survival or comfort.

Things to look out for:

Environmental signs

- Smoke or fire
- Dead Animals or people
- Clouds, vapors or mists
- Downed power lines
- Damaged buildings
- Debris and rubbish
- Abandoned cars and belongings

Signs of Dangerous Areas

Gang "tags"

Criminal gangs "tag" their territory – a process that usually involves spray-paint or markers painting slogans or designs on buildings, vehicles, bus stops, mailboxes, or anything else that they can get the paint to stick to. In disputed areas, rival gangs will over paint the existing tags, challenging the claim of the first gang. Tags are also used to mark protected areas, announce threats against a member of another gang, brag of criminal exploits, and announce events.



An example of gang tagging marking an area. The overpaint of "Nikola" over the Faro tag is announcing the impending assassination of one of the gang members.

What to worry about:

Safe zones usually will have no tags. Residents in those areas will usually clean up any that appear.

New tags mean fresh gang activity in the area.

It will take the gangs a few hours or days to start moving into new territories with their tags, so tagged areas will be even more dangerous during the first few hours.

Groups of "Ruffians"

During the 2007 UK Floods, on the M4 motorway, motorists were stuck on the highway by a combination of traffic volume

and closed junctions. Most did not have any food or water in their vehicles. As night approached, most of the motorists simply locked their cars and walked to the nearest pub to get food and shelter. Gangs of ruffians realized this and started walking down the highway – breaking windows on cars and taking anything they fancied. One traveler that I interviewed had decided to stay in his vehicle, as he had supplies available to him. He watched this group openly walk down the motorway collecting their ill-gotten goods. When they reached a car only inhabited by an attractive woman in her early twenties, with no other witnesses in sight (so they thought), the ruffians smashed her window and pulled her forcibly from the car – with obviously no good intentions. At this point, he had to ask himself questions – “What do I do?” “Do I get involved?” “What risk does that place me in?” His answer (fortunately) was made for him. A trucker was in his cab nearby and sounded his air horn, startling the ruffians enough that the woman could escape their grasp. She ran to the truck, and the trucker let her into his cab for safety as he called the police.

The catch to all this is that the ruffians believed the police couldn't get there either – that they were trapped by the same traffic blockade as the victims. However, they forgot about police motorcycle patrols, which arrived shortly later.

Con Artists

It seems that disasters can bring out the best in many people – individuals risking life and limb to help their neighbors and total strangers. Unfortunately, disasters also bring out the worst kind of predator – those that prey on the victims. During the aftermath of Katrina, con artists perpetrated scams ranging from insurance fraud to price gouging, and many other so-called “confidence” schemes. During other disasters, polluted water was sold as fresh, contractors would take money in advance of repair work, only to vanish, and as many other scams as they could think of. (and far more than I can)

Recovery

After it is all over, the cleanup will take the longest. Debris, dirty water, rotten buildings, deteriorating infrastructure, it all can be a hazard to your life and well being. Be careful about salvaging materials from abandoned areas. When entering a new area – Survey the scene, make sure it is safe. Entering an unsafe area for any reason is unwise. Be alert for possible environmental dangers. Some of these are:

- ❖ Downed power lines
- ❖ Fire
- ❖ Rabid animals
- ❖ Unsafe terrain
- ❖ Unstable geography (landslides and sinkholes)
- ❖ Radioactive fallout and radioactive zones

Most people don't realize how long it takes to rebuild after a disaster. While it may only take 3-4 months to build a house, it can take 12 months or more to repair it after a fire. It is faster to bulldoze and start from scratch, though the insurance companies usually don't allow you that luxury.

Insurance companies are supposed to be your friend and savior after a disaster, but any story of the aftermath of a major hurricane is peppered with stories of insurance

companies not paying claims. Sometimes there are sections in the contract that exempt them from certain kinds of disasters or damage, and other times the lesser insurance companies have simply gone out of business. The best advice about this is to:

- Only pick stable (top rated) insurance companies.
- Know your policy. Make sure it covers the kinds of disasters you might get.
- Make sure you have enough coverage to actually replace your home and belongings.
- Keep a current inventory of the items in your household. A video walkthrough is a good start.
- Keep an inventory with serial numbers of all serialized equipment.
- Keep a copy of your full insurance policy in your Bug out Bag.
- Get to know your insurance agent – they can be your advocate with the insurance company after a disaster.

Barter and trade

In a disaster, money tends to have less meaning. Prices may skyrocket, or some places and people simply won't take money at all. Money is only truly worth the faith that people have in it. Historically, during disasters, price gouging, rampant local inflation, and general distrust of the value of money have caused prices to skyrocket. This was seen in the South during the Civil War (or The War of Northern Aggression, if you are a son/daughter of the Confederacy). The Confederate dollar became worth effectively nothing. Today, most people don't have large sums of cash readily available, and ATMs (if they even work) will be emptied in a disaster, either by withdrawal or confiscation. This cash unbalance in a crisis can create dramatic pricing issues. If you are bargaining for your life, what is that cash worth to you? Will it be worth anything to the person who has the goods or services you need? Barter, or exchange of goods for goods, may be your best bet. You can turn excess items you have into critical items you need. Depending on the type of disaster, the following things are usually of high value:

- Drinkable water
- Food
- Gasoline
- Shelter materials
- First aid supplies
- 12 gauge shotgun shells, ammunition
- Gold Bullion (but actually holds a lesser value)
- Luxuries (cigarettes, liquor)
- Good Boots (that fit the buyer)
- Hygiene supplies
- Medicine – especially antibiotics, insulin, and painkillers.
- Batteries (charged)
- Working electronic items (if there is electricity or the chance of finding electric power.
- Tools
- Firearms

Aftermath! Book One has some guidelines for calculating the relative barter values of items in a survival situation.

In the end, recovery has 3 phases:

- Clean up debris and dangers
- Rebuild infrastructure

Appendix 3: Food Storage Guidelines

SHELF-LIFE OF FOODS FOR STORAGE

The following provides some general guidelines for replacement of common emergency foods.

Use within six months:

- Powdered milk - boxed
- Dried fruit
- Dry, crisp crackers
- Potatoes

Use within one year, or before the date indicated on the label:

- Canned condensed meat and vegetable soups
- Canned fruits, fruit juices, and vegetables
- Ready-to-eat cereals and uncooked instant cereals
- Peanut butter
- Jelly
- Hard candy and canned nuts
- Vitamins

May be stored indefinitely (in proper containers and conditions):

- Wheat
- Vegetable oils
- Dried corn
- Baking powder
- Soybeans
- Instant coffee, tea, and cocoa
- Salt
- Noncarbonated soft drinks
- White rice
- Bouillon products
- Dry pasta
- Powdered milk – in nitrogen-packed cans
- The processing techniques utilized by Hormel Foods makes the canned product safe for use indefinitely if the product seal remains intact, unbroken and securely attached to a can that has been well maintained. It is suggested that all canned products be stored in a cool and dry environment to keep the flavor adequately preserved. For maximum flavor it is recommended that the product be used within three years of the manufacturing date. After that period of time, the product is still safe to use however, the flavor gradually declines. <http://www.hormelfoods.com/faqs.aspx#can4>

MRE Shelf Life							
Storage Temperature (Fahrenheit/Celsius)	100/ 38	90/ 32	85/29	80/27	75/24	70/21	60/15
Storage Life	22 Months	55 Months	60 Months	76 Months	88 Months	100 Months	130+ Months

REFRIGERATOR & FREEZER STORAGE CHART (from foodsafety.gov)

Since product dates aren't a guide for safe use of a product but instead "best used by for flavor", consult this chart and follow these tips. These short but safe time limits will help keep refrigerated food 40° F (4° C) from spoiling or becoming dangerous.

- Purchase the product before "sell-by" or expiration dates.
- Follow handling recommendations on product.
- Keep meat and poultry in its package until just before using.
- If freezing meat and poultry in its original package longer than 2 months, over wrap these packages with airtight heavy-duty foil, plastic wrap, or freezer paper, or place the package inside a plastic bag or vacuum bag.

Because freezing 0° F (-18° C) keeps food safe indefinitely, the following recommended freezer storage times are for quality only.

Product	Refrigerator	Freezer
Eggs , Fresh, in shell	4 to 5 weeks	Don't freeze
Eggs , Raw yolks, whites	2 to 4 days	1 year
Eggs , Hard cooked	1 week	Doesn't freeze well
Eggs , Liquid pasteurized eggs or egg substitutes, opened	3 days	Don't freeze
Eggs , Liquid pasteurized eggs or egg substitutes, unopened	10 days	1 year
Mayonnaise, commercial, Refrigerate after opening	2 months	Don't freeze

Product	Refrigerator	Freezer
TV Dinners, Frozen Casseroles Keep frozen until ready to heat		3 to 4 months
Deli & Vacuum-Packed Products	Refrigerator	Freezer
Store-prepared (or homemade) egg, chicken, tuna, ham, macaroni salads	3 to 5 days	Don't freeze well
Pre-stuffed pork & lamb chops, chicken breasts stuffed w/dressing	1 day	Don't freeze well
Store-cooked convenience meals	3 to 4 days	Don't freeze well
Commercial brand vacuum-packed dinners with USDA seal, unopened	2 weeks	Don't freeze well
Raw Hamburger, Ground & Stew Meat	Refrigerator	Freezer
Hamburger & stew meats	1 to 2 days	3 to 4 months
Ground turkey, veal, pork, lamb	1 to 2 days	3 to 4 months
Ham, Corned Beef	Refrigerator	Freezer
Corned beef in pouch with pickling juices	5 to 7 days	Drained, 1 month
Ham, canned, labeled "Keep Refrigerated," unopened	6 to 9 months	Don't freeze
Ham, canned, labeled "Keep Refrigerated," opened	3 to 5 days	1 to 2 months
Ham, fully cooked, whole	7 days	1 to 2 months
Ham, fully cooked, half	3 to 5 days	1 to 2 months
Ham, fully cooked, slices	3 to 4 days	1 to 2 months
Hot Dogs & Lunch Meats	Refrigerator	Freezer (in freezer wrap)
Hot dogs, opened package	1 week	1 to 2 months
Hot dogs, unopened package	2 weeks	1 to 2 months
Lunch meats, opened package	3 to 5 days	1 to 2 months
Lunch meats, unopened package	2 weeks	1 to 2 months
Soups & Stews	Refrigerator	Freezer
Vegetable or meat-added & mixtures of them	3 to 4 days	2 to 3 months
Bacon & Sausage	Refrigerator	Freezer
Bacon	7 days	1 month
Sausage, raw from pork, beef, chicken or turkey	1 to 2 days	1 to 2 months
Smoked breakfast links, patties	7 days	1 to 2 months
Summer sausage labeled "Keep Refrigerated," unopened	3 months	1 to 2 months
Summer sausage labeled "Keep Refrigerated," opened	3 weeks	1 to 2 months
Fresh Meat (Beef, Veal, Lamb, & Pork)	Refrigerator	Freezer
Steaks	3 to 5 days	6 to 12 months
Chops	3 to 5 days	4 to 6 months
Roasts	3 to 5 days	4 to 12 months
Variety meats (tongue, kidneys, liver, heart, chitterlings)	1 to 2 days	3 to 4 months
Meat Leftovers	Refrigerator	Freezer
Cooked meat & meat dishes	3 to 4 days	2 to 3 months
Gravy & meat broth	1 to 2 days	2 to 3 months
Fresh Poultry	Refrigerator	Freezer
Chicken or turkey, whole	1 to 2 days	1 year
Chicken or turkey, parts	1 to 2 days	9 months
Giblets	1 to 2 days	3 to 4 months
Cooked Poultry, Leftover	Refrigerator	Freezer
Fried chicken	3 to 4 days	4 months
Cooked poultry dishes	3 to 4 days	4 to 6 months
Pieces, plain	3 to 4 days	4 months
Pieces covered with broth, gravy	1 to 2 days	6 months
Chicken nuggets, patties	1 to 2 days	1 to 3 months
Fish & Shellfish	Refrigerator	Freezer
Lean fish	1 to 2 days	6 months
Fatty fish	1 to 2 days	2 to 3 months
Cooked fish	3 to 4 days	4 to 6 months
Smoked fish	14 days	2 months
Fresh shrimp, scallops, crawfish, squid	1 to 2 days	3 to 6 months
Canned seafood	<i>after opening</i>	<i>out of can</i>
Pantry, 5 years	3 to 4 days	2 months

Appendix 4: Biological and Chemical Threats

List of Select Diseases

Avian Influenza (H5N1)

Category: A

Transmissible person-to-person: Yes, in Pandemic Phase

Infectivity: Moderate

Lethality: High

Incubation Period: 1-7 days

Duration of Illness: 3-5 days

Vaccination/Toxoids available? No

Rate of Action: symptoms in 24-36 hours, shock and death occurs within 2-12 days after symptoms manifest.

Symptoms: Fever, malaise, fatigue, cough and mild chest discomfort, followed by severe respiratory distress with dyspnea, diaphoresis, stridor, and cyanosis.

Treatment: Usually not effective after symptoms are present. Antiviral treatments within first 36 hours may be effective. Supportive therapy may be necessary.

Possible means of delivery: Aerosol, natural contagion (Flu)

Encoding: A – (-) – HLH – 2d4 + 2d6 hours – 3 – 2 days – see above.

Anthrax

Category: A

Transmissible person-to-person: No

Infectivity: Moderate

Lethality: High

Incubation Period: 1-7 days

Duration of Illness: 3-5 days

Vaccination/Toxoids available? Yes

Rate of Action: symptoms in 2-3 days, shock and death occurs within 24-36 hours after symptoms manifest.

Symptoms: Fever, malaise, fatigue, cough and mild chest discomfort, followed by severe respiratory distress with dyspnea, diaphoresis, stridor, and cyanosis.

Treatment: Usually not effective after symptoms are present. High dose antibiotic treatment with penicillin, ciprofloxacin, or doxycycline should be undertaken. Supportive therapy may be necessary.

Possible means of delivery: Aerosol

Encoding: A – (+) – HLH – 1d6 days – 3 – 2 days – see above.

Brucellosis

Category: B

Transmissible person-to-person: No

Infectivity: High

Lethality: Low

Incubation Period: days to months

Duration of Illness: weeks to months

Vaccination/Toxoids available? Yes

Rate of Action: highly variable, usually 6-60 days

Symptoms: Chills, sweats, headache, fatigue, myalgias, arthralgias, and anorexia. Cough may occur. Complications include sacroiliitis, arthritis, vertebral osteomyelitis, epididymo-orchitis, and rarely endocarditis.

Treatment: doxycycline (200mg/day) plus rifampin (900mg/day) for 6 weeks

Possible means of delivery: Aerosol, expect it to mimic a natural disease.

Encoding: A – (+) – HLH – 3d10 days – 3 – 3d10 days – see above.

Cholera

Category: A

Transmissible person-to-person: Negligible

Infectivity: Low

Lethality: Moderate-High

Incubation Period: 1-5 days

Duration of Illness: 1 or more weeks

Vaccination/Toxoids available? Yes

Rate of Action: sudden onset after 1-5 day incubation period.

Symptoms: Initial vomiting and abdominal distention with little or no fever or abdominal pain, followed rapidly by diarrhea, which may be either mild or profuse and watery, with fluid losses exceeding 5 to 10 liters or more per day. Without treatment, death may result from severe dehydration, hypovolemia, and shock.

Treatment: Fluid and electrolyte replacement. Antibiotics will shorten the duration of diarrhea and thereby reduce fluid losses. Tetracycline, ampicillin, or trimethoprim-sulfamethoxazole are most commonly used.

Possible means of delivery: Sabotage (food/water) or Aerosol

Encoding: G – (0) – none – 1d3 days – special – 1 days – see above. (see book 3, pg 47)

Glanders

Category: B

Transmissible person-to-person: Negligible

Infectivity: *

Lethality: Moderate-High

Incubation Period: 10-14 days

Duration of Illness: N/A

Vaccination/Toxoids available? No

Rate of Action: N/A

Symptoms: Fever, rigors, sweats, myalgia, headache, pleuritic chest pain, cervical adenopathy, splenomegaly, popular/pustular eruptions. Almost always fatal without treatment.

Treatment: Sulfadiazine may be effective in some cases. Ciprofloxacin, doxycycline and rifampin. A combination of TMP-SMX, ceftazidime, and/or gentamicin might be considered.

Possible means of delivery: Aerosol

Encoding: A – (+) – HLH – 1d6+7 days – 4 – 2 days – see above.

Plague (pneumonic, bubonic)

Category: A

Transmissible person-to-person: High

Infectivity: High

Lethality: Very High – in untreated personnel, mortality is 100%

Incubation Period: 2-6 days for bubonic, 3-4 days for pneumonic

Duration of Illness: 1-2 days

Vaccination/Toxoids available? Yes

Rate of Action: Two to Three Days

Symptoms: High Fever, chills, headache, hemoptysis, and toxemia, progressing rapidly to dyspnea, sturdier, and cyanosis. Death results from respiratory failure, circulatory collapse, and a bleeding diathesis.

Treatment: Early administration of antibiotics is very effective. Supportive therapy for pneumonic and septicemic forms is required.

Possible means of delivery: May be delivered by contaminated vectors (fleas) causing bubonic plague, or via aerosol causing pneumonic plague.

Encoding: (Pneumonic) A – (-) – HLH – 2d6 hours – 4 – 2 hours – see above.

(bubonic) S – (-) – HLH – 2d3 days – 4 – 2 hours – see above.

Shigellosis

Category: B

Transmissible person-to-person: Negligible

Infectivity: High

Lethality: Low

Incubation Period: 1-7 days (usually 2-3)

Duration of Illness: 1-2 days

Vaccination/Toxoids available? Yes

Rate of Action: symptoms usually manifest within 2-3 days, but may be as little as 12 hours or as long as 7 days

Symptoms: Fever, nausea, vomiting, abdominal cramps, watery diarrhea, and occasionally traces of blood in the feces. Symptoms may be mild to severe, with some individuals experiencing no symptoms.

Treatment: Antibiotics – ampicillin, trimethoprim/sulfamethoxazole (also known as Bactrim or Septra), nalidixic acid, or ciprofloxacin. Persons with mild infections will usually recover quickly without antibiotic treatment. Antidiarrheal agents such as Imodium or Lomotil are likely to make the illness worse, and should be avoided.

Possible means of delivery: Contaminated food and water.

Encoding: G – (-) – HLH – 1d6 days – 1 – 4 hours – see above.

Tularemia

Category: A

Transmissible person-to-person: No

Infectivity: High

Lethality: Moderate if untreated

Incubation Period: 1-10 days

Duration of Illness: 2 or more weeks

Vaccination/Toxoids available? Yes

Rate of Action: three to five days

Symptoms: Ulceroglandular tularemia with local ulcer and regional lymphadenopathy, fever, chills, headache, and malaise. Typhoidal or septicemic tularemia presents with fever, headache, malaise, substernal discomfort, prostration, weight loss, and non-productive cough.

Treatment: Antibiotics with early treatment is very effective. Streptomycin – 1 gm I. M. q. 12 hrs x 10 10-14 d. Gentamicin – 3 – 4 mg/kg/day x 10-14 d.

Possible means of delivery: Infected vector (flea or tick), Aerosol

Encoding: G or A – (+) – HLH – 1d10 days – 2 – 3 days – see above.

Typhoid

Category: B

Transmissible person-to-person: Negligible

Infectivity: Moderate

Lethality: Moderate if untreated

Incubation Period: 6-21 days

Duration of Illness: Several weeks

Vaccination/Toxoids available? Yes

Rate of Action: One to Three Days

Symptoms: Sustained fever, severe headache, malaise, anorexia, a relative bradycardia, splenomegaly, nonproductive cough in the early stage of the illness, and constipation more commonly than diarrhea.

Treatment: Chloramphenicol amoxicillin or TMP-SMX. Quilone derivatives and third generation cephalosporins and supportive therapy.

Possible means of delivery: Sabotage of food and water supplies.

Encoding: G – (+) – HLH – 3d6 + 3 days – 3 – 3 days – see above.

Q-Fever

Category: B

Transmissible person-to-person: No

Infectivity: High

Lethality: Very Low

Incubation Period: 10-20 days

Duration of Illness: 2 days to 2 weeks

Vaccination/Toxoids available? Yes

Rate of Action: Onset may be sudden.

Symptoms: Chills, retrobulbar headache, weakness, malaise and severe sweats.

Treatment: Tetracycline or doxycycline are the treatment of choice and are given orally for 5 to 7 days

Possible means of delivery: Aerosol – may be a dust cloud either from a line source or point source, which spreads downwind one-half mile or more.

Encoding: A – (-) – HLH – 1d10 + 10 days – 1 – 2 days – see above.

Typhus (classic)

Category: B

Transmissible person-to-person: No

Infectivity: High

Lethality: High

Incubation Period: 6-15 days

Duration of Illness: weeks to months

Vaccination/Toxoids available? No

Rate of Action: Variable onset, often sudden, terminates by rapid lysis after about 2 weeks of fever

Symptoms: Headache, chills, prostration, fever, and general pain. A macular eruption appears on the fifth to sixth day, initially on the upper trunk, followed by a spread to the entire body, but not usually the face, palms, or soles.

Treatment: Tetracyclines or chlormphenical orally in a loading dose of 2-3 g, followed by daily doses of 1-2g/day in 4 divided doses until individual becomes afelorite (usually 2 days) plus 1 day.

Possible means of delivery: Contaminated vectors (lice or fleas)

Encoding: I – (0) – HLH – 1d10 + 5 days – 4 – 1 week – see above.

Encephalitis (EEE, WEE)

Category: B

Transmissible person-to-person: Negligible

Infectivity: High

Lethality: High

Incubation Period: 5-15 days

Duration of Illness: 1-3 weeks

Vaccination/Toxoids available? Yes

Rate of Action: sudden

Symptoms: Inflammation of the meninges of the brain, headache, fever, dizziness, drowsiness or stupor, tremors or convulsions, muscular incoordination

Treatment: No specific treatment; supportive treatment is essential.

Possible means of delivery: Aerosol

Encoding: A – (-) – WIT – 3D6 days – 4 – 4 days – see above.

Encephalitis (Venezuelan Equine)

Category: B

Transmissible person-to-person: Low

Infectivity: High

Lethality: Low

Incubation Period: 1-5 days

Duration of Illness: days to weeks

Vaccination/Toxoids available? Yes

Rate of Action: sudden

Symptoms: Inflammation of the meninges of the brain, headache, fever, dizziness, drowsiness or stupor, tremors or convulsions, muscular incoordination

Treatment: No specific treatment; supportive treatment is essential.

Possible means of delivery: Aerosol

Encoding: A – (0) – WIT, WILL – 1d5 days – 2 – 1d6 days – see above.



Ebola Fever

Category: A

Transmissible person-to-person: Moderate

Infectivity: High

Lethality: High

Incubation Period: 7-9 days

Duration of Illness: 5-16 days

Vaccination/Toxoids available? No

Rate of Action: sudden

Symptoms: Malaise, Myalgias, headache, vomiting, and diarrhea. May also include a macular dermatologic eruption.

Treatment: No specific treatment; intensive supportive treatment is essential

Possible means of delivery: Aerosol

Encoding: A – (+) – HLH – 1d6 + 3 days – 4 – 3 days – see above.

Marburg Fever

Category: A

Transmissible person-to-person: Moderate

Infectivity: High

Lethality: High

Incubation Period: 3-6 days

Duration of Illness: 1-2 weeks

Vaccination/Toxoids available? No

Rate of Action: sudden

Symptoms: Malaise, Myalgias, headache, vomiting, and diarrhea. May also include a macular dermatologic eruption.

Treatment: No specific treatment; intensive supportive treatment is essential

Possible means of delivery: Aerosol

Encoding: A – (0) – HLH, WIT – 2d3 days – 4 – 4 days – see above.

Hemorrhagic Fever

Category: A

Transmissible person-to-person: Moderate

Infectivity: High

Lethality: very High

Incubation Period: 1-3 days

Duration of Illness: 1-3 days

Vaccination/Toxoids available? No

Rate of Action: sudden

Symptoms: Malaise, Myalgias, headache, vomiting, extremely high fever, and diarrhea. May also include a macular dermatologic eruption.

Treatment: No specific treatment; intensive supportive treatment is essential.

Possible means of delivery: Contaminated food

Encoding: G,I – (-) – HLH, WL – 1d3 days – 5 – 1d10 hours – see above.

Possible mutation to airborne form results in Airborne transmission possibility.

Yellow Fever

Category: A

Transmissible person-to-person: Negligible

Infectivity: High

Lethality: High

Incubation Period: 3-6 days

Duration of Illness: 1-2 weeks

Vaccination/Toxoids available? Yes

Rate of Action: sudden

Symptoms: Malaise, Myalgias, headache, vomiting, and diarrhea. May also include a macular dermatologic eruption.

Treatment: No specific treatment; intensive supportive treatment is essential

Possible means of delivery: Aerosol

Encoding: A – (0) – HLH – 2d3 days – 4– 3 days – see above.

Smallpox (Variola virus)

Category: A

Transmissible person-to-person: High

Infectivity: High

Lethality: High

Incubation Period: 7-17 days

Duration of Illness: 1-2 weeks

Vaccination/Toxoids available? Yes**Rate of Action:** 2-4 days**Symptoms:** malaise, fever, rigors, vomiting, headache, and backache. 2-3 days later lesions appear which quickly progress from macules to papules, and eventually to pustular vesicles. They are more abundant on the extremities and face, and develop synchronously.**Treatment:** No specific treatment. Supportive treatment is essential.**Possible means of delivery:** Aerosol**Encoding:** A – (+) – HLH, WIT – 2d6+5 days – 4 – 3 days – see above.**Botulinum Toxin****Category:** A**Transmissible person-to-person:** No**Infectivity:** N/A**Lethality:** High**Incubation Period:** Variable (hours to days)**Duration of Illness:** 24-72 hours/Months if lethal**Vaccination/Toxoids available?** Yes**Rate of Action:** 12-72 hours**Symptoms:** Initial signs and symptoms include ptosis, generalized weakness, lassitude, and dizziness. Diminished salivation with extreme dryness of the mouth and throat may cause complaints of a sore throat. Urinary retention or ileus may also occur. Motor symptoms usually are present early in the disease; cranial nerves are affected first with blurred vision, diplopia, ptosis, and photophobia. Bulbar nerve dysfunction causes dysarthria, dysphonia, and dysphagia. This is followed by a symmetrical, descending, progressive weakness of the extremities along with weakness of the respiratory muscles. Development of respiratory failure may be abrupt.**Treatment:** (1) Respiratory failure – tracheostomy and ventilatory assistance, fatalities should be less than 5%. Intensive and prolonged nursing care may be required for recovery (which may take several weeks or even months)

(2) Food-borne botulism and aerosol exposure – equine antitoxin is probably helpful, sometimes even after onset of signs of intoxication. Administration of antitoxin is reasonable if disease has not progressed to a stable state. Use requires pretesting for sensitivity to horse serum (and desensitization for those allergic). Disadvantages include rapid clearance by immune elimination, as well as a theoretical risk of serum sickness.

Possible means of delivery: Sabotage of food and water supply, Aerosol**Encoding:** G,A – (-) – HLH – 3d6 x4 hours – 4 – 4d6 hours – see above.**Ricin****Category:** B**Transmissible person-to-person:** No**Infectivity:** N/A**Lethality:** High**Incubation Period:** Hours**Duration of Illness:** 3-5 days**Vaccination/Toxoids available?** Not Effective**Rate of Action:** 6-72 hours**Symptoms:** Rapid onset of nausea, vomiting, abdominal cramps, and severe diarrhea with vascular collapse; death has occurred on the third day or later. Following inhalation, one might expect nonspecific symptoms of weakness, fever, cough,

and hypothermia followed by hypotension and cardiovascular collapse.

Treatment: Management is supportive and should include maintenance of intravascular volume. Standard management for poison ingestion should be employed if intoxication is by the oral route.**Possible means of delivery:** Sabotage of food and water supply, Aerosol**Encoding:** G,A – (-) – HLH – 2d6 hours – 3 – 6d10 hours – see above.**Staphylococcal enterotoxin B****Category:** B**Transmissible person-to-person:** No**Infectivity:** N/A**Lethality:** Low**Incubation Period:** Days to weeks**Duration of Illness:** Days to weeks**Vaccination/Toxoids available?** Not Effective**Rate of Action:** 30 min – 6 hours**Symptoms:** Fever, chills, headache, myalgia, and nonproductive cough. In more severe cases, dyspnea and retrosternal chest pain may also be present. In many patients, nausea, vomiting, and diarrhea will also occur.**Treatment:** Treatment is limited to supportive care. No specific antitoxin for human use is available.**Possible means of delivery:** Sabotage of food and water supply, Aerosol**Encoding:** G,A – (-) – HLH – 3d6 combat turns – 1 – 4d6/2 hours – see above.**Trichothecene (T-2) Mycotoxins****Category:** B**Transmissible person-to-person:** No**Infectivity:** N/A**Lethality:** High**Incubation Period:** hours**Duration of Illness:** hours**Vaccination/Toxoids available?** Not Effective**Rate of Action:** Sudden**Symptoms:** Victims are reported to have suffered painful skin lesions, lightheadedness, dyspnea, and a rapid onset of hemorrhage, incapacitation, and death. Survivors developed a radiation-like sickness including fever, nausea, vomiting, diarrhea, leucopenia, bleeding, and sepsis.**Treatment:** General supportive measures are used to alleviate acute T-2 toxicoses. Prompt (within 5-60 minutes of exposure) soap and water wash significantly reduces the development of the localized destructive, cutaneous effects of the toxin. After oral exposure, management should include standard therapy for poison ingestion.**Possible means of delivery:** Sabotage of food and water supply, Aerosol**Encoding:** G,A – (-) – HLH – 2d6 hours – 1 – 2d6 hours – see above.**SYMPTOM DEFINITIONS****Abdominal distention:** bloating of the abdomen.**Anorexia:** loss of appetite**Arthralgias:** pain in the joints**Arthritis:** inflammation of the joints**Bleeding diathesis:** tendency for bleeding.**Cardiovascular collapse:** collapse of the blood vessels.

Cervical adenopathy: swollen lymph nodes.
Cyanosis: a bluish color of the skin and the mucous membranes due to insufficient oxygen in the blood.
Diaphoresis: excessive sweating
Diplopia: double vision
Dysarthria: slurred speech
Dysphagia: difficulty swallowing.
Dysphonia: difficulty speaking; hoarseness.
Dyspnea: shortness of breath.
Endocarditis: infection of one of the heart valves.
Epididymoorchitis: simultaneous inflammation of epididymis and testis.
Hemoptysis: coughing up blood
Hemorrhage: abnormal bleeding
Hypotension: low blood pressure
Hypothermia: low body temperature
Hypovolemia: an abnormal decrease in blood volume
Ileus: obstruction of the intestine due to it being paralyzed.
Inflammation of the meninges of the brain: swelling of the brain lining.
Lassitude: weakness, weariness, listlessness, exhaustion, lethargy.
Lesions: abnormality involving any tissue or organ
leucopenia: a decreased total number of white blood cells in the circulating blood
Local ulcer: an area of tissue erosion
Macular dermatologic eruption: small skin rash
Macular eruption: small rash
Macules: small circumscribed changes in the color of skin that are neither raised (elevated) nor depressed
Malaise: a vague feeling of discomfort
Myalgia/myalgias: muscle pain
Papules: small solid rounded bumps rising from the skin that are each usually less than 1 centimeter in diameter (less than 3/8 inch across).
Photophobia: painful oversensitivity to light.
Pleuritic chest pain: pain when breathing
Popular/pustular eruptions: pus filled pimples and sores.
Prostration: extreme exhaustion or lack of energy or power.
Ptosis: downward displacement. Ptosis of the eyelids is drooping of the eyelids.
Pustular vesicles: small pus-filled blisters
Regional lymphadenopathy: abnormally enlarged lymph nodes
Relative bradycardia: a slow heart rate, usually defined as less than 60 beats per minute.
Retrobulbar headache: headache behind the eyes.
Retrosternal chest pain: pain in the middle of the chest.
Rigors: rigidity in living tissues or organs that prevents response to stimuli
Sacroiliitis: inflammation of the sacroiliac joint
Sepsis: presence in the blood or other tissues of pathogenic microorganisms or their toxins.
Shock: failure of the circulatory system to maintain adequate blood flow to vital organs
Splenomegaly: enlargement of the spleen.
Stridor: a harsh, high-pitched breath sound.
Stupor: a lowered level of consciousness.
Substernal discomfort: discomfort below the sternum.
Toxemia: the condition resulting from the spread of bacterial products (toxins) by the bloodstream
Tremors: involuntary trembling or quivering
Ulceroglandular tularemia: swelling of the lymph nodes in the armpit or groin
Urinary retention: lack of ability to urinate.

Vascular collapse: collapse of the blood vessels.
Vertebral osteomyelitis: inflammation of the bones in the spine.

List of Select Chemical Agents

I have included a list of chemical agents that are a risk, selected by availability and effects. Each agent is described as follows:

Name of agent
Symbol: (US Military Designation)
Class: (What kind of agent?)
State @ 20° C: (What does it look like at room temperature?)
Odor: (what does it smell like?)
Decomposition Temperature: (How hot to heat it to kill it?)
Eye & skin toxicity: (can it be absorbed thru the skin?)
Rate of Action: (how long after exposed before you start feeling symptoms?)
Symptoms: (list of symptoms)
Detoxification Rate: (If removed from the source, will you get better?)
Encoding: A – (+) – HLH – 1d6 days – 3 – 2 days – see above.

Tabun
Symbol: GA
Class: Nerve
State @ 20° C: Colorless to brown liquid
Odor: Faintly Fruity; none when pure
Decomposition Temperature: 150° C
Eye & skin toxicity: Very High
Rate of Action: Very Rapid
Symptoms: Cessation of breath – death may follow
Detoxification Rate: Slight, but definite.
Encoding: A – (+) – HLH – 1d6 days – 3 – 2 days – see above.

Sarin
Symbol: GB
Class: Nerve
State @ 20° C: Colorless liquid
Odor: Almost none when pure
Decomposition Temperature: 150° C
Eye & skin toxicity: Very High
Rate of Action: Very Rapid
Symptoms: Cessation of breath – death may follow
Detoxification Rate: cumulative.
Encoding: A,D – (+) – HLH – 1-4 Combat Turns – 4 – 10 minutes

Soman
Symbol: GD
Class: Nerve
State @ 20° C: Colorless liquid
Odor: Fruity; camphor when pure
Decomposition Temperature: 130° C
Eye & skin toxicity: Very High
Rate of Action: Very Rapid
Symptoms: Cessation of breath – death may follow
Detoxification Rate: low, essentially cumulative.
Encoding: A,D – (+) – HLH – 1d6 Combat Turns – 4 – 10 minutes

Cyclo-Sarin**Symbol:** GF**Class:** Nerve**State @ 20° C:** liquid**Odor:** Sweet, musty, peaches, shellac**Decomposition Temperature:** --**Eye & skin toxicity:** Very High**Rate of Action:** Very Rapid**Symptoms:** Cessation of breath – death may follow**Detoxification Rate:** low.**Encoding:** A,D – (+) – HLH – 1d5 Combat Turns – 4 – 10 minutes**VX****Symbol:** VX**Class:** Nerve**State @ 20° C:** Colorless to amber liquid**Odor:** none**Decomposition Temperature:** half-life of 36 hours at 150° C**Eye & skin toxicity:** Very High**Rate of Action:** Very Rapid**Symptoms:** produces casualties when inhaled or absorbed.**Detoxification Rate:** low, essentially cumulative.**Encoding:** A,D – (+) – HLH – 1-4 Combat Turns – 4 – 10 minutes**Vsubx****Symbol:** V_x**Class:** Nerve**State @ 20° C:** Colorless liquid**Odor:** none**Decomposition Temperature:** --**Eye & skin toxicity:** Very High**Rate of Action:** Rapid**Symptoms:** produces casualties when inhaled or absorbed.**Detoxification Rate:** low, essentially cumulative.**Encoding:** A,D – (+) – HLH – 1d10 Combat Turns – 4 – 10 minutes**Distilled Mustard****Symbol:** HD**Class:** Blister**State @ 20° C:** Colorless to pale yellow liquid**Odor:** Garlic or horseradish**Decomposition Temperature:** 149-177**Eye & skin toxicity:** Eyes very susceptible, skin less so.**Rate of Action:** Delayed – hours to days**Symptoms:** Blisters; destroys tissues; injures blood cells**Detoxification Rate:** very low, essentially cumulative.**Encoding:** A,D – (-) – HLH – 2d20-1 hours – 2 – 1 Hour**Nitrogen Mustard****Symbol:** HN-1**Class:** Blister**State @ 20° C:** dark liquid**Odor:** Fishy or musty**Decomposition Temperature:** <194**Eye & skin toxicity:** Eyes very susceptible, skin less so.**Rate of Action:** Delayed – 12 hours or longer**Symptoms:** Blisters; affects respiratory tract; destroys tissues; injures blood cells**Detoxification Rate:** not detoxified, essentially cumulative.**Encoding:** A,D – (-) – HLH – 2d20-1 hours – 2 – 1 Hour – Lethal Poison**Nitrogen Mustard****Symbol:** HN-2**Class:** Blister**State @ 20° C:** dark liquid**Odor:** soapy (low concentrations); Fruity (higher concentrations)**Decomposition Temperature:** <75**Eye & skin toxicity:** Toxic to eyes; blisters skin**Rate of Action:** Delayed – 12 hours or longer**Symptoms:** Blisters; affects respiratory tract; destroys tissues; injures blood cells; bronchopneumonia possible after 24 hours.**Detoxification Rate:** not detoxified, cumulative.**Encoding:** A,D – (-) – HLH – 2d20-1 hours – 2 – 1 Hour – Lethal Poison**Nitrogen Mustard****Symbol:** HN-3**Class:** Blister**State @ 20° C:** dark liquid**Odor:** none, if pure**Decomposition Temperature:** <256**Eye & skin toxicity:** Eyes very susceptible, skin less so.**Rate of Action:** Delayed – 12 hours or longer**Symptoms:** Blisters; affects respiratory tract; destroys tissues; injures blood cells; bronchopneumonia possible after 24 hours.**Detoxification Rate:** not detoxified, cumulative.**Encoding:** A,D – (-) – HLH – 2d20 hours – 2 – 1 Hour – Lethal Poison**Phosgene Oxi****Symbol:** CX**Class:** Blister**State @ 20° C:** colorless solid or liquid**Odor:** sharp, penetrating**Decomposition Temperature:** decomposes slowly at normal temperature**Eye & skin toxicity:** powerful irritant to eyes and nose; liquid corrosive to skin.**Rate of Action:** Immediate effects on contact.**Symptoms:** Violently irritates mucous membranes, eyes, and nose; forms wheals rapidly.**Detoxification Rate:** --**Encoding:** A,D – (-) – HLH – 1 Combat Turn – 3 – 1 Combat Turn/1 Hour –**Lewisite****Symbol:** L**Class:** Blister**State @ 20° C:** colorless to brownish**Odor:** Varies; may resemble geraniums.**Decomposition Temperature:** >100**Eye & skin toxicity:** Severe eye damage, skin less so.**Rate of Action:** rapid**Symptoms:** Blisters; affects respiratory tract; destroys tissues; injures blood cells; bronchopneumonia possible after 24 hours; systemic poisoning.**Detoxification Rate:** not detoxified.**Encoding:** A,D – (-) – HLH – 1d3 Combat Turns – 2 – 1 Combat Turn– Lethal Poison

Mustard-Lewisite

Symbol: HL

Class: Blister

State @ 20° C: dark, oily liquid

Odor: Garlic

Decomposition Temperature: >100

Eye & skin toxicity: Very High

Rate of Action: prompt stinging – blister agent about 13 hours

Symptoms: Blisters; affects respiratory tract; destroys tissues; injures blood cells; bronchopneumonia possible after 24 hours; systemic poisoning.

Detoxification Rate: not detoxified

Encoding: A,D – (-) – HLH – 1 Combat Turn/3d6 hours – 4 – 1 Combat Turn – Lethal Poison

Phenyldichlorarsine

Symbol: PD

Class: Blister

State @ 20° C: colorless liquid

Odor: none

Decomposition Temperature: stable to boiling point

Eye & skin toxicity: low doses cause blindness, skin less so.

Rate of Action: Immediate eye effects; skin effects in 30-60 minutes.

Symptoms: Blisters; irritates; causes nausea and vomiting

Detoxification Rate: Probably rapid

Encoding: A,D – (-) – HLH – 1 Combat Turn – 2 – 1 Combat Turn – blindness

Ethylidichlorarsine

Symbol: ED

Class: Blister

State @ 20° C: colorless liquid

Odor: fruity, but biting; irritating

Decomposition Temperature: stable to boiling point

Eye & skin toxicity: vapor harmful on long exposure. Liquid blisters

Rate of Action: Immediate irritation; delayed blistering

Symptoms: Blisters; damages respiratory tract; affects eyes; can cause systemic poisoning.

Detoxification Rate: Rapid

Encoding: A,D – (-) – HLH – 1 Combat Turn – 4 – 1 Combat Turn – Lethal Poison

Methylidichlorarsine

Symbol: MD

Class: Blister

State @ 20° C: colorless liquid

Odor: none

Decomposition Temperature: stable to boiling point

Eye & skin toxicity: eye damage possible; blisters less than HD

Rate of Action: Immediate irritation; delayed blistering

Symptoms: Blisters; damages respiratory tract; injures lungs and eyes; can cause systemic poisoning.

Detoxification Rate: Rapid

Encoding: A,D – (-) – HLH – 1 Combat Turn – 2 – 1 Combat Turn – Lethal Poison, blindness

Hydrogen Cyanide

Symbol: AC

Class: Blood

State @ 20° C: colorless gas or liquid

Odor: bitter almonds

Decomposition Temperature: >65.5

Eye & skin toxicity: Moderate

Rate of Action: very rapid

Symptoms: Interferes with body tissue's oxygen use; accelerates rate of breathing.

Detoxification Rate: Rapid

Encoding: A,D – (-) – HLH – 1d3 Combat Phases – 3 – 1 Combat Turn – Lethal Poison

Cyanogen Chloride

Symbol: CK

Class: Blood

State @ 20° C: colorless gas or liquid

Odor: Pungent; Biting; can go unnoticed.

Decomposition Temperature: 100

Eye & skin toxicity: Low; lacrimatory and irritating.

Rate of Action: very rapid

Symptoms: Chokes; irritates; causes slow breathing rate.

Detoxification Rate: Rapid

Encoding: A,D – (-) – HLH – 1 Combat Turn – 1 – 1 Combat Turn

Arsine

Symbol: SA

Class: Blood

State @ 20° C: colorless gas

Odor: mild garlic

Decomposition Temperature: 280

Eye & skin toxicity: none

Rate of Action: delayed 2 hours to 11 days

Symptoms: Damages blood, liver, and kidneys

Detoxification Rate: Low

Encoding: A,D – (-) – HLH – 2d100 hours – 3 – 2d6 Hours

Phosgene

Symbol: CG

Class: Choking

State @ 20° C: colorless gas

Odor: new mown hay; green corn

Decomposition Temperature: 800

Eye & skin toxicity: none

Rate of Action: immediate to 3 hours.

Symptoms: Damages and floods lungs.

Detoxification Rate: not detoxified – cumulative.

Encoding: A,D – (-) – HLH – 1d100 Combat Turns – 4 – 1d20 Hours – Lethal Poison

Diphosgene

Symbol: DP

Class: Choking

State @ 20° C: colorless gas

Odor: new mown hay; green corn

Decomposition Temperature: 300 to 350

Eye & skin toxicity: slightly lacrimatory

Rate of Action: immediate to 3 hours.

Symptoms: Damages and floods lungs.

Detoxification Rate: not detoxified – cumulative.

Encoding: A,D – (-) – HLH – 1d100 Combat Turns – 3 – 1
Combat Turn – Lethal Poison

Diphenylchloroarsine

Symbol: DA

Class: Vomiting

State @ 20° C: white to brown solid

Odor: none

Decomposition Temperature: 300

Eye & skin toxicity: irritating, not toxic

Rate of Action: very rapid

Symptoms: Like cold symptoms, plus headache, vomiting, nausea.

Detoxification Rate: Moderate

Encoding: A,D – (-) – HLH – 1 Combat Turn – 1 – 1 Combat Turn

Adamsite

Symbol: DM

Class: Vomiting

State @ 20° C: yellow to green solid

Odor: none

Decomposition Temperature: greater than boiling point

Eye & skin toxicity: irritating, relatively not toxic

Rate of Action: very rapid

Symptoms: Like cold symptoms, plus headache, vomiting, nausea.

Detoxification Rate: Rapid in small amounts

Encoding: A,D – (-) – HLH – 1 Combat Turn – 2 – 1 Combat Turn

Diphenylcyanoarsine

Symbol: DC

Class: Vomiting

State @ 20° C: white to pink solid

Odor: bitter almond-garlic mixture

Decomposition Temperature: 300 (25% decomposed)

Eye & skin toxicity: irritating, not toxic

Rate of Action: Extremely rapid

Symptoms: Like cold symptoms, plus headache, vomiting, nausea.

Detoxification Rate: Rapid

Encoding: A,D – (-) – HLH – 1d10 Combat Phases – 3 – 1
Combat Turn

BZ

Symbol: BZ

Class: Incapacitating

State @ 20° C: white crystal

Odor: none

Decomposition Temperature: begins at 170

Eye & skin toxicity: N/A

Rate of Action: Delayed – 1 to 6 hours, depending on exposure

Symptoms: Fast heart beat, vomiting, dry mouth, blurred vision, stupor, increasing random activity, hallucinations.

Detoxification Rate: --

Encoding: A,D – (-) – HLH – 1d6 hours – 3 – 1d6 minutes

Chloroacelophenone

Symbol: CN

Class: Tear

State @ 20° C: solid

Odor: apple blossoms

Decomposition Temperature: stable to boiling point

Eye & skin toxicity: temporary severe eye irritation; mild skin irritation

Rate of Action: instantaneous

Symptoms: causes tearing; irritates eyes and respiratory tract.

Detoxification Rate: Rapid

Encoding: A,D – (-) – HLH – 0 – 2 – 1d6 Combat Phases

Chloroacelophenone in Chloroform

Symbol: CNC

Class: Tear

State @ 20° C: liquid

Odor: chloroform

Decomposition Temperature: stable to boiling point

Eye & skin toxicity: temporary severe eye irritation; mild skin irritation

Rate of Action: instantaneous

Symptoms: causes tearing; irritates eyes and respiratory tract.

Detoxification Rate: Rapid

Encoding: A,D – (-) – HLH – 0 – 3 – 1d6 Combat Phases

Chloroacelophenone and Chloropicrin in Chloroform

Symbol: CNS

Class: Tear

State @ 20° C: liquid

Odor: flypaper

Decomposition Temperature: stable to boiling point

Eye & skin toxicity: temporary severe eye irritation; mild skin irritation, not toxic

Rate of Action: instantaneous

Symptoms: causes tearing; irritates eyes and respiratory tract. Vomiting and choking.

Detoxification Rate: Slow

Encoding: A,D – (-) – HLH – 0 – 2 – 1d3 Combat Phases

Chloroacelophenone in Benzene and Carbon Tetrachloride

Symbol: CNB

Class: Tear

State @ 20° C: liquid

Odor: benzene

Decomposition Temperature: >247

Eye & skin toxicity: temporary severe eye irritation; mild skin irritation

Rate of Action: instantaneous

Symptoms: powerful tearing.

Detoxification Rate: Rapid

Encoding: A,D – (-) – HLH – 0 – 2 – 1d6 Combat Phases

Bromobenzylcyanide

Symbol: CA

Class: Tear

State @ 20° C: yellow solid or liquid
Odor: soured fruit
Decomposition Temperature: 60 to 242
Eye & skin toxicity: irritating, not toxic.
Rate of Action: instantaneous
Symptoms: causes tearing; irritates eyes and respiratory tract.
Detoxification Rate: Rapid in low dosage
Encoding: A,D - (-) - HLH - 0 - 1 - 1d6 minutes

O-chlorobenzylmalonitrile
Symbol: CS
Class: Tear
State @ 20° C: colorless solid
Odor: pepper
Decomposition Temperature: --
Eye & skin toxicity: highly irritating; not toxic
Rate of Action: instantaneous
Symptoms: causes tearing; irritates eyes and respiratory tract.
Detoxification Rate: Rapid
Encoding: A,D - (-) - HLH - 0 - 1 - 1d6 minutes

CR
Symbol: CR
Class: Tear
State @ 20° C: yellow powder in solution
Odor: burning sensation
Decomposition Temperature: N/A
Eye & skin toxicity: highly irritating; not toxic

Rate of Action: instantaneous
Symptoms: causes tearing; irritates eyes, skin, nose, throat, and respiratory tract.
Detoxification Rate: Moderate
Encoding: A,D - (-) - HLH - 0 - 4 - 1d6 minutes

Chloropicrin
Symbol: PS
Class: Tear
State @ 20° C: liquid
Odor: stinging; pungent
Decomposition Temperature: >400
Eye & skin toxicity: highly irritating; not toxic
Rate of Action: instantaneous
Symptoms: acts as tear, vomiting, and choking agent.
Detoxification Rate: Slow
Encoding: A,D - (-) - HLH - 0 - 1 - 1d6 minutes



Appendix 5: For More Information

<http://www.dhs.gov/dhspublic/>

<http://www.ready.gov/>

<http://www.redcross.org/>

<http://www.foodsafety.gov/>

<http://www.survivalring.org/>

www.fema.gov

www.noaa.gov

www.foodsafety.gov

<http://www.azdhs.gov/phs/oeh/fses/sfstt.htm>

US Army Field Manuals

FM 20-3 Camouflage

FM 21-10 Field Hygiene And Sanitation

FM 21-11 First Aid For Soldiers

FM 21-26 Map Reading

FM 22_51 Leaders Manual for Combat Stress

FM 21-60 Visual Signals

FM 21-76 Survival

FM 23-10 Sniper Training

FM 3-05.201 Special Forces Operational Doctrine

FM 3-06.11 Combat In Built Up Areas

FM 3-07.11 Counter Guerrilla Operations

FM 3-11 Flame, Riot Control And Herb Ops

FM 3-11.19 NBC Recon

FM 3-11-4 NBC Protection

FM 31-20.5 Special Forces Recon Tactics

FM 3-14 NBC Vulnerability Analysis

FM 3_21 Chemical Accident Containment Control

FM 3-23.10 Sniper Training

FM 3-24.3 Camouflage Concealment And Decoys

FM 3-25.20 Physical Readiness Training

FM 3-25.26 Map Reading And Land Navigation

FM 3_3 Chemical And Biological Contamination Avoidance

FM 3-3-1 Nuclear Contamination Avoidance

FM 3_4 NBC Protection

FM 3_4_1 Fixed Site Protection

FM 3-5 NBC Decontamination

FM 3-6 Field Behavior Of NBC Agents

FM 3-7 NBC Field Handbook

FM 3-9 Potential Military Chemical/Biological Agents And Compounds

FM 3-97.14 Northern Operations 1

FM 3-97.3 Desert Operations

FM 3-97.5 Jungle Operations

FM 4-02-283 Treatment Of Nuclear And Radiological Casualties

FM 4-30.11 First Aid For Soldiers

FM 5 -31 Boobytraps

FM 5-103 Survivability

FM 8-284 Treatment Of Biological Warfare Casualties

FM 8-285 Treatment Of Chemical Agent Casualties And Conventional Military Chemical Injuries

FM 90-10 Military Operations in Urban terrain (MOUT)

FM 8_285 Treatment Of Chemical Casualties

FM 8_36 The Aidmans Medical Guide

FM 8_9 Nato NBC Handbook

FMFM 6-7 Scouting & Patrolling

FMFM 7-32 Raid Operations

FMFM 8-2 Counterinsurgency

FMFM 8-4 Riverine Operations

FMFRP 0-13 Marine Combat Water Survival

FMFRP 7-23 Leaders Guide To Cold Weather Operations

SH 21-76 Ranger Handbook 2000

ST 31_91b Us Army Special Forces Medical Handbook

TM 31-200-1 Unconventional Warfare Devices & Techniques – References

TM 31-201-1 Incendiary Devices & Techniques

TM 31-210 Improvised Munitions Handbook

Desert Survival Handbook by Charles A. Lehman, Primer Publishers, 1990

Desert Survival, Maricopa County Department of Emergency Management, (602) 273-1411



Appendix 6: Aftermath! Game Rules

This section provides the game rules and mechanics for roleplaying the collapse using the Aftermath! Role Playing Game. Aftermath is required for play, and can be obtained from Fantasy Games Unlimited at www.fantasygamesunlimited.net. Many of the items in this section are fictionalized.

Many movies have documented the possible scenarios for a collapse of civilization, resulting in an Aftermath! Campaign setting. This book gives the player and the Gamemaster the ability to role play the events of the collapse. In the movies, the characters are unaware of the impending collapse, generally don't do the right thing, and yet seem to barely make it through and survive. Now is the opportunity to see if your players can do better.

With most games, knowing what is coming, or the theme of the game is part of making a character. Using these rules, the Gamemaster should hide as much of this as possible. The confusion, incorrect information, and lack of information are all part of the scenario.

This supplement provides the Gamemaster with timelines, special rules, a few sample characters and scenarios, and some media feeds to help tell the story of the collapse. Much of the early pre-collapse information will be given to the players through media feeds. After the collapse – it's "have you heard anything about -----"

Remember – it is OK to lie to the players within the story.

I hope you will enjoy this supplement, and its companion volume Aftermath! Black Ops.

Character Generation

Modifications to the AFTERMATH! rules

This book, as an expansion for the AFTERMATH! game system requires that a few modifications be made in the AFTERMATH! rules.

Combat System

AFTERMATH! utilizes a slightly different combat system than many gamers are familiar with. Below is an explanation of "house rules" that make the AFTERMATH! combat system easier to referee.

Prelude to Combat: A phase breakdown should be prepared for each character, prior to play, and noted on their character sheet. A phase breakdown details the phases in which a character can act within a combat turn. Example: Slash The Orc has a BAP of 15 and a MNA of 5, giving him a PCA of 3. This means that Slash can act in phases 15, 12, 9, 6, and 3.

When to Act: The Gamemaster, at the start of each combat round, begins an action phase countdown, starting at the highest character's Base Action Phase (BAP). The GM calls out the number of the phase and any characters that act in that phase resolve all actions within that phase. A character acts on each phase in his phase breakdown. Example: The GM calls out, "phase twelve." The player controlling Slash says, "I acts in phase twelve. I wants to smash da puny widdel dwarf wif my axe!" (Hey, he's an Orc. What did you expect. Shakespeare?!)

How to Act: This is a role-playing game. This means role-play everything. Including combat. Make physical actions act faster than verbal actions. If a player dives under the table, then rolls over and tells the GM that his character dives for cover, that player is role-playing appropriately, and the GM should reward such actions. -Example: When a player controlling a healer in a tournament wanted to save his comrades from a grenade, he dove out of his chair and did a belly flop on a concrete floor, rolled over, and groaned, "I throw myself on the grenade to save my friends." (he got a standing ovation, by the way.)

Universal Character Generation

This system will allow generation of characters in any milieu. The first step is to determine the character's age group by rolling a d20 on this table. The following chart also gives the base skill points for a given age group.

AGE		Base Age	Development Points
d20	GROUP		
1- 5	0	13	13 + 2d10 skill points
6- 10	1	22	22 + 2d10
11- 14	2	31	31 + 2d10
15- 17	3	40	40 + 2d10
18- 19	4	49	49 + 2d10
20	5	58	58 + 2d10

The Attribute Group Chart is modified at the top end to appear as this:

ATTRIBUTE GROUP CHART

Attribute Rating	45- 54	55- 64	65- 74	75- 84	85-94	95- 104
Group Number	6	7	8	9	10	11
Effect Die	2D10+1	2D10+1D6	2D10+2D6	2D10+3D6	2D10+4D6	2D10+5D6

The occurrence of "Changed" or mutated characters will vary from campaign to campaign, and it is up to the Gamemaster to decide the probabilities of this occurring to a character. Note that it is not only a post-holocaust world that will contain characters that are "Changed". Usually mutations occur one time in 1000. (Roll 3d10, and a 30 results in mutation) The Gamemaster should not feel forced into allowing changed characters into the game, but should use it only if it fits his image of his world. The Gamemaster must remember that mutations must improve the individual's chance of survival, or they will "die out." This must be remembered for "20 years after" or later campaigns.

TECHNOLOGICAL LEVEL CHART		
TECH LEVEL	TIME PERIOD	REFERENCE
0	Early Stone Ages	
1	Late Stone Ages	
2	Early Bronze Age	Ancient Egypt
3	Late Bronze Age	Classical Greece
4	Iron Age	Roman Empire
5	Early Dark Ages	Fall of the Roman Empire
6	Dark Ages	Norman Invasion of Briton
7	Middle Ages	Crusades
8	Late Middle Ages	Pre Gunpowder
9	Late Middle Ages	Advent of Gunpowder
10	Early Renaissance	
11	Renaissance	
12	Colonization	Revolutionary War
13	Early Industrial Revolution	American Civil War
14	Industrial Revolution	Zulu War
15	World War I	
16	World War II	
17	Korean War	
18	Vietnam War	
19	Computer Era	
20	Fall of the Communist Bloc	
21	Moonbase Established	
22	Solar System Exploration	
23	First Warp Drives	
24	First Galactic Empire	Blasters
25	First Galactic Dark Age	
26	Second Terran Empire	
27	Fall of Terra	
28	SpaceFleet Confederation Established	
29	Age of Peace in Space	
30	?????	

The Gamemaster may place restrictions on the available skills and races in the campaign. For Example, a spy campaign on earth during the 1980's would be Tech Level 19, no magic, no non-human races.

INITIAL SKILLS FOR CHARACTERS

The character receives a number of initial education skill points equal to his age group plus the technological level of the campaign, plus the value number of a reaction roll. (Aftermath! Book One, P.56) The character also receives a number of initial development points equal to his base age skill point number

plus 2d10. Guideline technological levels are given in the chart above. The technological level is defined as the average education level of a 20 year old person in skill points

INITIAL EQUIPMENT

Initial Equipment for characters will vary from campaign to campaign. The Gamemaster must decide what equipment is reasonable for the characters. Simple, eh? Generally, however, it is usually feasible to have a player roll a D10 for each of his skills, to determine the Utility number of the equipment that the character has for the skill. It is still up to the Gamemaster to decide what, if any, items that the character has, but this system can be used as a guideline.

Specifics for Playing "Collapse" Scenarios

Since part of the fun of playing a collapse scenario is the surprise to the player and character, it is suggested that the following rules be applied when putting together a collapse scenario:

1. Players should generate their characters without knowing what the actual collapse will be.
2. The players should give the GM a description of their character – who they are, what their job is, what their hobbies are, etc. The GM should use this to apply "social pressure" to the character during the collapse. Example – if the character is active (or retired) military – they could be recalled to active duty. (and put in a bad situation....)
3. A sum of money could be given to players to "go shopping" – they can buy anything they want with this. The other option is to use the utility value method described above.
4. The players should produce a list of where and how everything is stored. They may not be able to get to it during the collapse.
5. Play should start pre-collapse. Gamemasters should remember that this is the "real world" – people walking around with obvious weaponry will be harassed/arrested. The GM should keep pushing this through the beginning of the collapse. In 2005 New Orleans, immediately after Katrina, the police confiscated all firearms (legal or not) from the citizens during the days following the disaster. Possession of illegal firearms (illegal FA conversions, etc.) should result in confiscation and jail.
6. The GM should use the media (described below) to help sow confusion and misinformation to the players. Keep the suspense going. As the collapse becomes complete, information (or the lack thereof) may be critical to play.

Because most of these collapse scenarios assume modern events, the Tech Level should be assumed to be 20.

For the sample scenarios provided, the following character generation process should be used:

- a. Each player should roll 1d10 for their character. On a 1, they have prior military experience, and should buy skills accordingly. For details about Military characters, or for playing military based collapse scenarios, please see Aftermath! Black Ops.

The character receives a number of initial education skill points equal to his age group plus the technological level of the campaign (20), plus the value number of a reaction roll. (Aftermath! Book One, P.56) The character also receives a number of initial development points equal to his base age skill

point number plus 2d10. Guideline technological levels are given in the chart above. The technological level is defined as the average education level of a 20 year old person in skill points.



General Special Rules

Called Shots

(Optional Rule) in many scenarios, it is common for someone to need to hit a specific location. (Shoot 'em in the head) – to facilitate that in game play, an optional “called shot” rule is introduced. This is best used with the Superskill rule.

A person using a combat attack may attempt a “called shot” instead of using Aim to hit a specific location.

A player may designate a certain location of the body, and take a shot at a minus to hit. If they miss their modified BCS roll by 1, then the hit is resolved as a normal shot (roll hit location), otherwise, it is a miss. The modifiers are as follows:

Head Shot : -4 to BCS

Hand Shot : (or other single location) -6 to BCS

Example: Ted with an adjusted pistol BCS of 12 attempts a head shot on the zombie (-4) if he rolls 1-8, he hits the head. If he rolls a 9, then he hit the zombie in a random location, otherwise, it's a miss.

Superskilled characters

(Optional Rule) To represent some of the trained actions of elite soldiers, and some of the amazing feats represented in the modern action films and shows, or in IPSC Pistol competition, superskilled characters should be allowed. This is represented by format 3 skills. The GM can decide which skills will be allowed to be Superskilled, or Format 4. This should be told to players before the game begins.

A Format 4 skill acts as a Format 3 skill, in that the skill score goes to 200, however all 200 points are used to calculate the

BCS. This will result in BCS scores greater than 20. This unmodified BCS score is then used to apply modifiers to. A roll of 20 is still a Critical Miss.

If using this rule, then all situational and accuracy modifiers must be applied by the Gamemaster.

Example – a character has a firearms skill score of 150. This results in a Format 4 BCS of 30. They could easily hit a running target (-6) newly acquired (-2) in dim light (-3) at short range (+1) with a .357 magnum (recoil 2, adjusted by 2 for skill) for a final BCS of 20.

“Trick Shots”

A Character may choose to be an expert of a single “trick shot” – this is allowed by giving them a plus to their BCS for the trick shot, and a double minus to their BCS when not in the trick shot situation. The bonus is based on the situational modifier that is being ignored. This is allowed during character generation by having them specialize in their firearms skill in the trick shot. Any combination of situational modifiers may be chosen for the trick shot, but any situation that does not exactly match suffers in double the minus.

For example, a character who can “always make a head shot” (basically a +4) will have a -8 to their normal firearms BCS.

A note on durability of firearms

While modern firearms are generally more reliable than those simulated in a 20 Years After scenario, critical misses are still an issue. Many players have made claims to me at conventions and in gaming sessions that “XXX gun doesn't fail like that.”

However, if you search any of the firearm forums on the internet, there are hordes of posts about modern, high quality military grade guns (that most people would not disagree need a DUR 5 rating) experiencing failures – there are even names for them: FTF (Failure To Feed), FTE (Failure to Eject), OOB – Out of Battery ignition, AD (Accidental Discharge), Squib (underpowered round that leaves a bullet in the barrel), etc. – and these all before we discuss jams and misfires. So how often do they really occur? Well, often enough that there are police and military combat training programs that teach how to clear these under stress (where possible) and/or switch to a backup weapon.

Also, Cook offs are pretty rare, and there is no mechanism for representing firearm failure – broken firing pin, etc., so we'll fix that.

Looking at the Critical Miss chart, we can apply these situations (and modify) as follows:

Modified Firearms Critical Miss chart

D100	Result
1-10	AD (safely downrange) 1 round or burst expended
11-40	Dud Round (dud, FTF)
41-70	Jammed (jam, FTE)
71-85	Firearm Failure (Broken part, Case head separation, etc. Must be repaired by a gunsmith as a task with a value of 3d10 and a period of 1 hour)
86-95	Chamber Explosion (OOB) roll 1d10 against the dur of the gun – if roll is higher than DUR, gun is destroyed.
96-100	Chamber Explosion (Squib, then another round fired) roll 1d10 against the DUR of the gun – if roll is higher than DUR, gun is destroyed.

A note on Gas Masks and such

Gas masks use filters that lose their efficiency over time – most filters are rated for 4-8 hours, but may work in a low saturation environment for longer.

In a high saturation environment (during the actual nuclear fallout, for example,) the particles can block and clog the filters. This will prevent their proper function, and reduce the amount of time the mask can be worn without changing them. A filter therefore starts with a DUR of 5, and each hour that it blocks contamination, the GM should secretly roll 1d6. If the result is higher than the DUR, then the DUR is reduced by 1. When the DUR is reduced to 0, the gas mask no longer provides protection.

Gas masks also require a good mask-to-face seal – this means no facial hair. Also, if a lethal wound is sustained to location 2 (the face), that penetrates the mask and causes lethal damage, the gas mask loses its protective value.

Survival Guide

Shelter Options

Find Safe Ground

If a disaster is regionally localized, and there is no danger of being exposed while traveling, and a safe place is known, then relocating to safe ground is the best option. This includes evacuation from risky areas during a hurricane, or can find safer shelter if there is warning of the disaster in advance.

Shelter In Place

Generally, Shelter In Place means to stop where you are, secure the local environment, and wait the situation out. Different areas are better to SIP, depending on the nature of the crisis. For a chemical attack, upper floors are better, while the basement or an underground shelter is better for protecting against Nuclear fallout.

Bug Out Bag

A Bug out Bag – or BOB, is a pre-prepared container with everything you need for basic survival in the collapse. This should include a generalized set of items that can cover multiple scenarios. There are a few common tips:

- Every kit should consist of a Container (to store and transport it all in); Instructions, procedures and manuals on the gear; Methods for generating light and fire; Multi-function tools, at a minimum a knife; Food and Water; Shelter and Comfort; and Medical. Optional items will be in the Hygiene, Defense, and Gathering categories. Avoid single use items – pick items that have more than one use.
- Always include food and first aid.
- Firearms are heavy, and should be included as an add-on.
- Items should be set up to take you through the first 72 hours.
- There should be provisions for replenishing consumables.

An example basic single person 72 hour kit should include:

Container:

1 Backpack

Instructions:

1 Survival Guide

1 First Aid Manual

Photocopies of passports, Drivers license, property deeds, car titles, and any required paperwork.

Light and Fire:

1 Box Waterproof Matches

1 12-Hour Cyalume® Stick

1 50 Hour Candle

Tools:

1 13-Function Pocket Knife

Food and water:

1 3600 Calorie 3-day Food Bar (Super K ration)

6 MRE Snacks

3 Spoons

12 Water pouches – 125ml each

1 Canteen

1 Collapsible Cup

Can Opener

Shelter and comfort:

1 Tube Tent

1 Space Blanket

2 Heat Packs

Medical

1 First Aid Kit

Additions to this kit could include

Defense - Fishing supplies

Gathering - Firearms and ammo

Hygiene – Toiletries

Shelter and Comfort - Clothing

Upgrades to other items in all categories – more food, better tools, etc.

Using this formula, it is easy for a player to build and design their BOB. A BOB checklist is provided in the back of the book.

Starvation and dehydration

The 2 most dangerous issues in any survival situation are lack of food and water. If adequate food and water are not consumed, then the character will die. These rules will help document the intake of food and water as it relates to the character.

For every day, at normal temperature and activity, 1 man-day of food and 2 liters of water is required.

In extreme cold weather, the food requirement is doubled.

In extreme hot weather the water requirement is doubled (or more – see chart)

In arid environments, the water requirement is doubled.

The water requirements increase with heat and activity. (see chart)

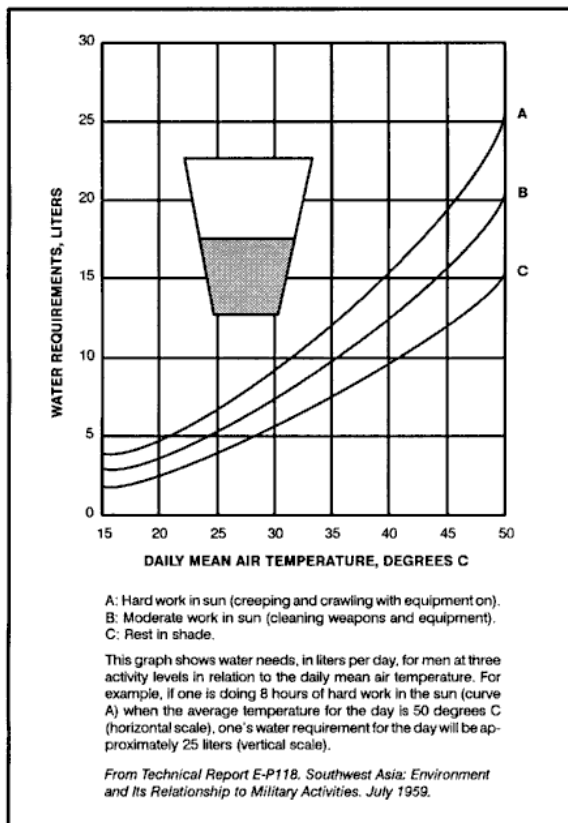


Figure 13-2. Daily water requirements for three levels of activity.

For every period that the character does not eat or drink the proper amount, the following effects will occur:

Half Rations

For every 3 days at half rations of food, Starvation should be checked at the current stage.

For every day of half rations of water, Thirst should be checked at the current stage.

No rations

For every 3 days without food, the body progresses in starvation one stage.

For every day without water, the body progresses in thirst by 1 stages.

Recovery

For every day at normal rations, the body will recover 1 stage, if the recovery saving throw is made. (see chart below) At later stages of starvation, medical assistance is required to avoid overfeeding and such. A successful nutritionist BCS roll will allow the save to be taken at +1 (critical nutritionist BCS +5).

Stages of Starvation

Stage 1 Slowdown of body systems – SPD, HLH reduced by 1D6 per period each, HLH AST or double rations to recover. When HLH reaches HLH AST, Stage 3 is reached.

Stage 2 Slowdown of body systems – STR reduced by 1d3 per period, SPD, HLH reduced by 1D6 each per period, HLH AST to recover. When HLH reaches HLH AST, Stage 3 is reached.

Stage 3 Convert remaining fat in body to energy. STR, SPD reduced by 1d6 per period each HLH reduced by 2d6 per period. HLH AST to recover. When HLH is reduced to HLH CST, Stage 5 is reached.

Stage 4 Convert remaining fat in body to energy. STR, SPD reduced by 1d6 per period each HLH reduced by 2d6 per period. HLH AST to recover. When HLH is reduced to HLH CST, Stage 5 is reached.

Stage 5 Terminal phase Body converts protein from muscles to energy. STR, SPD, HLH reduced by 2D6 per period. When HLH reaches 0, death occurs. HLH CST to recover.

Stage 6 Terminal phase Body converts protein from muscles to energy. STR, SPD, HLH reduced by 2D6 per period. When HLH reaches 0, death occurs. Treatment Medical BCS plus HLH CST to recover.

Stage 7 Terminal phase Body converts protein from muscles to energy. STR, SPD, HLH reduced by 2D6 per period. When HLH reaches 0, death occurs. Treatment Medical BCS plus HLH CST at -2 to recover.

Stages of Thirst

Stage 1 Dehydration – WIT, HLH reduced by 1D6 per period each, HLH AST or double rations to recover. When HLH reaches HLH AST, Stage 3 is reached.

Stage 2 WIL reduced by 1d3 per period, WIT, HLH reduced by 1D6 each per period, HLH AST to recover. When HLH reaches HLH AST, Stage 3 is reached.

Stage 3 WIT, WIL reduced by 1d6 per period each HLH reduced by 2d6 per period. HLH AST to recover. When HLH is reduced to HLH CST, Stage 5 is reached.

Stage 4 WIT, WIL reduced by 1d6 per period each HLH reduced by 2d6 per period. HLH AST to recover. When HLH is reduced to HLH CST, Stage 5 is reached.

Stage 5 Terminal phase WIT, WIL, HLH reduced by 2D6 per period. When HLH reaches 0, death occurs. HLH CST to recover.

Stage 6 Terminal phase WIT, WIL, HLH reduced by 2D6 per period. When HLH reaches 0, death occurs. Treatment Medical BCS plus HLH CST to recover.

Stage 7 Terminal phase WIT, WIL, HLH reduced by 2D6 per period. When HLH reaches 0, death occurs. Treatment Medical BCS plus HLH CST at -2 to recover.

The following sections are for the Gamemaster only. Players should stop reading here.

Media Guide

Each Collapse scenario will be able to use similar media reports to introduce and mislead the players to the scenario. For example, the Gamemaster can have civil unrest news feeds, followed by a new astronomical sighting, and ultimately then introduce any of the scenarios.

It is suggested that the Gamemaster define the timeline for their campaign. Then players should be read or shown news feeds while they are playing. This will allow them to adjust to the changing information (correct or misleading).

If the Gamemaster develops news reports, it should be remembered that in a crisis, the news media tends to over dramatize and sometimes exaggerate the actual events, especially when hard data is scarce. During Hurricane Katrina, there were reports of "All of New Orleans is on fire" and "Militant gangs have taken over the 9th ward." Neither of these reports were actually true, in retrospect, but were reports based on isolated eyewitness accounts.

The Gamemaster can also use real news reports, collected from online and broadcast agencies. Anything can be part of the story.

News stories should be kept to headlines or 60-90 second "teasers" as existing or generic media feeds can then be used, and if the players decide to research more, the Gamemaster can just give them the results in narrative form.

Sample News Timeline

* Days before collapse *

Increasing reports of unrest and violence in remote areas

Political issues in US

New Comet sighted

Plane Crash in European mountains

* Day of collapse *

Storm brewing in Gulf of Mexico

Riots in Major European cities

Troop Movements in North Korea and Middle East

* Collapse *

Riots start being reported all across US – attributed to political unrest

Israel launches nuclear weapons at Lebanon, Syria, and Egypt, carpeting the borders and destroying nearby population centers.

Actual collapse – Zombie Uprising

Sample News Reports

Gamemasters should use these reports as templates, changing the place names as needed for their game scenario. Gamemasters can also search the news media websites for other articles that may assist in their presentation to the players. These reports could all be used for pretty much any scenario, just by the Gamemaster assigning different real meanings. For example, Report 12 – was the shooting random? Was it a criminal event? Or were they actually killing zombies?

Report 1

Israel preparing for war?

Israel is moving Armor and infantry to surround the Gaza Strip region, claiming that they need to secure the territory against Palestinian insurgents.

Report 2

Scientists Discover new Comet.

Scientists have discovered a new comet in the solar system. They predict it will pass close enough to the Earth that it will be visible during daytime with the naked eye. This comet has been named the Ezzedine-Warner Comet after the Astronomers who discovered it.

Report 3

10 police injured in Miami Riots.

In Miami, a Student protest of the new government policies turned violent, when they clashed with Miami-Dade police in Riot Gear. Police were forced to use water cannons and rubber bullets to subdue the crowd. At least ten police officers are reported injured, and it is unknown how many students were injured or killed. The Miami police chief is scheduling a press conference for this afternoon to discuss the events.

Report 4

UN general: More troops needed in Lebanon

UN Forces commander today urged allied nations to send reinforcements to war-ravaged southern Lebanon. Militants are inflicting heavy casualties on UN forces and have captured a border town from UN peacekeepers for the second time in two months.

Report 5

Dallas police make arrest in serial Cannibal Killer case

Police have arrested a man believed connected to an investigation of the so-called Cannibal Killer, a serial murderer believed to have killed, dismembered, and eaten at least eighteen people, a police spokesman said Thursday.

Report 6

10 dead in executions in Prague disco

Late Saturday night, heavily armed gunmen barged into a disco in central Prague, fired their weapons into the ceiling, and tossed six human heads onto the dance floor, a Prague police representative said, upon condition of anonymity. The gunmen then searched the crowd, and executed 4 more patrons before leaving.

Report 7

UN Security Council meets on Lebanon situation

The members of the UN Security Council met Tuesday in a special session to discuss the UN response to the new issues in Lebanon. A resolution is expected Thursday after a heated vote.

Report 8

Soldiers fire automatic weapons into crowd.

Witnesses say Myanmar's security forces are firing automatic weapons into crowds of anti-government protestors in downtown Yangon, Myanmar, during an intensification of the government crackdown there.

Report 9

Cholera outbreak in Palestinian army camp.

Undisclosed sources are reporting an outbreak of cholera in the Rafah Palestinian camp in Gaza. The Israeli army has surrounded the area, enforcing a strict quarantine.

Report 10

State of Emergency in Georgia.

A state of emergency was declared yesterday in the Georgian capital of Tblisi, after anti-government protestors clashed violently with police and forced the state-run TV station off the air.

Report 11

Angolan disease a mystery.

Officials from the World Health Organization are investigating a mysterious disease in Angola that killed at least 400 people, and as left an estimated 2000 sick. The illness, which leads to weakness, muscle spasms, mental confusion, speech impairment, and violent behavior, surfaced in Luanda last week.

Report 12

10 dead in shooting in Peoria shopping mall.

Late Monday afternoon, a pair of gunmen opened fire in a crowded Peoria shopping mall, killing ten people. No other people were injured. The gunmen then fled the scene. Police are on the lookout for 2 men wearing military style clothing and armed with semi-automatic rifles. Suspects are armed and should be considered extremely dangerous.

Report 13

Tensions increase after breakdown in Mideast peace talks.

The peace talks at Camp David broke down yesterday after Syria denied the existence of Nuclear Weapons. The Israeli delegate then produced photos of a nuclear weapons stockpile taken in a Damascus warehouse. The weapons all appeared to be Russian surplus SS-11 warheads, reportedly destroyed in compliance with the START-1 treaty.

Report 14

Turkey invades Iraq.

In a massive movement of troops, Turkish forces have invaded northern Iraq. In a press release this morning, the Turkish government announced that the invasion was to stop incursions across the border by rebels based in Iraq. These attacks have increased dramatically in recent weeks.

Regional Collapse Scenarios

Regional scenarios affect only a small area – the area around the players. If they can get to “Safe ground” – they’ll be fine.

New Creature Discovery

The players get together as a group, and in an isolated region find a new creature, that of course turns out to be violent.

Collapse Timeline

Days before Collapse – Players get together as a group and travel to a remote region. This could be to escape the threat of another collapse scenario, or as part of an organized scientific or military team.

Collapse – individuals associated in the area start disappearing or are found dead. Players must then find the source of the deaths. They may directly encounter the creature or creatures themselves. Tension and misdirection work well here. The longer the players go without actually understanding the exact scenario is better.

Collapse Special Concerns

These creatures usually are hard to kill, and many have special abilities that make them extra deadly.

Creatures

Dinosaurs



Tyrannosaurus Rex

Bap: 15 Bite BCS: 12 WDM: 2.5 L
MNA: 3 Damage Die: 2D10
PCA: 5 Mass: 250
BMA: 5
AV: 4
WDA: 2
CDA: 1
DRT: 8D10 + 80
SF: 50

Velociraptor

Bap: 18 Bite BCS: 18 WDM: 2.0 L
MNA: 3 Damage Die: 2D6
PCA: 6 Mass: 50
BMA: 6
AV: 3
WDA: 2
CDA: 5
DRT: 4D10 + 20
SF: 25

Stegosaurus

Bap: 10 Tail BCS: 18(S) WDM: 1.7 L
MNA: 1 Damage Die: 2D6
PCA: 10 Mass: 250
BMA: 2
AV: 10
WDA: 1
CDA: 1
DRT: (4D10 + 40) x 2
SF: 45

Brontosaurus

Bap: 10 Tail BCS: 12 WDM: 1.7 B
 MNA: 1 Damage Die: 2D6
 PCA: 10 Mass: 600
 BMA: 1 Trample damage: 4d10 x 2,B
 AV: 6
 WDA: 1
 CDA: 1
 DRT: (4D10 + 60) x 2.5
 SF: 75

Triceratops

Bap: 8 Horn BCS: 12 WDM: 2.5 L
 MNA: 1 Damage Die: 2D6
 PCA: 8 Mass: 150
 BMA: 2
 AV: Loc 1-4, 10; other locations, 6
 WDA: 1
 CDA: 1
 DRT: (4D10 + 40) x 3
 SF: 45

Ankylsaurus

Bap: 10 Tail BCS: 18(S) WDM: 2.0 L
 MNA: 1 Damage Die: 2D6
 PCA: 10 Mass: 100
 BMA: 2
 AV: 10
 WDA: 1
 CDA: 1
 DRT: 4D10 + 40
 SF: 25

Pterodactyl

Bap: 18 Bite BCS: 12 WDM: 1.7 L
 MNA: 3 Damage Die: 1D6
 PCA: 6 Mass: 5
 BMA: 1 (land) 6 (flying)
 AV: 3
 WDA: 2
 CDA: 3
 DRT: 2D10 + 40
 SF: 25

Tunneler

Bap: 8 Bite BCS: 12 WDM: 1.7 L
 MNA: 3 Damage Die: 1D6
 PCA: 2 Mass: 50
 BMA: 1 (surface) 3 (underground)
 AV: 7
 WDA: 1
 CDA: 1
 DRT: 4D10 + 140
 SF: 75

Has 1-20 snakelike heads that each have a bite attack. Likes to pull its victims underground. Attacks vibration and noise.

Sabretooth Tiger

Bap: 14 Bite BCS: 16 WDM: 2.7 L
 MNA: 2 Damage Die: 2D6
 PCA: 7 Mass: 17
 BMA: 3 AV: 3
 WDA: 2

CDA: 3
 DRT: 2D10 + 40
 SF: 25

Dire Wolf

Bap: 15 Bite BCS: 15 WDM: 2.2 L
 MNA: 2 Damage Die: 1D10
 PCA: 7 Mass: 18
 BMA: 3
 AV: 4
 WDA: 2
 CDA: 3
 DRT: (4D10 + 40) x 2.5
 SF: 45

Woolly Mammoth

Bap: 10 Trunk BCS: 12 WDM: none
 MNA: 1 Tusk BCS: 12 WDM: 1.5
 PCA: 10 Trample Damage 5D10,B
 BMA: 1 Mass: 300
 AV: 5
 WDA: 1
 CDA: 1
 DRT: (3D10 + 40) x 3
 SF: 60

Cave Bear

Bap: 10 Bite BCS: 8 WDM: 1.5 L
 MNA: 2 Damage Die: 2D10
 PCA: 5 Mass: 75
 BMA/quad: 1 1/2
 Bi: 1 Paw BCS: 14 WDM: 3.5 B
 AV: 6
 WDA: 2
 CDA: 1
 DRT: (4D10 + 40) x 4
 SF: 55

Giant Creatures**Giant Spider**

Bap: 12 Bite BCS: 12 WDM: 1.5
 MNA: 2
 PCA: 6
 BMA: 3 Mass: 50
 AV: 5
 WDA: 1
 CDA: 2
 DRT: (3D10 + 10) x 3
 SF: 40

Giant Spider Poison: S – L – DFT,SPD – 1D3 Combat Turns – Per unit injected – 1 minute - paralysis

Giant Scorpion

Bap: 14 Claw BCS: 12 WDM: 1.2
 MNA: 2 Tail BCS: 16 WDM: 1.5
 PCA: 7
 BMA: 3 Mass: 45
 AV: 9
 WDA: 7
 CDA: 2
 DRT: (3D6 + 40) x 2.5
 SF: 60

Giant Scorpion Poison: S – L – DFT,HLH – 1D3 Combat Turns –
Per unit injected – 1 Combat Turn - paralysis

Giant Wasp

Bap: 18 Bite BCS: 8 WDM: none
MNA: 3 Sting BCS: 12 WDM: 1.5
PCA: 6
BMA: 3/6 Mass: 30
AV: 2
WDA: 1
CDA: 5
DRT: 3D10+50
SF: 30

Giant Wasp Poison: S – L – HLH,SPD – 1D3 Combat Turns –
Per unit injected – 1 Combat Turn - paralysis

Vampires and Lycanthropes

Anatomy of the Collapse

A viral agent causes humans to mutate into Vampires, killing those around them. They players can either be random acquaintances or an organized vampire hunting team.

Collapse Timeline

Treat as any other Biological contamination.

Reference

Vampires

Vampire Virus

I(-)-HLH,Will-2d10 hours – 3 – 1d10 hours

Spread from the blood and saliva of infected people. Special – when the crisis stage is reached, the disease has taken hold, and the character becomes a Virus Vampire, unless the disease is thrown off. Victims that are already drained partially of blood have a reduced HLH saving throw to throw off the disease. For each liter of blood volume that they are drained, a -1 modifier is applied to their AST and CST.

Virus Vampire

WIT +15 (60) WILL (17d20-6)
STR +20 (+20) DFT +5(+5)
SPD +10(+10) HLH +5(+5)
Claw: BCS 14
Bite: BCS 16
Weapon: BCS 12+2D6
WDM 1.3L WDM 1.4L+Will Drain
WDM as weapon

The Vampire is a diseased human who feeds off blood. The Vampire's statistics other than Will are given as a modifier and a new maximum, which should be applied to the former race of the Vampire. The number in parenthesis is the new maximum, or modifier to the maximum.

The Vampire is immune to healing spells (see Aftermath! Magic!), poisons and diseases. Vampires recover Will at a rate of their Will Group per 30 Minutes, if well fed. Vampires lose consciousness when they reach 0 Will.

The only way to kill a vampire is to destroy the heart-mind relationship, or to completely consume it in fire. As long as locations 1-4 are intact and connected, the vampire can

regenerate itself over time, at a cost of 20 Will per location per hour, plus 10 will per DRT per hour. A vampire that has taken damage in excess of its DRT will go into suspended animation, while it recovers. A sever special effect to locations 1-4 will kill a Vampire instantly. Otherwise, 1/4 of the DRT of the vampire is spread across each location 1-4. If this amount of damage is done to a single location, the vampire dies.

Vampires must feed on blood, drinking at least 1/2 liter per day. Vampires that do not drink this much will be subject to starvation as per the rules above. Human blood is the most nutritious, with other blood providing sustenance as follows:

Nutritional efficiency per liter of blood:

Blood Type	Efficiency
Human	1.0
Pig	0.9
Ape	0.9
Cow	0.8
Chicken	0.5
Fish	0.3

A human has an amount of blood in their body equal to:

Personal Enc x HLH Grp/2 = Liters of blood

For each liter of blood drained from a target, the target's DRT and HLH are reduced by:

DRT per liter = DRT / (Liters* 0.2 *HLH GRP)

HLH per liter = HLH / (Liters* 0.2 *HLH GRP)

For every month of successful treatment, a person regenerates their HLH group in liters of blood.



Lycanthropes

Lycanthropes are humans that can transform into an animal form. The transformation each way takes large amounts of energy, which must be consumed while in animal form. The

energy required depends on the type of lycanetrope. Once they transform into animal form, they are effectively immediately starving, and must eat the Ration Mass amount in fresh meat or suffer starvation effects. They must eat the ration amount again to build the energy to transform back into human form. Lycanthropes can regenerate wounds at a rate of their HLH Grp in DRT per combat round, unless those wounds were caused by silver.

Lycanthropy is a disease, that is spread by the infected bite of a lycanetrope. It is coded as follows:

Lycanthrope Virus

I(-)-HLH,Will-3d10 hours – 3 – 1d10 hours

Spread from the blood and saliva of infected people. Special – when the crisis stage is reached, the disease has taken hold, and the character becomes a Lycanetrope of the class of the creature that bit it, unless the disease is thrown off or cured before the crisis stage. A cure can be made from the blood of the infecting lycanetrope. This is a combined task using the averaged BCS of the character's Pathology and Pharmacy skills, with a task value of 45 and a duration of 1 hour.

Specific Lycanthropes:

Werewolf

Animal Form

Bap: 15 Bite BCS: 18(S) WDM: 1.7 L
 MNA: 3 Damage Die: 2D6
 PCA: 5 Mass: 5
 BMA: 2 1/2
 AV: 3
 WDA: 2
 CDA: 3
 DRT: 4D10 + 40
 SF: 25
 Ration Mass: 6 Man-days per change

Human Form

WIT +0 WILL +1d10(+10)
 STR +2d6 (+20) DFT +1d10+5(+5)
 SPD +1d10(+10) HLH +1d10(+10)

Were Leopard

Animal Form

Bap: 15 Bite BCS: 18 WDM: 1.3 L
 MNA: 3 Claw BCS: 18 WDM: 2.0 L
 PCA: 5 Damage Die: 2D10
 BMA: 2 Mass: 15
 AV: 3
 WDA: 2
 CDA: 3
 DRT: (3D10 + 10) x2.5
 SF: 25
 Ration Mass: 8 Man-Days per change

Human Form

WIT +0 WILL +1d10(+10)
 STR +1d10 (+20) DFT +1d10+10(+15)
 SPD +2d10(+10) HLH +1d10(+10)

Were Bear

Animal Form

Bap: 10 Bite BCS: 18 WDM: 1.5 L
 MNA: 2 Claw BCS: 18 WDM: 2.5 L

PCA: 5 Damage Die: 3D6
 BMA: 2 Mass: 45
 AV: 5
 WDA: 2
 CDA: 2
 DRT: (4D6 + 15) x2.5
 SF: 45
 Ration Mass: 12 Man-Days per change

Human Form

WIT +0 WILL +1d10(+10)
 STR +2d10 (+20) DFT +1d10(+5)
 SPD +0(+10) HLH +1d10+10(+10)

Foreign Invasion

Anatomy of the Collapse

A foreign or hostile army invades the area that the players are in. The players can choose to defend against the invasion, hide, or flee.

Collapse Timeline

This depends greatly on where the players are based. An invasion in a small third-world country may not even be much of a surprise, while an invasion of the United States is more complex. Fortunately, the Gamemaster can choose to restrict information to the players so they don't really know the scope of the invasion. Remember that an invading army has a goal of disrupting communication to keep coordinated resistance at a minimum.

Modern warfare has shown us that successful invasions follow a general pattern. First the invading army attacks the communications and detection infrastructure. This is then followed by a massive ground troop movement, overpowering defenses and securing zones. The invading force will keep a supply line open back to the border, and will defend it at some level. If they are moving too quickly, and they do not have sufficient forces to quickly fortify the area, they may find the supply line exposed. Once they get to a city, if there is still active organized military resistance, they respond with excessive force and destruction of property. Once the military is subdued, they invaders switch to subduing the population. This can take the form of curfews, rationing, night time raids, securing means of transportation and communication, and house-to-house searches. The form that these actions take depends on the invading army and their observation of the Geneva Convention, their exposure to the Media, and their government's stability and political type. Autocratic governments tend to have military forces that are more brutal and less worried about civilian rights. Democratic governments tend to pay much closer attention to human rights, the Geneva Convention and to the news, therefore their forces are more aware of their actions impact on global opinion.

After the Invasion

The impact on life in an occupied zone is dramatic. Civilians lose basic rights, curfews are established,, communications are restricted and monitored, travel may be controlled. The invaders are doing everything they can to keep the population in check so their forces are not tied up in a police action, but can continue to conquer and defend what they have. This

scenario is very dynamic and the situation will change and adapt based on localized events – the player’s successes and failures.

Global Collapse Scenarios

Nuclear Event

Anatomy of the Collapse

Global tensions are increasing. Russia has not stepped down from its cold war preparedness stance. Things heat up in the Middle East. Then the nukes start to fly.

Collapse Timeline

Day	Event
-30	Tensions building in the Middle East, arguments between delegates in the UN.
-24	Syria is accused of having Nuclear Weapons bought from Russia, that were “destroyed” in compliance with the START Treaty
-25	Russian UN Delegates walk out of Security Council meeting.
-23	Hezbollah resumes rocket attacks against Northern Israel.
-22	Israel files formal protest against Lebanon and Syria in the World Court.
-20	Israel military forces move into southern Lebanon to secure Hezbollah missile launch sites.
-19	Syria accuses Israel of bombing inside its territory and threatens retaliation. Hezbollah increases rocket attacks. Israel continues bombings. Russia announces its support for Syria.
-18	North Korea, Iran, and Syria hold a summit to discuss the “increasing tension” in the Middle East.
-17	The United Nations issues a resolution condemning the Israeli invasion of Lebanon. Israel moves military forces to the Syria-Israel border, “as a precaution.”
-16	The United States reroutes 2 carrier groups to the region.
-15	Suicide bombers in Jerusalem kill 250 people in 6 separate attacks. The attacks seem to have been targeted against members of the Israeli government.
-14	Israel fully occupies Lebanon and begins house-to-house searches for Hezbollah terrorists. Suspected Hezbollah supporters are gathered into prison camps.
-13	Refugees fleeing the Lebanon conflict swarm aboard US and Italian ships.
-12	Russia Denounces the Israeli occupation of Lebanon, and offers to unilaterally send in “peacekeepers” to stabilize the situation.
-8	Turkey moves forces to southern border to “stop the flood of refugees and secure their border.”
-6	Russian “peacekeepers” arrive in Lebanon. Israel refuses to withdraw its troops.
-5	US Carrier groups arrive in the region and begin patrols.

- 4 Russian and Israeli troops exchange fire. 45 Russian and 120 Israeli soldiers are killed. There is no report of the damage to civilians.
- 3 Israeli forces invade Syria. Israeli forces directly attack the Russian Peacekeepers. The US pledges its support for Israel.
- 2 North Korea successfully tests a missile system capable of delivering a nuclear warhead 12,000 KM.
- 2 Syria and Israel are engaged in bitter conflict. Israeli forces are surrounding Damascus.
- 1 Syria detonates a nuclear device in Jerusalem. Israel responds by firing nuclear missiles at Syria and Egypt.
- 0 Israel launches a nuclear missile that strikes Moscow. Russia launches its primary and secondary strikes against all targets. This sends hundreds of missiles into the US. The United States, detecting the incoming attack launches a retaliatory strike against Russia.



Collapse Special Concerns

Nuclear weapons have special, immediate effects. These include blast, wind, fire, and of course, radiation. The Russian missile targets in the US are listed in Appendix 7. The Gamemaster can use this information to build a damage map of the area the players are in. For detailed maps, an online resource is available at: <http://meyerweb.com/eric/tools/gmap/hydesim.html>. With this simulator, you can calculate the blast radius of an explosion in the area you choose. If you key in the Latitude and longitude from the targeting information in Appendix 7, you can see the general blast coverage. The blast rating can be converted from the overpressure figure as follows:

$$\text{Blast} = \text{overpressure (psi)} \times 1.75, \text{ nearest}$$

A table of blast effects at a given radius is given below:

Blast Effects

Blast Effects											
Distance from Blast (miles)											
Size of Bomb	0.4	0.8	1.1	1.5	2.2	3.2	3.6	5.8	7	8.7	12
500KT air	30	20	18	15	10	5	3	2	2	1	0
500KT Surface	50	30	20	10	5	3	2	1	0	0	0
200KT air	30	20	15	10	5	3	2	1	1	0	0
200KT Surface	30	20	15	10	3	2	2	1	0	0	0
1MT Air	40	30	20	17	13	10	6	4	2	2	1
1MT Surface	100	50	30	15	10	8	5	3	2	1	0

Burn Effects

The second instantaneous effect of the nuclear blast is the thermal pulse. This causes fire damage to directly exposed targets as follows:

Strength Group of Thermal Pulse (fire damage)										
Distance from Blast (miles)										
Size of Bomb	0.4	0.8	2.2	3.2	3.6	5.8	7	8.7	12	
500KT air		32	16	8	7	6	4	2	1	0
500KT Surface		32	16	8	7	6	4	2	1	0
200KT air		32	16	8	5	4	2	1	0	0
200KT Surface		32	16	8	5	4	2	1	0	0
1MT Air		42	20	14	10	8	4	3	2	1
1MT Surface		42	20	14	10	8	4	3	2	1

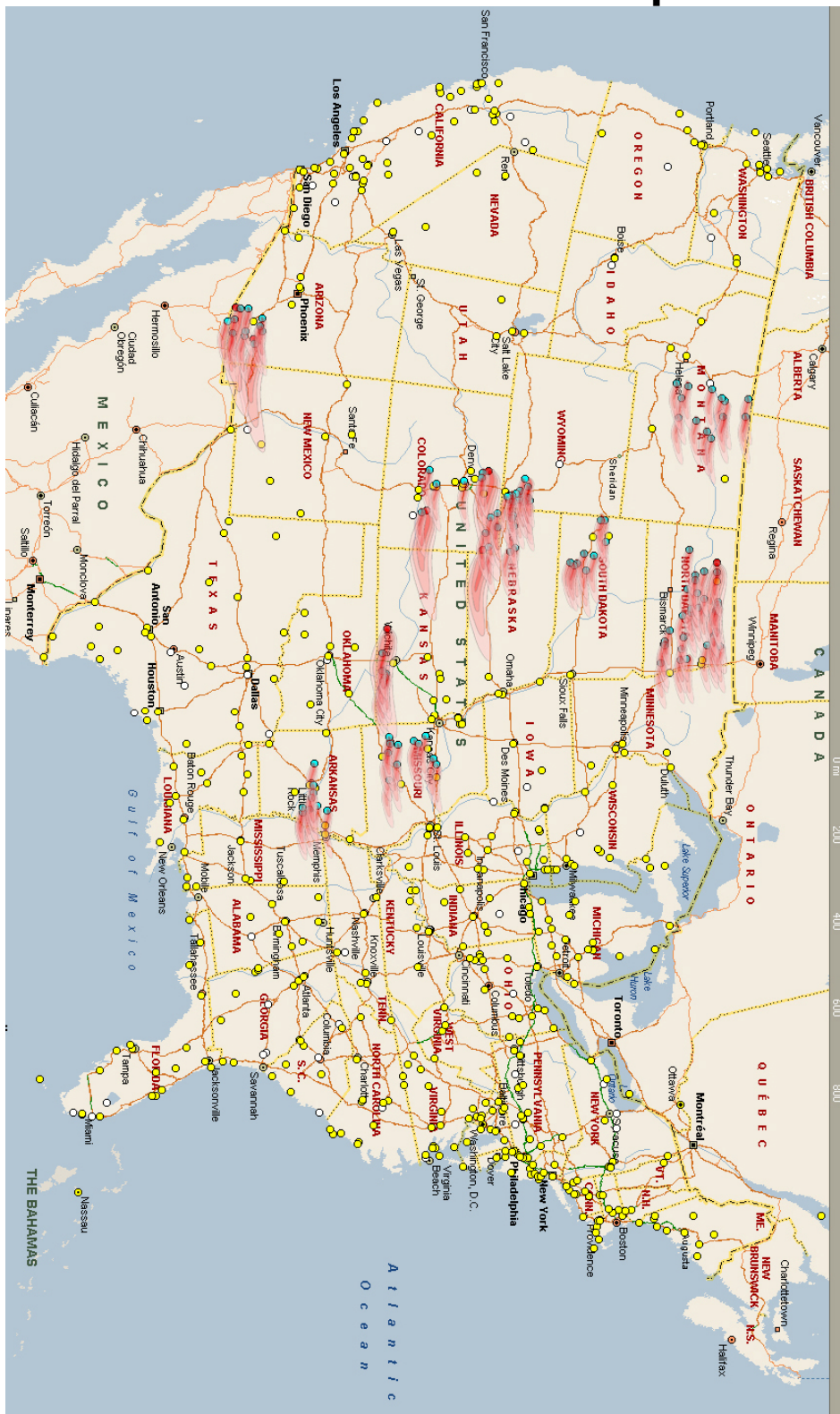
Radiation Levels(blast) The third risk from the blast is the instantaneous pulse of radiation. This is summarized in the chart below.

Radiation Pulse (rads)									
Distance from Blast (miles)									
Size of Bomb	0.4	0.8	2.2	3.2	3.6	5.8	7	8.7	12
200KT air		650	75	10	1	0	0	0	0
200KT Surface		8100	2800	700	350	5	0	0	0
500KT air		2600	80	25	10	0	0	0	0
500KT Surface		14000	6200	1200	30	0	0	0	0
1MT Air			250	50	2	0	0	0	0
1MT Surface			4500	1200	250	90	5	1	0

Fallout

Fallout is the precipitation of radioactive particles from a nuclear blast. These particles continue to emit radiation as they decay. The various particles have different decay rates, but they can be represented as an average based on the total amount of radiation at time of fall. The particulate fallout begins about 15 minutes after the blast, and continues for about an hour, depending on the distance from the actual blast. At this point it is at its maximum radioactivity. If a given area is at a certain radiation level, it will decay to half its value in 7 days. In 7 more days, it will decay to half again. This seven day half rule will continue until there is no more measurable radiation.

US Fallout Prediction Map



Radiation decay over weeks

Initial Radiation	1	2	3	4	5	6	7	8	9
4000 rads	2000r	1000r	500r	250r	125r	63r	31r	16r	8r
1000 rads	500r	250r	125r	63r	31r	16r	8r	4r	2r
500 rads	250r	125r	63r	31r	16r	8r	4r	2r	1r
125 rads	63r	31r	16r	8r	4r	2r	1r	.5r	.25r

As you can see from the table above, radiation hotspots will exist for months after the fallout occurs.

Because fallout is particulate matter (dust) – it can accumulate in higher concentrations that will give higher radiation levels. If the fallout from 1 square meter is removed and added to another square meter, the radiation is doubled. This becomes important in 2 situations: recovery and rainfall.

Rainfall will wash away the fallout, but then concentrates it into rivers streams and puddles, potentially creating severe hotspots. There is no quick and easy formula, but imagine if all the rain hitting your yard pooled into one spot. (an empty swimming pool for example) – this pool that is 20 meters by 10 meters for a total of 200 square meters, and the rain pools in the bottom and then evaporates – this will concentrate the radiation by as much as 200 times. This will continue to make some areas of high radiation unsafe for a very long time.

Even if the radiation is concentrated “over there” – it can still affect exposed people from a distance. The effective radiation is reduced by roughly 10% per meter distant from the source. This means that a survey meter can detect rising radiation levels as you get close.

The gamemaster should prepare a “radiation topographical map” of the area that the players will be in to document their radiation exposure. A sample such map is included in the appendix.

EMP

Solid state circuitry is very prone to the effects of an Electromagnetic Pulse.

Damage = number of rads in radiation pulse as a group, with electronics having a EMP DRT of 5. For example, a 40 rad pulse will do 2d10 of EMP damage to unprotected circuitry. Radiation shielding and hardening will reduce this effect. Radiation shielding reduces the effect by reducing the incoming radiation. (see shielding) EMP Hardening gives the circuit an armor value (AV) versus the EMP damage. The gamemaster should determine this value. If the EMP DRT is exceeded, the electronics dies permanently. If the EMP DRT is not exceeded, the equipment dies if the amount of EMP damage exceeds the roll of 1d6. This equipment can subsequently be recovered from the pulse with a successful electronics BCS roll.

Civilian circuitry (Modern automobiles, PCs, cell phones, etc.) will have no EMP hardening. This means that a modern (Electronic Fuel Injection) vehicle that is subjected to EMP will become a very large paperweight, and if in motion will become a poorly guided missile.

Military field equipment has a EMP hardening of 50, and a EMP DRT of 10 x DUR.

Preparedness Guide

Bug Out Bag – BOB

Should contain 21 days rations, ammo, medical kit, knife, Geiger counter, and a firearm at the least.

Tips for surviving the collapse:

1. Move to a low radiation area (underground) and stay there.
2. When moving check the radiation level frequently and calculate accumulated dosage.
3. Check the radiation levels of acquired water and food.
4. When in exposed areas – do not eat or drink. You can ingest radioactive particles and bring radiation with you.
5. Travel in pairs (when possible).
6. Never go unarmed.
7. Wear protection from dust and radioactive particles.
8. Decontaminate when entering a shelter.
9. Rest whenever possible.
10. Move during the day, sleep at night.
11. A victim of radiation poisoning is a liability – if moving, they slow you down.
12. Never own more than you can carry at a dead run.
13. Gear should be multi-use whenever possible.
14. You should be prepared to shelter in place, as travel might be suicide, or impossible, depending on the nature of the crisis.

Biological Event

Anatomy of the Collapse

A global pandemic is unleashed. 80% or more of the population is wiped out within a few months.

Collapse Timeline

Day	Event
0	Patient Zero catches disease
1-3	Patient Zero exposes everyone he comes in contact with to the disease. If we assume a global traveler, the spread is faster.
3	Patient Zero starts showing symptoms
6	Second set of patients start showing symptoms. With our global traveler, this now starts showing up in other countries.
14	Outbreaks begin in major transportation hubs around the world.
30	Most inhabitants of major cities infected. Transportation of food and supplies problematic at best. Curfews and quarantines abound.

Encoded diseases are listed in Appendix 4. This collapse will generally result in secondary collapses as the support and maintenance of infrastructure degrades.

Meteor Strike

Anatomy of the Collapse

Scientists discover “just before impact” that a large meteor is on a collision course with the Earth. There may or may not be much civilian warning.

Collapse Timeline

Day	Event
0	Meteor strikes earth. Impact is described below.
1	Clouds of dust and debris block out sunlight, and damage crops.
3	Livestock across the world begin to sicken and die without care.
6	Food shortages begin. Rioting and destabilization of economy ensues.

Collapse Special Concerns

Meteor Impact damage calculations.

The easiest way to calculate the impact effects of a small meteor is to liken it to a nuclear explosion. All of the same effects will be there, except the radiation. The meteor striking the ground will displace air and debris, creating blast. Specific effects can be calculated online at: <http://www.lpl.arizona.edu/impacteffects/>

Sample Historical Meteors:

Meteor Crater, USA

Projectile Diameter: 40 m
 Projectile Density: iron (8000 kg/m³)
 Impact Velocity: 20 km/s
 Impact Angle: 45 degrees
 Target Type: Sedimentary Rock
 Nuclear Equivalent: 3.17MT

Tunguska Fireball, Siberia 1908

Projectile Diameter: 60 m
 Projectile Density: rock (2700 kg/m³)
 Impact Velocity: 20 km/s
 Impact Angle: 45 degrees
 Target Type: Sedimentary Rock
 Nuclear Equivalent: 1.34 MT

Chicxulub, Mexico (Yucatan)

Projectile Diameter: 17500 m
 Projectile Density: rock (2700 kg/m³)
 Impact Velocity: 20 km/s
 Impact Angle: 45 degrees
 Target Type: Water, depth 100 m
 Nuclear Equivalent – off the charts!

Gateways to another world

Gateways to another world can be opened in one of three ways: by Magic, by Technology, or by random chance. The random ones are where the Gamemaster wants them. If a gateway opens to a world that is (observably) identical to the one the players are in, at that point, then there will only be a

slight distortion in the air at the threshold between the worlds. This will appear (if they notice) as a heat shimmer. The more different the two worlds, the more opaque and reflective the gateway will appear. Ultimately, the gateway will appear as a floating, rippling mirror in thin air. Temporal Physics can be used to predict the appearance of a gateway, or to predict the destination of the gateway. Gateways can open to another timeline, to another reality, or to another place in the same universe.

Alien Invasion

Definition of the Collapse Scenario

An advanced alien civilization has come to Earth to take over – for their own nefarious purposes – refugees, feeding program, or just malice.

Collapse Timeline

Before the collapse, the aliens will observe our activities – monitor television and radio communications, and develop a plan of attack.

Collapse Special Concerns

Alien races are generally treated as generic NPCs, with expertise levels similar to those on P. 32 of Aftermath! Book 3.

The following Alien races are provided as examples:

Martians

	WT	WL	STR	DFT	SPD	HLH
Personality	+10	+10	-5	+5	-5	-5
Average	21	21	6	16	6	6
Superior	31	31	16	26	16	16
Heroic	41	41	26	36	26	26
	BAP	MNA	PCA	CDA	DRT	AV
	as	as	as	as	as	
Personality	PC	PC	PC	PC	PC	0
Average	10	3	3	1	20	0
Superior	15	4	3	2	40	0
Heroic	20	5	4	3	60	0

Special Abilities: Telepathy, High Technology

Ursoids

	WT	WL	STR	DFT	SPD	HLH
Personality	-5	-5	+20	-5	-5	+5
Average	6	6	35	6	6	16
Superior	16	16	41	16	16	26
Heroic	26	26	51	26	26	36
	BAP	MNA	PCA	CDA	DRT	AV
	as	as	as	as	as	
Personality	PC	PC	PC	PC	PC	3
Average	3	2	1	1	37	3
Superior	8	3	2	2	55	3
Heroic	13	4	3	3	75	3

Special Abilities: High Technology, Low light vision level 2

Saurians

	WT	WL	STR	DFT	SPD	HLH
Personality	-5	0	+10	-5	0	+5
Average	6	11	35	6	11	16
Superior	16	21	35	16	21	26
Heroic	26	31	41	26	31	36
	BAP	MNA	PCA	CDA	DRT	AV
Personality	as	as	as	as	as	Str
Average	PC	PC	PC	PC	PC	Grp
Superior	3	2	1	1	39	5
Heroic	8	3	2	2	54	5
Heroic	13	4	3	3	72	5

Special Abilities: High Technology, Passive Infravision

Ape, Chimpanzee

	WT	WL	STR	DFT	SPD	HLH
Personality	+3	0	0	+2	-1	+1
Average	14	11	11	13	10	12
Superior	24	21	21	23	20	22
Heroic	34	31	31	33	30	32
	BAP	MNA	PCA	CDA	DRT	AV
Personality	as	as	as	as	as	
Average	PC	PC	PC	PC	PC	2
Superior	7	2	3	1	23	2
Heroic	12	3	4	2	43	2
Heroic	17	4	4	3	63	2

Special Abilities: none

Ape, Gorilla

	WT	WL	STR	DFT	SPD	HLH
Personality	-5	-5	+8	0	0	0
Average	6	6	19	11	11	11
Superior	16	16	29	21	21	21
Heroic	26	26	39	31	31	31
	BAP	MNA	PCA	CDA	DRT	AV
Personality	as	as	as	as	as	
Average	PC	PC	PC	PC	PC	2
Superior	3	2	1	1	24	2
Heroic	8	3	2	2	44	2
Heroic	13	4	3	3	64	2

Special Abilities: none

Ape, Orangutan

	WT	WL	STR	DFT	SPD	HLH
Personality	+5	+2	+2	-5	0	+2
Average	16	13	13	6	11	13
Superior	26	23	23	16	21	23
Heroic	36	33	33	26	31	33
	BAP	MNA	PCA	CDA	DRT	AV
Personality	as	as	as	as	as	
Average	PC	PC	PC	PC	PC	2
Superior	8	2	4	1	26	2
Heroic	13	3	4	2	46	2
Heroic	18	4	4	3	66	2

Special Abilities: none

Preparation for the Collapse

Preparedness Guide

Bug Out Bag – BOB

Should contain 2 days rations, ammo, medical kit, knife, and a firearm at the least.

Tips for surviving the collapse:

1. Shoot only when necessary – they outgun you.
2. Travel in pairs (when possible).
3. Never go unarmed.
4. Move as quietly as possible.
5. Rest whenever possible.
6. Move during the night, sleep at daytime.
7. Never own more than you can carry at a dead run.
8. Gear should be multi-use whenever possible.
9. You should be prepared to shelter in place, as travel might be suicide, or impossible, depending on the nature of the crisis.

Zombie Uprising

Definition of the Collapse Scenario

The Zombie uprising comes because of the accidental (or purposeful) release of the zombie plague into the environment. Any contact with the zombies quickly results in contagion. This advancing virulence makes the zombie plague destroy the world.

Collapse Timeline

This collapse follows a similar timeline initially to other biological contaminations.

Preparation for the Collapse

Preparedness Guide

Bug Out Bag – BOB

Should contain 2 days rations, ammo, medical kit, knife, and a firearm at the least.

Tips for surviving the collapse:

1. Shoot them in the head.
2. Travel in pairs (when possible).
3. Never go unarmed.

4. Wear protection from bites and cuts.
5. Move as quietly as possible.
6. If someone around you is bitten kill them.
7. Rest whenever possible.
8. Move during the day, sleep at night.
9. Range is your friend. Going hand to hand with a zombie is foolish.
10. Never own more than you can carry at a dead run.
11. Gear should be multi-use whenever possible.
12. You should be prepared to shelter in place, as travel might be suicide, or impossible, depending on the nature of the crisis.

Reference

There are 3 generations of the basic Zombie Plague – each more virulent than the last. There is also a variant, known as “Hemorrhagic Zombie” – a tailored virus designed to wipe out enemy military formations. The plague can generate any of 4 classes of zombie. If the GM desires, “tailored” zombie plague can be found, that has a higher likelihood of a certain class of zombie.

Zombie Plague, generation 1

I,A,D,G(-)-HLH,WIT-2d10 days – 3 – 1d10 hours

This is the base, unmutated virus. Its contagion pathogen allows for widespread contagion before it mutates into Generation 2.

This virus has few symptoms, and appears to be a cold or flu, until the crisis stage is reached. After crisis, a person exposed can throw off the stage 1 virus, but they are still a carrier of the plague, and their blood and saliva contain the stage 1 virus. If they are unable to resist the virus at the crisis stage, the virus mutates into its second generation.

Zombie chance:

1d10	Zombie Class
1-5	Slow Dead
6-8	Average Zombie
9	Fast Zombie
10	Rage Zombie

Zombie Plague, generation 2

I,D(-)-HLH,WIT-2d10 hours – 3 – 2d10 CT

Spread from the saliva or blood of infected generation 2 zombie people and animals.

Special – when the crisis stage is reached, the disease has taken hold, and the character becomes a zombie. This is an “incurable disease” – once it reaches the crisis stage, there is no HLH CST to throw it off. The person so infected then becomes a carrier of the Generation 3 plague.

Zombie chance:

1d10	Zombie Class
1-3	Slow Dead
4-6	Average Zombie
7-8	Fast Zombie
9-10	Rage Zombie

Zombie Plague, generation 3

I(-)-HLH,WIT-2d10 CT – 3 – 1d10 CT

Spread from the saliva or blood of infected generation 2 or 3 people and animals. Special – when the crisis stage is reached, the disease has taken hold, and the character becomes a

zombie. This is an “incurable disease” – once it reaches the crisis stage, there is no HLH CST to throw it off.

Zombie chance:

1d10	Zombie Class
1	Slow Dead
2-4	Average Zombie
5-7	Fast Zombie
8-10	Rage Zombie

Hemorrhagic Zombie Virus, gen 1

I,G(-)-HLH,WL-1d3 days – 4 – 1d10 hours, special

This is the base, unmutated virus. It is carried by the saliva and blood of the infected host. This disease has all the symptoms of Ebola: Malaise, Myalgias, headache, vomiting, and diarrhea. May also include a macular dermatologic eruption. When the crisis stage is reached, the victim dies, only to get up again as a zombie in 2d10 hours.

Zombie chance:

1d10	Zombie Class
1-3	Slow Dead
4-6	Average Zombie
7-9	Fast Zombie
10	Rage Zombie

Hemorrhagic Zombie Virus, gen 2

A,I,G(-)-HLH,WL-1d3 days – 4 – 1d10 hours, special

This is the first mutation virus. It is carried by the saliva, mucous, and blood of the infected host. This variant is now airborne, and spreads similar to the common cold. This disease has all the symptoms of Ebola, Malaise, Myalgias, headache, vomiting, and diarrhea. May also include a macular dermatologic eruption. When the crisis stage is reached, the victim dies, only to get up again as a zombie in 2d10 hours.

Zombie chance:

1d10	Zombie Class
1-3	Slow Dead
4-6	Average Zombie
7-9	Fast Zombie
10	Rage Zombie

Zombie Stats

All classes of zombie thirst for blood and flesh of living things – this sustains them. If they are not fed at least 2 locations of living flesh a day, they will deteriorate as if starving (see starvation rules)

Slow Dead

SPD cut in half
STR increased by 10
WIT/WIL become 1

Average Zombie

SPD -5
STR Plus 10
WIT/WIL become 1d6

Fast Zombie

Spd normal
Str plus 10
WIT/WIL 1d10

Rage Zombie

SPD +10
STR +10
WIT/WIL 1d10

Zombies have the following skills:

Brawling BCS 12
Fist/fingernail WDM 1.1L
Bite WDM 1.3L

The only way to kill a Zombie is to destroy the brain. As long as locations 1-2 are intact and connected, the Zombie will attempt to keep in motion with any remaining connected body parts. A zombie's DRT is divided among these 2 locations – with ½ of its DRT in each location. All other damage simply damages the body. If a zombie takes more than ½ its DRT in damage to a single location, there is a chance that the location will be destroyed. Roll 2D20, if this is less than the damage done, then the location is severed. A sever special effect to locations 1-2 will kill a Zombie instantly.

Special Rules

FIREARMS MAINTENANCE AND REPAIR

Automatic fire conversion

Converting an AL firearm to full auto is a task for a professional gunsmith. Pre-collapse, this conversion will get you 10 years in prison and a \$250,000 fine. Simply possessing the AL firearm and the conversion parts together is a crime. The author of this book does not condone any criminal activities. That being said, simulating these activities in the game can add to the atmosphere of the collapse.

While some firearms may be easier or harder to convert in reality, the following rules are offered for standardizing the process. Converting a Semi-Automatic (AL) version of a firearm to Full Auto (AL/FA or AL/FA/AB or AL/AB) is a task. The prerequisite for the task is that the gunsmith has the firearm, and a set of conversion parts. Making the conversion parts is discussed below. The governing skill of the conversion task is Firearms Repair, Modern. The task period is 1 day. The target number is computed as follows:

Base task value for weapon:

Pistol : 15
SMG : 8
Rifle : 10
Shotgun : 20

Modifiers:

Civ/mil factor = Civilian version of military weapon: 1.8

Non-military weapon: 2.5

Durability factor = (civ/mil factor) + (((1 + (Final DUR - current DUR)) x (6 - original DUR)) x .5)

Auto Factor:

AL/FA=1.0
AL/AB=1.5
AL/FA/AB=2.0

Final task value = base task value x durability factor x Auto Factor

Example: Converting an AR-15 (Original DUR 5, Current DUR 5) to an M-16 (DUR 5) AL/FA would be calculated as follows:

Base task value = 10 (rifle)

Civ/Mil=1.8

Durability Factor=(1.8)+(((1+(5-5))x(6-5))x.5) = 2.3

Auto Factor = 1.0

Task Value = 10x2.3x1.0 = 23

Converting the same rifle and "shortcutting" to end up with a DUR 3 would be:

Durability Factor=(1.8)+(((1+(3-5))x(6-5))x.5) = 1.3

Task value = 10 x 1.3 x 1.0 = 13

Making FA Conversion Parts

Making the conversion parts is a task with a task period of 1 hour. The governing skill is machining. The task value is the base task value times the Civ/Mil factor, times the Auto Factor. The machinist can continue the task beyond the first success, and at every additional base task value of accumulated points, will produce another set of conversion parts.

Improvised Armor conversions for vehicles

In many cases, it is desired to improve the armor protection of vehicles. This is a task, with a governing skill of Auto Mechanic, and a task period of 1 day. The difficulty of the task is computed as follows:

Base task value = target AV of vehicle times 5

Soft target conversion = multiplier 1.0

Hard target conversion = multiplier 2.5

Improvised armor = multiplier 0.5

Improvised Firearms

Making an improvised firearm is a task using firearms repair, with a difficulty equal to the BDG of the round, times the square of the DUR rating, times a modifier for the action, and a task period of one hour.

Action	Modifier
SS	0.8
BA,LA	1.0
AL	2.0
FA	2.5
AL/FA	3.5
AB/FA	4.0

If a critical miss occurs during the task period, then the gun will explode the first time it is used. Each time an improvised firearm is used, there is a chance it will be damaged during firing, and become inoperable. A D6 should be rolled, and if it is greater than the DUR, then the gun is destroyed. If it is equal to the DUR, the DUR is reduced by 1.

WEATHER DAMAGE

Wind damage to buildings

High winds can cause structural damage to buildings. This damaged is assessed once per hour to the structure rating of the building. Winds cause damage based on a group from wind speed. High winds also reduce the accuracy of projectile weapons, including firearms, crossbows, bows and thrown weapons.

Wind Speed	Damage Group	Missile BCS
20-38 MPH	N/A	-1
39-58 MPH	N/A	-2
59-73 MPH	0	-3
74-95 MPH	1	-4
96-110 MPH	2	-5

111-130 MPH	3	-6
131-155 MPH	4	-7
156-180 MPH	5	-8
181-200 MPH	6	-9

Wind borne projectiles

High winds can also cause debris to become a projectile. This is similar to the fragmentation effect of grenades. Wind borne debris attacks should be resolved once per Combat Round, in action phase 0. The BCS and damage group of debris is listed below. The WDM is based on the type of projectile, but can be randomized as 0.5 + (1d10/10).

Wind Speed	Debris Damage Group	Debris BCS
74-95 MPH	0	4
96-110 MPH	1	5
111-130 MPH	2	6
131-155 MPH	3	8
156-200 MPH	4	9
201+ MPH	5	10

Effects of cold

Cold weather is severely damaging to unprotected people. In addition, it can increase the chances of mechanical malfunction as grease and oils solidify and become more like a glue holding parts together. If a firearm, for example, is not lubricated with low temperature oils, then it is subject to an increased chance of critical miss. Cold damage is subdual and assessed once per 15 minutes. Insulating clothes and gear will protect by the insulation factor, and move up in the chart by one category per insulation factor. Damage is calculated based on the wind chill value, while equipment failure is based on actual temperature

Temperature Degrees F	Damage Group	Critical Miss
0 to -19	0	20
-20 to -40	1	19-20
-41 to -69	2	18-20
-70 to -80	3	16-20
-81 to -89	4	14-20
-91 to -97	5	12-20
-98 to -110	6	10-20

Severe Heat

Severe Heat can also cause damage to personnel and equipment. Heat damage is subdual, and assessed once per half hour. Burn damage can also occur when unprotected skin touches hot gear. Confined spaces (inside a closed car, for example) will be one class hotter, while in the shade will be one class cooler.

Temperature Degrees F	Damage Group	Burn Group
95 to 104	0	0
105 to 113	1	0
114 to 118	2	0
119 to 122	2	1
123 to 126	3	1
127 to 130	3	2

Race Specific diseases

Most diseases will affect all humanoid races equally. However, humanoid race specific diseases can be tailored. This is up to the GM.

Mutating diseases

Some diseases will be unstable – and mutate. Some examples of these are here:

Andromeda Strain

Gen1

A – (-) – HLH - 1d20 minutes - 5 – 1d3 CT

This virus attacks the blood stream causing rapid clotting of all the blood.

It mutates rapidly (2d20 minutes) into gen2

Gen2

A – (-) – Will – 1d10 hours – 2 – 1d10 hours

This virus causes High Fever, Disorientation, hallucinations, and paranoia. If the crisis stage is reached, and the victim throws it off, then they will survive, with a permanent reduction to Will of 1d6.

It is stable for 2d20 hours, then mutates into gen3

Gen3

A – (?) – Rubber and plastic – 1d10 CT – 3 – 1d20 CT

In the final form, the virus is benign to humans and animals, and only attacks rubber and plastics.

Zombie Plagues

Zombie Plague, generation 1

I,A,D,G(-)-HLH,WIT-2d10 days – 3 – 1d10 hours

This is the base, unmutated virus. Its contagion pathogen allows for widespread contagion before it mutates into Generation 2.

This virus has few symptoms, and appears to be a cold or flu, until the crisis stage is reached. After crisis, a person exposed can throw off the stage 1 virus, but they are still a carrier of the plague, and their blood and saliva contain the stage 1 virus. If they are unable to resist the virus at the crisis stage, the virus mutates into its second generation.

Zombie chance:

1d10	Zombie Class
1-5	Slow Dead
6-8	Average Zombie
9	Fast Zombie
10	Rage Zombie

Zombie Plague, generation 2

I,D(-)-HLH,WIT-2d10 hours – 3 – 2d10 CT

Spread from the saliva or blood of infected generation 2 zombie people and animals.

Special – when the crisis stage is reached, the disease has taken hold, and the character becomes a zombie. This is an “incurable disease” – once it reaches the crisis stage, there is no HLH CST to throw it off. The person so infected then becomes a carrier of the Generation 3 plague.

Zombie chance:

1d10	Zombie Class
1-3	Slow Dead
4-6	Average Zombie
7-8	Fast Zombie
9-10	Rage Zombie

Zombie Plague, generation 3

I(-)-HLH,WIT-2d10 CT – 3 – 1d10 CT

Spread from the saliva or blood of infected generation 2 or 3 people and animals. Special – when the crisis stage is reached , the disease has taken hold, and the character becomes a zombie. This is an “incurable disease” – once it reaches the crisis stage, there is no HLH CST to throw it off.

Hemorrhagic Zombie Virus, gen 1

I,G(-)-HLH,WL-1d3 days – 4 – 1d10 hours, special

This is the base, unmutated virus. It is carried by the saliva and blood of the infected host. This disease has all the symptoms of Ebola: Malaise, Myalgias, headache, vomiting, and diarrhea. May also include a macular dermatologic eruption. When the crisis stage is reached, the victim dies, only to get up again as a zombie in 2d10 hours.

Zombie chance:

1d10 Zombie Class

1-3	Slow Dead
4-6	Average Zombie
7-9	Fast Zombie
10	Rage Zombie

Hemorrhagic Zombie Virus, gen 2

A,I,G(-)-HLH,WL-1d3 days – 4 – 1d10 hours, special

This is the first mutation virus. It is carried by the saliva, mucous, and blood of the infected host. This variant is now airborne, and spreads similar to the common cold. This disease has all the symptoms of Ebola, Malaise, Myalgias, headache, vomiting, and diarrhea. May also include a macular dermatologic eruption. When the crisis stage is reached, the victim dies, only to get up again as a zombie in 2d10 hours.

Zombie chance:

1d10 Zombie Class

1-3	Slow Dead
4-6	Average Zombie
7-9	Fast Zombie
10	Rage Zombie

Sample Collapse Scenario

The players are part of a strike team. (They can be US Special forces, Navy Seals, or a Private strike team.) Use the military generation system above to generate the characters. They are brought into the briefing room by their commanding officer. In the room is their CO, one female officer, 2 unidentified men in suits, and one female in a suit. They are introduced to you as:

CO: Colonel Edward Benton, 56 years old.

Major Julia Sosa, 42 years old. US SOCOM.

David Kharra, CEO GreenTech Corporation, 57 years old.

Jim Strom, CIA, 34 years old.

Salina Pennington, 28 years old. 100 looks (perfect model type). David Kharra’s executive assistant.

GreenTech is a multinational holding company, with interests in oil, food, military contracts, shipping, clothing, gems and diamonds, manufacturing, and other sectors. Greentech’s Gross revenue is 45.2 Billion per year. The briefing goes something like this:

CO: (introduces everyone). Team, everything you are about to hear is classified “Top Secret”. You all have been individually cleared for this information. The day before yesterday, Richard

Kharra (picture of 30-something male appears on projector) was on a cruise in the Mediterranean on the Star Voyager. Terrorists from the “Crescent of God” terror group have taken the ship, and are asking for the release of 540 prisoners held by Israel and in Guantanamo Bay. The president has asked you to “take care” of the situation. This is a “weapons free” mission. Jim, can you take over?

(floorplan of small cruise ship appears on screen.)

Jim: This is the Star Voyager. We believe that there are 6 Tangos on board. They are well armed and trained. They have taken the crew and passengers and secured them in the forward lounge. Salina will be accompanying you as an advisor on this one. It is in the Eastern Med, heading west at 30 knots.

(Jim waits for the group to object.)

Jim: Salina is a retired Navy SEAL. She can handle this mission. There is no objection to this, right? OK. On this one, you have your choice on insertion methods. Options? (if no options, then the suggestion is HALO insertion to SCUBA to the boat.)

At this point, open the discussion to the players to plan the op.

Equipment per team member:

Primary weapon:

1 H&K MP5-SD3 w/ reflex sight, integral silencer, and 12 full 32 round mags. Or

1 M-4 w/ reflex sight,

1 Sidearm w/6 mags, laser sight. choice of: Glock 17, M1911, Makarov, or CZ99.

2 Black Jumpsuits, Plastex, AV6

1 combat harness w/ holsters, pockets, etc.

1 pair Plastex Boots AV6

1 Short range radio, Earpiece, 2km range, no encumbrance.

1 personal medikit, equivalent to medikit 1 w/10 bandages and 10 units of med supply.

1 small flashlight, enc 0.1

Team Gear, issued to the team as a whole:

1 folding raft, enc. 1.0, 8 man capacity

1 Satellite radio, enc. 1.1

1 Sniper Rifle, choice of Parker-Hale M85 or M-21 w/ 10x infrared scope, silencer, bipod, 6 full mags.

1 Medikit 2 w/3 syr. Polycellulac 3, 5 syr. Neo-Heroin, 20 bandages, 20 units med supply, 2 inflatable splints, 1 electromedikit.

1 tank emergency oxygen, 120 man-minutes of oxygen

1 photo, Richard Kharra (son of VP) w/ brief bio.

1 pack intelligence info

The Intelligence info:

The ship is in the middle of the Mediterranean, 50 miles from the nearest shore. There are 6 Terrorists aboard. They are armed with light small arms.

There are 30 Hostages: 6 crew and 24 passengers. The ship is headed West at 30 knots.

The Twist:

Salina actually works for a major bio-engineering firm. They have been developing a virus weapon that could wipe out the world. Richard Kharra is the chief genetic engineer on the

project, and is transporting the sample to France for sale to a rival corporation. The virus is contained within Richard's briefcase in a glass scotch flask. If exposed to the air, it will spread across the world. There is no cure. The virus has the following code:

GWVdl : A,D - (-) - WT,WL,STR,HLH - 2d20 hr - 8 - 10 min. - Puerpera, Dystopia, Fainting, Tinnunitis

G - (-) - WT,WL,STR,HLH - 1 min - 11 - 2 min. - Puerpera, Nausea, Dizziness, Fainting, Dystopia

S - (-) - WT,WL,STR,HLH - 1 min - 18 - 30 sec. - Puerpera, Nausea, Dizziness, Fainting, Dystopia

The terrorists do not know Richard's identity, nor do they know about the virus.

The ship is a small cruise ship, with 14 staterooms. The hostages are being held in the cafeteria, and being watched over by terrorists 7 and 10. Terrorist 2 is in the crows nest. Terrorist 4 is in the control cabin. The other terrorists can be placed by the GM as he sees fit. If the players try this as a "shoot-em-up" they should die. If they check on the passenger manifest, they'll get the names below. More research should tell them that the terrorists are better armed than expected. More research about Richard should eventually tell them that he is a bio-engineer with specializations in virus engineering. Extensive research into his background will reveal that his parents are both dead (and have been for over 20 years). David isn't really his father, but his lying. David knows that Richard is planning on defecting to a rival corporation. Richard is hiding in an air duct, and will be found by the terrorists within 1 hour of game time. (Whenever it would speed up the game). The terrorists will eventually open his briefcase, and find the scotch flask. This should be timed to occur as the players are watching. Richard will be (obviously) VERY adamant about the terrorists not drinking his scotch. If the players intervene in time...

The Players:

Salina

5'10", 125 lbs, Looks 100

Superior NPC Wit 21, Will 26, STR 16, DFT 26, SPD 26, HLH 26. DRT 47

Skills: Acrobatics 16, Commerce 20, Interrogation 26, M. Pistol 18, Fast Draw 20, Knife 20/16

Weapons: American Derringer Model 1, 5.56 NATO in Auto Wrist Holster, Knife in Boot. Plus what she gets assigned by the team.

Richard Kharra

6'3", 185 lbs, Looks 65

Superior NPC Wit 30, Will 26, STR 16, DFT 26, SPD 26, HLH 26. DRT 47

Skills: All Medical 18, Brawling 8, M. Pistol 12

Weapons: Glock 20 w/2 full mags.

Terrorist 1

28 Years old, 5'10, 255 lbs, Looks 36

Superior NPC Wit 11, Will 11, STR 65, DFT 15, SPD 20 HLH 31. DRT 70

Skills: Autoweapon 18, M. Pistol 18, M. Rifle 17, Brawling 20/14 Average AV: 9

Weapons: AMD-65 w/10 mags, Grizzly Win-Mag w/ 3 mags

Terrorist 2

35 Years old, 6'1", 165 lbs, Looks 52

Superior NPC Wit 11, Will 11, STR 65, DFT 15, SPD 20 HLH 31. DRT 70

Skills: Autoweapon 16, M. Pistol 18, M. Rifle 18, Brawling 20/14 Average AV: 10

Weapons: Barrett m82 w/10 mags, Grizzly Win-Mag w/ 2 mags

Terrorist 3

38 Years old, 6'8", 290 lbs, Looks 66

Superior NPC Wit 11, Will 11, STR 55, DFT 16, SPD 16 HLH 26. DRT 59

Skills: Autoweapon 18, M. Rifle 17, Brawling 20/14, Single Weapon 20/18, Polearm 20/16

Average AV: 13

Weapons: AMD-65 w/ 10 mags, Battle axe, monofilament, WDM 5.0L, Enc. 1.7, STR 5, Surv. 9

Terrorist 4

25 Years old, 6'3", 200 lbs, Looks 78

Superior NPC Wit 16, Will 21, STR 35, DFT 16, SPD 21 HLH 26. DRT 55

Skills: Autoweapon 16, M. Pistol 16 M. Rifle 20/12, Unarmed Combat 20/14

Average AV: 14

Weapons: Atchisson W/12 mags 12g mag 00 buck (BDG 48), Grizzly Win-Mag w/ 2 mags

Terrorist 4

27 Years old, 6'0, 230 lbs, Looks 28

Superior NPC Wit 16, Will 21, STR 85, DFT 35, SPD 30 HLH 26. DRT 55

Skills: Autoweapon 18, M. Pistol 16, M. Rifle 20/3, Unarmed Combat 20/6

Average AV: 16

Weapons: AMD-65 w/10 mags, Retractable monofilament blades in Primary arms, WDM 4.2

Special: Powered Endoskeleton, boosted STR, 2 Cybernetic Eyes w/Thermograph, targeting, HUD, Infrared, Range Finder Binocular, EMR Scanner. Adrenal Booster. 2 Additional arms, STR 35.

Terrorist 5

17 Years old, 6'1", 155 lbs, Looks 44

Superior NPC Wit 11, Will 11, STR 36, DFT 21, SPD 26, HLH 21. DRT 40

Skills: Autoweapon 16, M. Pistol 16, M. Rifle 16, Brawling 14

Average AV: 10

Weapons: AMD-65 w/8 mags, Luger w/3 mags

Terrorist 6

18 Years old, 6'1", 225 lbs, Looks 63

Superior NPC Wit 11, Will 11, STR 36, DFT 21, SPD 26, HLH 21, DRT 40

Skills: Autoweapon 17, M. Pistol 15, M. Rifle 16, Brawling 16

Average AV: 10 w/skin

Weapons: AMD-65 w/ 8 mags, Luger w/3 mags

Terrorist 7

38 Years old, 6'0,195 lbs, Looks 76

Superior NPC Wit 21, Will 21, STR 25, DFT 21 SPD 21 HLH 21. DRT 44

Skills: Autoweapon 18, M. Pistol 16, M. Rifle 17, Brawling 12

Average AV: 6

Weapons: AMD-65 w/ 10 mags, Glock 17 w/ 3 mags

Terrorist 8

28 Years old, 7'8", 305 lbs, Looks 28
Superior NPC Wit 15, Will 10, STR 42, DFT 16, SPD 16, HLH 26. DRT 52
Skills: Autoweapon 17, M. Pistol 18, M. Rifle 17, Brawling 16
Average AV: 7
Weapons: AMD-65 w/ 9 mags, M1911a1 w/3 mags

Terrorist 9

22 Years old, 5'3", 175 lbs, Looks 58
Superior NPC Wit 16, Will 16, STR 16, DFT 21, SPD 21, HLH 31. DRT 47
Skills: Autoweapon 18, M. Pistol 18, M. Rifle 17, Brawling 14, Grenade Launcher 12
Average AV: 6
Weapons: M-22/M203 w/10 mags, 12 rds 40mm grenades, VZ-61 Skorpion w/5 mags

Terrorist 10

26 Years old, 3'10W/, 001bs, Looks 52
Superior NPC Wit 11, Will 11, STR 11, DFT 31, SPD 31, HLH 26, DRT 37
Skills: Autoweapon 18 M. Pistol 20/12, M. Rifle 15, Brawling 13
Average AV: 10
Weapons: Beretta M-93R w/ 8 mags, Luger w/3 mags

Terrorist 11

21 Years old, 6'0, 155 lbs, Looks 106
Superior NPC Wit 26, Will 26, STR 16, DFT 26, SPD 26 HLH 16. DRT 37
Skills: Advanced Stealth 18, M. Pistol 16, Acrobatics 19, Unarmed Combat 20/19
Average AV: 4
Weapons: Throat Snake.
Special: Terrorist 11 is posing as a hostage.

Passengers

Schwam Family, Tourists, European origin.
Lisa, female, 28 years old, DRT 21; Tim, male, 36 years old, DRT 20; Kim, female, 4 years old DRT 6;

Lenoire Family, Archaeologists, North American origin.

Eladhe 65 years old, male, DRT 19; Jasmella, female, 59 years old, DRT 22;

Dakow Family, Oil Worker and Family, European origin.

Jenarre, female, 35 years old, DRT 25; Klajja, male, 45 years old, DRT 20;
Twins: Lai'tee, female, 12years old DRT 12; Lai'kan, male, 12years old DRT 12;
Twins: Klis, male, 5years old DRT 8; Poli, male, 5years old DRT 8;
Twins: Hanarra, female, 2years old DRT 1; Galee, female, 2years old DRT 1;

Dolmen Family, Bankers, European origin.

Kimberly, female, 425years old, DRT 21; Boris, male, 456 years old, DRT 20;

Salim Family, Vacation, North African origin.

Mikhael 45 years old, male, DRT 19; Gina, female, 31 years old, DRT 22;

Alan 24 years old, male, DRT 16; Barbara, female, 85 years old, DRT 14;
Christopher 68 years old, male, DRT 12; Darlene, female, 23 years old, DRT 10;
Jamal Family, Computer Programmer/ Psychologist South American origin.
Both Deceased – Bodies in Stateroom #1. They were executed by the terrorists.

Crew:

Vladimir Schrenkov, Captain
56 years old, 6'1", 210 lbs, looks 77, DRT 22
Vladimir is diabetic, but nobody knows. He will be losing consciousness shortly, unless he gets medical treatment, as his sugar level is dropping.

Dmitri Kasperin, First Mate

38 years old, 6'0", 225 lbs, looks 56, DRT 26

Ed Woodson, Chief Engineer

Age 42, 5'11, 199 lbs, looks 66, DRT 31

Tom Kelley, Machinist's Mate

Age 44, 5'9", 200 lbs, looks 57, DRT 18

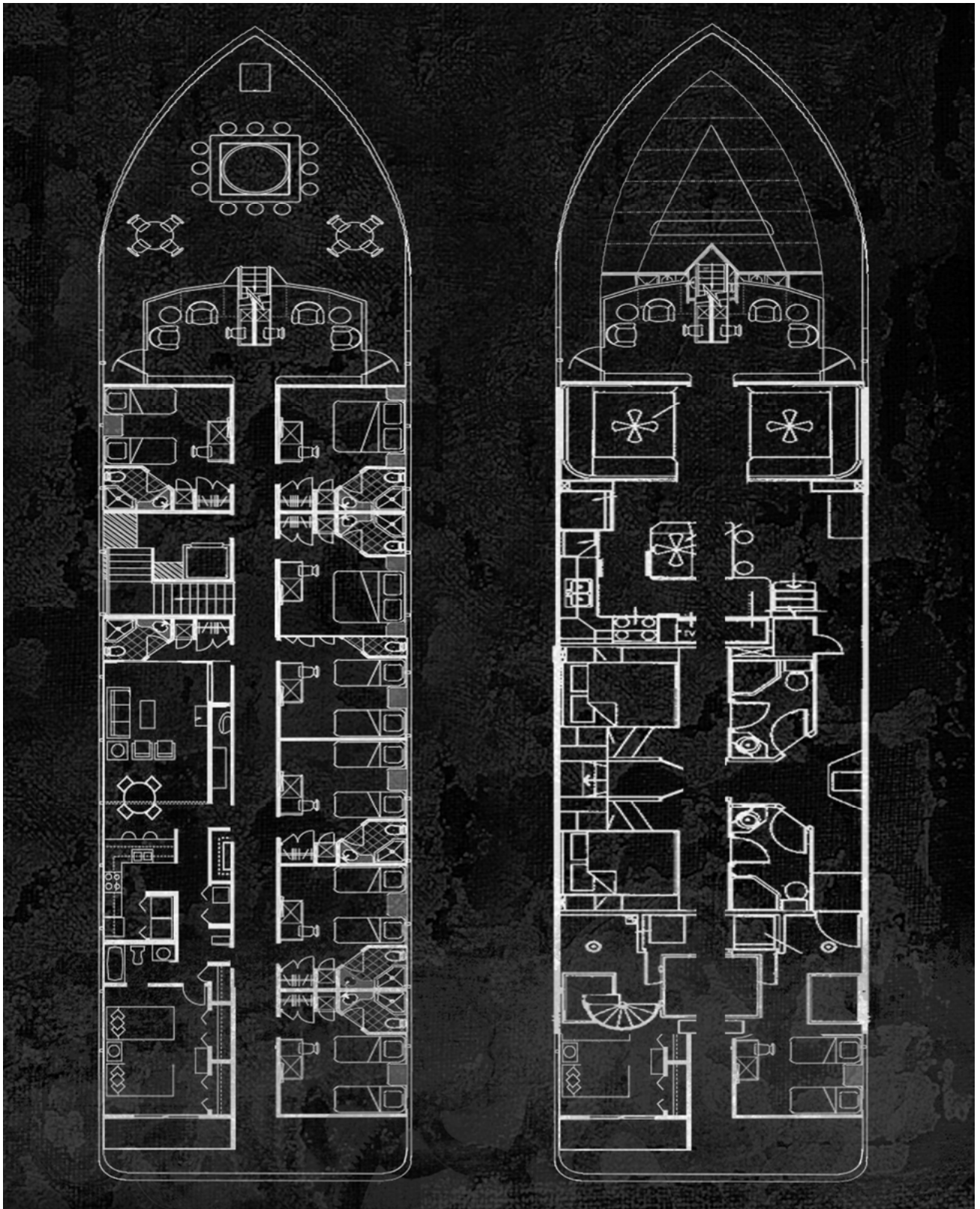
Igor Leondis, Mechanic

Age 38, 6'0", 225 lbs, looks 72, DRT 23

Hunter Jackson, Cook

Age 55, 6'1", 240 lbs, looks 67, DRT 24





Appendix 7: US Nuclear Targets

The following is a list of Russian missile targets in the United States. These targets probably still exist, even though the bases may have been decommissioned, as the targeted missile has not been. Listed is the target name, Latitude and Longitude of target ground zero, and what missile warhead is targeted at it. The targets are grouped into 3 categories, based on their priority in a nuclear attack. The priority also influences the likelihood that the missile will be launched, is currently being maintained, and whether it will be targeted accurately. Roll on the Missile Failure chart to determine the status of any missile that does not strike its intended target.

Missile Failure Chart (1d100)

Roll	Status
1-10	Missile is not launched. (launch failure)
11-25	Missile deviated from target and strikes random target 1d100 miles away (use grenade scatter for direction.)
26-30	Missile has been aimed at another target.
31-50	Missile launched delayed until next strike.
51-75	Missile crew refuses launch order.
76-90	Missile has been intercepted.
91-00	1d3 Missiles hit the target instead.

PRIMARY:

These are mostly missile silos, bomber bases, submarine bases, and command and control centers. If the Russian missiles are launched first, there is a 1 in 20 chance that a primary target will not be hit by the intended missile, due to missile failure or interception. If the US launches a first strike, there is a 1 in 10 chance that the missile will be destroyed before launch.

SECONDARY:

Major military, industrial, governmental, and transportation centers. Also included are sea ports, locks and dams. If the Russian missiles are launched first, there here is a 1 in 10 chance that a secondary target will not be hit by the intended missile, due to missile failure or interception. If the US launches a first strike, there is a 1 in 10 chance that the missile will be destroyed before launch.

TERTIARY:

These are population and industrial centers that are targeted as secondary strikes. If a second strike is launched before US missiles hit Russian Launch Sites, there is a 1 in 6 chance that a tertiary target will not be hit by the intended missile, due to missile failure, decommission, or interception. If the US launches a first strike, there is a 1 in 10 chance that the missile will not be destroyed before launch and will still hit its target.

The list of targets and missiles targeted at them is as follows.

ALABAMA

Primary:

Gunter AFB, 32°24'19.20" N, 86°15'23.73"W, SS-24, 550KT
Maxwell AFB, 32°22'43.67"N, 86°21'53.06"W, SS-27, 1MT
Redstone Arsenal, 34°38'03.21"N, 86°39'44.69"W, SS-25, 550KT

Secondary:

Anniston, 33°39'25.60"N, 85°49'10.02"W, SS-24, 550KT
Birmingham, 33°31'13.01"N, 86°48'41.47"W, SS-24, 550KT
Selma, 32°24'42.44"N, 87°01'20.03"W, SS-25, 550KT
Mobile, 30°41'11.00"N, 88°03'11.66"W, SS-25, 550KT

Tertiary:

Muscle Shoals, 34°44'32.75"N, 87°40'03.56"W, SS-25, 550KT
Gadsden, 34°00'26.52"N, 85°56'32.04"W, SS-24, 550KT
Childersburg, 33°16'58.09"N, 86°21'49.87"W, SS-25, 550KT
Tuscaloosa, 33°10'35.96"N, 87°33'35.96"W, SS-24, 550KT
Phenix City, 32°28'27.59"N, 85°00'50.06"W, SS-24, 550KT

ALASKA

Primary:

Eielson AFB, 64°39'54.67"N, 147°04'59.84"W, SS-25, 550KT
Elmendorf AFB, 61°15'06.89"N, 149°48'24.88"W, SS-25, 550KT
Fort Richardson. 61°15'49.12"N, 149°42'01.30"W, SS-24, 550KT

Secondary:

Adak Island, 51°52'41.60"N, 176°38'52.58"W, SS-24, 550KT
Shemya Island, 52°42'58.90"N, 174°06'50.28"W, SS-27, 1MT
Clear, 64°17'51.05"N, 149°09'08.00"W, SS-25, 550KT
Mount Cleveland, 52°49'24.72"N, 169°56'51.87"W, SS-25, 550KT

Tertiary: none

ARIZONA

Primary:

Davis-Monthan AFB, 32°08'48.38"N, 110°48'36.07"W, SS-25, 550KT

Titan missile launch sites,

31°12'8.16"N, 109°32'22.45"W, SS-27, 1MT
32°22'16.68"N, 110°4'3.19"W, SS-24, 550KT
32°4'4.3"N, 110°41'28.52"W, SS-27, 1MT
31°29'20.34"N, 110°47'32.76"W, SS-25, 550KT
31°30'20.61"N, 110°15'10.87"W, SS-24, 550KT
31°16'12.25"N, 110°40'28.07"W, SS-25, 550KT
31°38'26.28"N, 111°16'11.74"W, SS-25, 550KT
32°7'6.55"N, 109°53'36.13"W, SS-25, 550KT
31°27'18.75"N, 111°15'10.86"W, SS-27, 1MT
32°15'11.51"N, 109°55'38.61"W, SS-24, 550KT
32°4'4.82"N, 111°18'12.49"W, SS-24, 550KT
32°19'13.14"N, 109°55'37.92"W, SS-25, 550KT
32°25'18.85"N, 110°58'40.48"W, SS-24, 550KT
31°13'9.4"N, 110°7'5.14"W, SS-24, 550KT
31°54'37.68"N, 110°23'16.21"W, SS-24, 550KT
32°27'18.06"N, 110°28'19.18"W, SS-25, 550KT
31°55'38.61"N, 110°11'8.69"W, SS-25, 550KT
31°54'37.71"N, 111°18'13.49"W, SS-25, 550KT
32°13'10.39"N, 110°6'4.35"W, SS-27, 1MT
Luke AFB, 33°32'18.20"N, 112°22'16.61"W, SS-25, 550KT
MCAS Yuma, 32°39'03.33"N, 114°36'18.55"W, SS-24, 550KT
Williams AFB, 33°18'17.91"N, 111°39'57.87"W, SS-25, 550KT
Yuma Proving Ground. 33°08'57.73"N, 114°25'52.44"W, SS-25, 550KT

Secondary:

Gilbert, 33°21'04.62"N, 111°46'51.04"W, SS-27, 1MT
Perryville. 33°27'05.00"N, 112°26'49.43"W, SS-24, 550KT

Tertiary:

Phoenix, 33°26'47.28"N, 112°05'12.96"W, SS-24, 550KT

ARKANSAS

Primary:

Little Rock AFB, 34°54'20.28"N, 92°08'39.42"W, SS-24, 550KT
Titan missile launch sites,
34°26'18.55"N, 91°9'7.57"W, SS-25, 550KT
35°0'0.36"N, 91°16'12.69"W, SS-24, 550KT
34°57'38.1"N, 91°47'32.25"W, SS-25, 550KT
35°15'11.84"N, 91°10'8.29"W, SS-25, 550KT
35°1'1.4"N, 92°13'10"W, SS-27, 1MT
34°51'35.04"N, 91°55'38.63"W, SS-25, 550KT
34°56'38.63"N, 93°1'1.45"W, SS-25, 550KT
35°1'1.49"N, 91°24'17.22"W, SS-25, 550KT
35°12'9.25"N, 92°48'32.05"W, SS-25, 550KT
35°4'3.44"N, 91°41'28.62"W, SS-25, 550KT
34°45'30.9"N, 91°58'40.07"W, SS-24, 550KT
35°1'1.25"N, 91°54'37.32"W, SS-24, 550KT
34°57'38.51"N, 91°25'18.72"W, SS-25, 550KT
34°41'28.35"N, 91°15'11.5"W, SS-24, 550KT
35°0'0.59"N, 92°31'21.32"W, SS-27, 1MT
34°27'19.54"N, 91°21'15.9"W, SS-25, 550KT
34°46'31.42"N, 91°45'30.44"W, SS-24, 550KT
34°51'34.82"N, 92°16'12.9"W, SS-25, 550KT
35°7'5.95"N, 92°38'26.48"W, SS-24, 550KT
Blytheville AFB, 35°57'32.27"N, 89°56'58.91"W, SS-25, 550KT
Secondary:
Pine Bluff, 34°12'38.91"N, 92°00'12.27"W, SS-24, 550KT
West Memphis, 35°08'58.71"N, 90°13'19.65"W, SS-24, 550KT
Tertiary:
Fort Smith, 35°22'06.75"N, 94°22'22.78"W, SS-25, 550KT
Texarkana, 33°26'10.49"N, 93°59'20.32"W, SS-25, 550KT
Little Rock, 34°44'52.20"N, 92°16'12.67"W, SS-25, 550KT

CALIFORNIA

Primary:
Alameda NAS, 37°47'18.54"N, 122°18'57.00"W, SS-25, 550KT
Castle AFB, 37°22'04.90"N, 120°34'02.10"W, SS-25, 550KT
Beale AFB, 39°06'50.80"N, 121°23'39.38"W, SS-27, 1MT
Edwards AFB, 34°54'47.45"N, 117°53'07.01"W, SS-24, 550KT
El Toro MCAS, 33°40'16.28"N, 117°43'49.91"W, SS-24, 550KT
George AFB, 34°35'12.59"N, 117°22'37.68"W, SS-27, 1MT
Hamilton AFB, 34°55'53.14"N, 117°56'34.69"W, SS-24, 550KT
March AFB, 33°53'13.62"N, 117°15'32.98"W, SS-24, 550KT
Mather AFB, 38°32'56.33"N, 121°17'25.81"W, SS-25, 550KT
McClellan AFB, 38°39'53.96"N, 121°23'53.38"W, SS-25, 550KT
Miramar NAS, 32°52'17.64"N, 117°08'16.00"W, SS-24, 550KT
Norton AFB, 34°05'45.67"N, 117°14'47.74"W, SS-25, 550KT
Oxnard AFB, 34°11'01.14"N, 119°05'24.88"W, SS-25, 550KT
Travis AFB, 38°15'36.41"N, 121°56'39.67"W, SS-24, 550KT
Vandenberg AFB, 34°43'51.65"N, 120°33'25.79"W, SS-25, 550KT
Secondary:
San Francisco, 37°45'35.22"N, 122°25'32.76"W, SS-24, 550KT
San Jose, 37°18'50.98"N, 121°56'26.66"W, SS-25, 550KT
El Centro, 32°47'16.75"N, 115°34'01.43"W, SS-25, 550KT
China Lake, 44°26'12.76"N, 69°33'04.14"W, SS-25, 550KT
Camp Pendleton, 33°17'59.79"N, 117°21'16.05"W, SS-24, 550KT
Fort Ord, 36°37'26.60"N, 121°46'50.23"W, SS-27, 1MT
Twentynine Palms, 34°07'37.06"N, 116°07'34.97"W, SS-27, 1MT
Lemoore, 36°17'38.86"N, 119°47'27.61"W, SS-27, 1MT
Portola, 39°48'37.74"N, 120°28'12.48"W, SS-27, 1MT
Los Angeles, 34°00'31.76"N, 118°10'18.62"W, SS-24, 550KT
Oro Grande, 34°35'54.44"N, 117°20'11.47"W, SS-24, 550KT
Oceanside, 33°12'03.79"N, 117°21'57.19"W, SS-25, 550KT
San Diego, 32°43'29.75"N, 117°09'25.69"W, SS-25, 550KT

Lathrop, 37°48'23.94"N, 121°16'49.85"W, SS-27, 1MT
Santa Barbara, 34°25'09.30"N, 119°41'55.86"W, SS-24, 550KT
Oxnard, 34°12'10.83"N, 119°09'05.04"W, SS-25, 550KT
Ventura, 34°18'30.43"N, 119°13'49.92"W, SS-25, 550KT
Thousand Oaks, 34°11'52.65"N, 118°51'54.83"W, SS-24, 550KT
Mt. Laguna, 32°51'48.12"N, 116°26'16.64"W, SS-24, 550KT
Mill Valley, 37°54'05.62"N, 122°31'44.33"W, SS-24, 550KT
Tertiary:
Bakersfield, 35°19'37.03"N, 119°00'24.84"W, SS-27, 1MT
Barstow, 34°53'22.67"N, 117°01'11.06"W, SS-24, 550KT
Banning, 33°55'27.58"N, 116°52'17.35"W, SS-24, 550KT
Gilroy, 37°00'09.07"N, 121°34'12.42"W, SS-25, 550KT
Milford, 40°08'28.22"N, 120°11'37.24"W, SS-24, 550KT
Modesto, 38°39'27.20"N, 120°59'18.34"W, SS-24, 550KT
Monterey, 36°35'07.07"N, 121°53'20.85"W, SS-24, 550KT
Mojave, 35°03'23.02"N, 118°09'09.55"W, SS-24, 550KT
Sacramento, 38°33'48.70"N, 121°28'51.74"W, SS-24, 550KT
Santa Rosa, 38°26'24.29"N, 122°42'51.52"W, SS-25, 550KT
Stockton, 37°56'53.89"N, 121°17'17.89"W, SS-25, 550KT
Salinas, 36°40'39.71"N, 121°39'18.00"W, SS-25, 550KT
Fresno, 36°45'16.51"N, 119°44'53.22"W, SS-25, 550KT
Ridgecrest, 35°38'55.65"N, 117°40'56.88"W, SS-24, 550KT
Lancaster, 34°41'39.97"N, 118°08'15.31"W, SS-24, 550KT
Wrightwood, 34°21'32.41"N, 117°38'06.17"W, SS-24, 550KT
Yermo, 34°53'07.32"N, 116°49'09.15"W, SS-24, 550KT
Victorville, 34°31'11.62"N, 117°18'43.64"W, SS-27, 1MT
Warner Springs, 33°16'46.39"N, 116°38'44.96"W, SS-27, 1MT

COLORADO

Primary:
Cheyenne Mountain, 38°44'39.37"N, 104°50'47.79"W, SS-24, 550KT
Colorado Springs, 38°49'58.45"N, 104°49'25.45"W, SS-24, 550KT
Warren AFB Complex (Minuteman missiles),
38°9'7.42"N, 103°27'19.11"W, SS-25, 550KT
38°25'18.11"N, 103°39'26.76"W, SS-24, 550KT
40°19'14.88"N, 105°33'23.52"W, SS-24, 550KT
39°44'30.24"N, 105°10'8.33"W, SS-25, 550KT
40°7'5.5"N, 105°16'12.4"W, SS-25, 550KT
40°9'6.84"N, 105°7'5.88"W, SS-25, 550KT
38°33'23.93"N, 103°46'31.02"W, SS-27, 1MT
38°32'22.91"N, 105°29'20.63"W, SS-24, 550KT
38°21'14.2"N, 104°18'12.26"W, SS-24, 550KT
40°0'0.67"N, 105°14'10.72"W, SS-25, 550KT
38°49'34.17"N, 104°55'38.29"W, SS-25, 550KT
40°19'14.47"N, 105°2'2.07"W, SS-25, 550KT
40°8'6.86"N, 105°58'39.35"W, SS-24, 550KT
40°30'21.54"N, 105°42'29.03"W, SS-27, 1MT
Fort Carson, 38°44'30.03"N, 104°47'20.14"W, SS-25, 550KT
Secondary:
Denver, 39°43'00.00"N, 105°00'17.05"W, SS-25, 550KT
Pueblo, 38°15'04.80"N, 104°37'43.69"W, SS-25, 550KT
Tertiary:
Aurora, 39°41'05.27"N, 104°51'19.58"W, SS-24, 550KT
Boulder, 40°00'53.67"N, 105°16'33.02"W, SS-25, 550KT
Cheraw, 38°06'25.30"N, 103°30'38.77"W, SS-27, 1MT
Greeley, 40°25'21.70"N, 104°41'59.69"W, SS-25, 550KT
Boone, 38°14'47.81"N, 104°15'37.24"W, SS-25, 550KT
Broomfield, 39°55'17.02"N, 105°04'08.52"W, SS-24, 550KT
Rocky Flats, 39°25'51.83"N, 105°00'35.44"W, SS-24, 550KT

CONNECTICUT

Primary:
Brookley Field,
Groten-New London. 41°21'19.50"N, 72°05'58.73"W, SS-25, 550KT
Secondary: none
Tertiary:
Bristol, 41°40'40.13"N, 72°56'26.33"W, SS-24, 550KT
Bridgeport, 41°10'44.44"N, 73°11'36.10"W, SS-24, 550KT
Danbury, 41°22'51.66"N, 73°27'34.95"W, SS-25, 550KT
Hartford, 41°45'47.96"N, 72°40'49.34"W, SS-25, 550KT
New Haven, 41°18'32.25"N, 72°55'33.82"W, SS-25, 550KT
Norwalk, 41°06'37.57"N, 73°24'42.80"W, SS-25, 550KT
Stamford, 41°03'09.28"N, 73°32'25.34"W, SS-25, 550KT

DELAWARE

Primary:
Dover AFB, 39°07'32.31"N, 75°27'46.65"W, SS-24, 550KT
Secondary: none
Tertiary:
Wilmington, 39°44'42.90"N, 75°32'50.71"W, SS-25, 550KT
Odessa, 39°27'25.32"N, 75°39'40.11"W, SS-25, 550KT
New Castle, 39°39'45.24"N, 75°33'57.92"W, SS-25, 550KT

FLORIDA

Primary:
Cape Canaveral, 28°23'52.80"N, 80°36'40.15"W, SS-25, 550KT
Eglin AFB, 30°38'53.48"N, 86°19'15.70"W, SS-25, 550KT
Homestead AFB, 25°29'23.90"N, 80°23'21.97"W, SS-27, 1MT
Jacksonville NAS, 30°13'43.73"N, 81°40'52.85"W, SS-25, 550KT
Key West, 24°33'29.61"N, 81°48'08.43"W, SS-24, 550KT
MacDill AFB, 27°50'54.89"N, 82°31'15.59"W, SS-24, 550KT
Mayport, 30°23'44.79"N, 81°25'36.41"W, SS-25, 550KT
Orlando, 28°31'57.68"N, 81°29'24.92"W, SS-25, 550KT
Patrick AFB, 28°14'11.31"N, 80°36'26.30"W, SS-25, 550KT
St. Petersburg, 27°49'15.12"N, 82°40'38.96"W, SS-24, 550KT
Tyndall AFB, 30°01'33.98"N, 85°30'02.07"W, SS-25, 550KT
Pensacola NAS, 30°21'08.01"N, 87°15'53.02"W, SS-24, 550KT
Secondary:
Miami, 25°47'18.74"N, 80°17'14.49"W, SS-24, 550KT
Tertiary:
Port St. Joe, 29°49'02.10"N, 85°17'44.46"W, SS-25, 550KT
Tallahassee, 30°25'55.84"N, 84°16'58.25"W, SS-25, 550KT
Gainesville, 29°40'01.82"N, 82°19'03.74"W, SS-25, 550KT
Daytona Beach, 29°12'10.90"N, 81°03'01.95"W, SS-25, 550KT
Titusville, 28°37'58.70"N, 80°47'51.94"W, SS-24, 550KT
Sarasota, 27°20'30.68"N, 82°32'25.49"W, SS-24, 550KT
Ft. Myers, 26°38'06.97"N, 81°50'27.71"W, SS-24, 550KT
Palm Beach, 26°41'38.31"N, 80°03'59.55"W, SS-27, 1MT
Boca Raton, 26°22'08.33"N, 80°06'46.97"W, SS-25, 550KT
Fort Lauderdale, 26°07'14.26"N, 80°08'40.43"W, SS-27, 1MT

GEORGIA

Primary:
Warner-Robins AFB, 32°37'13.69"N, 83°35'16.17"W, SS-27, 1MT
Dobbins AFB, 33°54'55.37"N, 84°31'06.94"W, SS-25, 550KT
Fort Benning, 32°21'23.03"N, 84°57'30.47"W, SS-24, 550KT
Fort Stewart, 32°01'51.00"N, 81°37'50.55"W, SS-27, 1MT
King's Bay, 30°47'51.69"N, 81°33'49.30"W, SS-25, 550KT
Moody AFB, 30°58'05.78"N, 83°11'18.60"W, SS-24, 550KT
Atlanta, 33°44'53.22"N, 84°23'16.54"W, SS-25, 550KT
Secondary:

Albany, 31°35'21.58"N, 84°09'51.50"W, SS-24, 550KT
Brunswick, 31°09'01.39"N, 81°29'36.11"W, SS-24, 550KT
Savannah, 32°05'33.73"N, 81°06'07.78"W, SS-25, 550KT
Tertiary:
Augusta, 33°28'13.31"N, 81°59'48.89"W, SS-25, 550KT
Columbus, 32°27'46.51"N, 84°59'15.47"W, SS-25, 550KT
Stockbridge, 33°32'40.03"N, 84°13'54.62"W, SS-25, 550KT
Marietta, 33°57'09.02"N, 84°32'58.02"W, SS-24, 550KT

HAWAII

Primary:
Honolulu area
21°18'10.65"N, 157°48'58.76"W, SS-25, 550KT
21°22'26.48"N, 157°56'42.62"W, SS-24, 550KT
21°19'47.58"N, 158°04'23.39"W, SS-25, 550KT
21°32'33.77"N, 158°11'08.99"W, SS-24, 550KT
21°40'00.73"N, 158°00'11.86"W, SS-25, 550KT
21°19'18.50"N, 157°42'43.47"W, SS-25, 550KT
21°25'41.44"N, 157°48'16.61"W, SS-25, 550KT
Secondary: none
Tertiary: none

IDAHO

Primary:
Mountain Home AFB, 43°03'04.09"N, 115°51'57.83"W, SS-27, 1MT
Secondary: none
Tertiary:
Boise, 43°36'32.46"N, 116°12'31.96"W, SS-25, 550KT

ILLINOIS

Primary:
Chanute AFB, 40°17'29.80"N, 88°08'44.32"W, SS-24, 550KT
Scott AFB, 38°32'34.80"N, 89°50'49.93"W, SS-25, 550KT
Secondary:
Chicago, 41°48'26.57"N, 87°46'25.80"W, SS-25, 550KT
East St. Louis, 38°37'27.12"N, 90°08'56.88"W, SS-27, 1MT
Springfield, 39°47'51.99"N, 89°39'07.65"W, SS-25, 550KT
Tertiary:
Alton, 38°53'48.76"N, 90°09'56.80"W, SS-25, 550KT
Aurora, 41°45'12.89"N, 88°19'39.50"W, SS-25, 550KT
Bloomington, 40°29'06.03"N, 88°59'23.82"W, SS-24, 550KT
Champaign, 40°06'41.27"N, 88°14'17.28"W, SS-25, 550KT
Decatur, 39°50'25.64"N, 88°56'43.61"W, SS-25, 550KT
East Dubuque, 42°29'30.29"N, 90°38'27.65"W, SS-25, 550KT
Des Plaines, 42°02'16.95"N, 87°52'47.74"W, SS-25, 550KT
Freeport, 42°17'45.33"N, 89°37'43.38"W, SS-25, 550KT
Rockford, 42°15'56.15"N, 89°04'48.41"W, SS-24, 550KT
Zion, 42°26'06.47"N, 87°50'07.40"W, SS-24, 550KT
Moline, 41°29'26.23"N, 90°30'03.09"W, SS-25, 550KT
Peoria, 40°40'15.40"N, 89°35'55.67"W, SS-24, 550KT
Joliet, 41°31'29.19"N, 88°05'12.54"W, SS-27, 1MT
Elgin, 42°02'07.28"N, 88°17'29.74"W, SS-25, 550KT

INDIANA

Primary:
Grissom AFB, 40°39'07.28"N, 86°08'50.07"W, SS-27, 1MT
Secondary:
Crane, 38°53'27.44"N, 86°54'12.44"W, SS-25, 550KT
Jeffersonville, 38°17'44.38"N, 85°44'17.60"W, SS-27, 1MT
Tertiary:
Anderson, 40°06'21.82"N, 85°40'52.47"W, SS-25, 550KT
Evansville, 37°59'49.65"N, 87°33'43.73"W, SS-25, 550KT

Fort Wayne, 41°05'48.90"N, 85°07'04.01"W, SS-24, 550KT
Gary, 41°35'36.55"N, 87°20'57.51"W, SS-25, 550KT
Elkhart, 41°40'56.82"N, 85°58'38.91"W, SS-25, 550KT
Indianapolis, 39°46'01.04"N, 86°09'27.51"W, SS-25, 550KT
Lafayette, 40°24'28.24"N, 86°52'51.34"W, SS-24, 550KT
Muncie, 40°11'15.80"N, 85°23'02.83"W, SS-24, 550KT
New Albany, 38°17'20.24"N, 85°49'58.95"W, SS-27, 1MT
South Bend, 41°40'18.32"N, 86°15'20.94"W, SS-25, 550KT
Terre Haute, 39°27'43.92"N, 87°24'59.27"W, SS-25, 550KT

IOWA

Primary: none

Secondary:

Burlington, 40°48'23.43"N, 91°06'30.06"W, SS-27, 1MT
Sioux City, 42°29'57.65"N, 96°24'34.20"W, SS-24, 550KT
Tertiary:
Cedar Rapids, 41°58'57.99"N, 91°39'45.46"W, SS-27, 1MT
Council Bluffs, 41°15'04.67"N, 95°51'18.36"W, SS-24, 550KT
Dubuque, 42°29'56.09"N, 90°40'00.71"W, SS-25, 550KT
Des Moines, 41°34'57.66"N, 93°37'06.17"W, SS-25, 550KT
Davenport, 41°31'28.46"N, 90°34'31.37"W, SS-24, 550KT
Waterloo, 42°29'47.83"N, 92°20'37.68"W, SS-25, 550KT

KANSAS

Primary:

McConnell AFB, 37°37'18.16"N, 97°15'52.41"W, SS-25, 550KT
Titan missiles,
37°0'1.56"N, 96°10'7.36"W, SS-25, 550KT
37°24'17.6"N, 96°33'23.37"W, SS-24, 550KT
37°13'10.89"N, 96°10'8.92"W, SS-25, 550KT
37°11'8.37"N, 97°4'3.44"W, SS-25, 550KT
37°18'13.21"N, 96°29'20.27"W, SS-25, 550KT
37°18'12.64"N, 96°21'14.74"W, SS-25, 550KT
37°1'2.14"N, 97°5'4.16"W, SS-25, 550KT
37°21'15.98"N, 96°37'26.21"W, SS-25, 550KT
37°18'13.07"N, 96°30'20.93"W, SS-27, 1MT
37°25'17.76"N, 98°4'4.9"W, SS-27, 1MT
37°13'9.9"N, 96°36'25.21"W, SS-25, 550KT
37°7'6.54"N, 97°51'34.91"W, SS-25, 550KT
37°6'5.87"N, 97°42'28.22"W, SS-27, 1MT
37°16'11.43"N, 96°54'37.01"W, SS-25, 550KT
37°15'11.2"N, 98°6'5.3"W, SS-25, 550KT
37°23'16.97"N, 96°48'33.72"W, SS-25, 550KT
37°5'4.34"N, 97°3'3.85"W, SS-24, 550KT
37°10'8.32"N, 98°0'1.27"W, SS-24, 550KT
37°15'11.61"N, 97°39'26.79"W, SS-24, 550KT
Schilling AFB, 38°46'25.25"N, 97°31'50.66"W, SS-25, 550KT
Forbes AFB, 38°57'00.65"N, 95°39'59.03"W, SS-25, 550KT
Secondary:
Fort Riley, 39°09'01.40"N, 96°47'11.84"W, SS-25, 550KT
Olathe, 38°52'40.66"N, 94°48'34.72"W, SS-24, 550KT
Tertiary:
Elwood, 39°45'12.60"N, 94°52'18.61"W, SS-24, 550KT
Leavenworth, 39°18'40.98"N, 84°55'17.83"W, SS-25, 550KT
Manhattan, 39°11'11.05"N, 96°34'11.04"W, SS-25, 550KT
Topeka, 39°02'52.64"N, 95°41'04.82"W, SS-24, 550KT
Kansas City, 39°05'11.44"N, 94°33'29.28"W, SS-25, 550KT
DeSoto, 38°58'35.07"N, 94°58'02.66"W, SS-25, 550KT

KENTUCKY

Primary: none

Secondary:

Fort Campbell, 36°38'40.87"N, 87°26'38.70"W, SS-25, 550KT

Fort Knox, 37°53'19.13"N, 85°57'05.47"W, SS-25, 550KT
Louisville, 38°15'26.29"N, 85°45'50.92"W, SS-24, 550KT
Richmond, 37°44'40.27"N, 84°17'44.16"W, SS-24, 550KT
Tertiary:
Covington, 39°05'20.17"N, 84°29'41.25"W, SS-25, 550KT
Henderson, 37°49'44.02"N, 87°35'52.36"W, SS-24, 550KT
Owensboro, 37°45'17.66"N, 87°06'32.97"W, SS-25, 550KT
Paducah, 37°05'10.04"N, 88°35'56.70"W, SS-25, 550KT

LOUISIANA

Primary:

Barksdale AFB, 32°30'04.59"N, 93°33'36.66"W, SS-25, 550KT
England AFB, 31°19'27.09"N, 92°32'04.58"W, SS-24, 550KT
Secondary:
Fort Polk, 31°07'48.97"N, 92°58'25.92"W, SS-24, 550KT
New Orleans, 29°37'37.49"N, 90°02'20.39"W, SS-25, 550KT
Tertiary:
Baton Rouge, 30°26'33.87"N, 91°09'10.96"W, SS-25, 550KT
Sterlington, 32°41'47.93"N, 92°05'07.94"W, SS-25, 550KT
Monroe, 32°30'33.04"N, 92°07'08.91"W, SS-24, 550KT
Lake Charles, 30°13'33.79"N, 93°13.02'02.67"W, SS-24, 550KT
Lafayette, 30°13'35.32"N, 92°00'53.48"W, SS-25, 550KT
New Iberia, 30°00'09.77"N, 91°49'03.58"W, SS-24, 550KT

MAINE

Primary:

Loring AFB, 48°57'04.63"N, 67°53'24.22"W, SS-25, 550KT
Kittery, 43°07'16.00"N, 70°43'43.00"W, SS-25, 550KT
Secondary:
Brunswick, 43°54'22.09"N, 69°57'49.40"W, SS-25, 550KT
Charleston, 45°02'30.58"N, 68°59'32.81"W, SS-25, 550KT
Franklin, 44°35'12.89"N, 68°13'57.82"W, SS-24, 550KT
Tertiary:
Auburn, 44°05'52.75"N, 70°13'53.64"W, SS-25, 550KT
Bangor, 44°47'59.90"N, 68°46'40.22"W, SS-25, 550KT
Portland, 43°38'18.80"N, 70°17'12.69"W, SS-24, 550KT



MARYLAND

Primary:

Washington D.C., 38°53'37.03"N, 77°02'10.29"W, SS-25, 550KT
Camp David, 39°38'54.65"N, 77°27'51.85"W, SS-25, 550KT
Andrews AFB, 38°48'09.71"N, 76°52'49.40"W, SS-24, 550KT
Fort George Meade, 39°07'55.57"N, 76°45'17.77"W, SS-24, 550KT

Aberdeen Proving Ground, 39°30'09.92"N, 76°09'48.41"W, SS-25, 550KT
Secondary:
Baltimore, 39°17'16.41"N, 76°36'38.84"W, SS-25, 550KT
Tertiary:
Lexington Park, 38°16'05.92"N, 76°26'53.56"W, SS-25, 550KT
Wheaton, 39°02'11.27"N, 77°03'17.10"W, SS-24, 550KT

MASSACHUSETTS

Primary:
Fall River, 41°42'01.46"N, 71°09'02.81"W, SS-24, 550KT
Fort Devens, 42°33'08.44"N, 71°37'07.03"W, SS-25, 550KT
Otis AFB, 41°39'28.96"N, 70°33'08.50"W, SS-25, 550KT
Westover AFB, 42°11'56.19"N, 72°32'32.12"W, SS-25, 550KT
Secondary:
Boston, 42°21'30.05"N, 71°03'47.26"W, SS-24, 550KT
Springfield, 42°06'36.42"N, 72°34'47.77"W, SS-25, 550KT
Tertiary:
Fitchburg, 42°35'02.16"N, 71°48'08.33"W, SS-24, 550KT
Nantucket, 41°24'30.88"N, 70°13'40.94"W, SS-24, 550KT
New Bedford, 41°38'10.18"N, 70°55'58.54"W, SS-25, 550KT
Pawtucket, 41°52'39.29"N, 71°22'48.68"W, SS-24, 550KT
Lowell, 42°38'00.99"N, 71°19'01.53"W, SS-25, 550KT
Worcester, 42°15'44.96"N, 71°48'10.27"W, SS-24, 550KT

MICHIGAN

Primary:
Sawyer AFB, 46°20'31.75"N, 87°23'53.50"W, SS-24, 550KT
Kincheloe AFB, 46°15'04.33"N, 84°28'24.09"W, SS-25, 550KT
Selfridge AFB, 42°36'35.78"N, 82°50'13.44"W, SS-25, 550KT
Wurtsmith AFB, 44°27'10.59"N, 83°23'29.23"W, SS-25, 550KT
Secondary:
Detroit, 42°21'37.27"N, 83°05'41.62"W, SS-25, 550KT
Tertiary:
Alpena, 45°04'23.30"N, 83°26'10.39"W, SS-25, 550KT
Bay City, 43°35'42.97"N, 83°53'17.13"W, SS-24, 550KT
Battle Creek, 42°19'08.70"N, 85°10'48.79"W, SS-24, 550KT
Benton Harbor, 42°06'57.19"N, 86°27'10.72"W, SS-25, 550KT
Escanaba, 45°44'42.76"N, 87°05'00.08"W, SS-25, 550KT
Sault St. Marie, 45°50'55.36"N, 87°02'33.41"W, SS-25, 550KT
Midland, 43°37'15.39"N, 84°14'15.39"W, SS-25, 550KT
Saginaw, 43°25'40.99"N, 83°56'45.50"W, SS-25, 550KT
Muskegon, 43°13'30.81"N, 86°15'35.43"W, SS-25, 550KT
Flint, 43°00'46.64"N, 83°41'19.28"W, SS-24, 550KT
Grand Rapids, 42°57'48.18"N, 85°40'05.42"W, SS-25, 550KT
Port Huron, 42°58'01.68"N, 82°25'32.44"W, SS-24, 550KT
St. Clair, 42°49'22.60"N, 82°29'03.92"W, SS-24, 550KT
Lansing, 42°43'56.72"N, 84°33'21.88"W, SS-25, 550KT
Kalamazoo, 42°16'50.51"N, 85°34'57.72"W, SS-25, 550KT
Jackson, 42°14'48.04"N, 84°24'27.77"W, SS-25, 550KT

MINNESOTA

Primary: none
Secondary:
Minneapolis-St. Paul, 44°58'30.55"N, 93°10'42.90"W, SS-24, 550KT
Duluth, 46°47'52.08"N, 92°06'20.94"W, SS-25, 550KT
Tertiary:
Anoka, 45°12'01.84"N, 93°23'13.73"W, SS-25, 550KT
Forest Lake, 45°16'49.04"N, 92°59'06.74"W, SS-25, 550KT
Rochester, 44°01'09.46"N, 92°28'01.91"W, SS-25, 550KT

MISSISSIPPI

Primary:
Columbus AFB, 33°38'03.57"N, 88°26'26.47"W, SS-25, 550KT
Secondary:
Biloxi, 30°24'05.50"N, 88°53'34.09"W, SS-24, 550KT
Gulfport, 30°24'55.89"N, 89°05'53.85"W, SS-25, 550KT
Meridian, 32°21'54.11"N, 88°42'20.38"W, SS-25, 550KT
Tertiary:
Jackson, 32°17'55.26"N, 90°10'55.66"W, SS-25, 550KT
Meridian Station, 32°32'49.60"N, 88°36'28.18"W, SS-25, 550KT
Pascagoula, 30°21'56.16"N, 88°33'33.97"W, SS-25, 550KT

MISSOURI

Primary:
Whiteman AFB, 38°43'49.76"N, 93°33'19.36"W, SS-25, 550KT
Minuteman missiles,
37°23'16.42"N, 92°19'14.58"W, SS-25, 550KT
37°27'18.92"N, 94°7'6.83"W, SS-25, 550KT
39°6'5.24"N, 93°43'30.66"W, SS-25, 550KT
37°28'19.18"N, 93°49'33.65"W, SS-25, 550KT
37°44'30.48"N, 93°47'32.14"W, SS-24, 550KT
38°54'36.96"N, 93°6'5"W, SS-24, 550KT
38°40'27.97"N, 94°7'6.56"W, SS-25, 550KT
38°12'8.12"N, 92°33'22.28"W, SS-24, 550KT
39°9'6.13"N, 93°21'15.74"W, SS-24, 550KT
37°24'17.84"N, 93°28'20.36"W, SS-25, 550KT
38°26'18.43"N, 93°45'30.25"W, SS-24, 550KT
38°7'6.93"N, 92°51'35.28"W, SS-25, 550KT
37°40'27.05"N, 92°57'38.74"W, SS-24, 550KT
38°14'10.4"N, 92°48'33.45"W, SS-25, 550KT
38°59'40.73"N, 92°51'35.64"W, SS-25, 550KT
37°29'20.97"N, 93°55'37.98"W, SS-27, 1MT
37°24'17.4"N, 94°15'11.36"W, SS-25, 550KT
39°0'1.37"N, 92°29'20.15"W, SS-24, 550KT
38°16'11.16"N, 93°55'37.22"W, SS-24, 550KT
Secondary:
St. Louis, 38°37'29.31"N, 90°11'48.09"W, SS-24, 550KT
Kansas City, 39°05'53.89"N, 94°34'25.25"W, SS-24, 550KT
Fort Leonard Wood, 37°46'19.88"N, 92°06'45.94"W, SS-25, 550KT
Tertiary:
Columbia, 38°57'01.77"N, 92°19'52.54"W, SS-25, 550KT
Springfield, 37°11'33.94"N, 93°17'06.31"W, SS-25, 550KT
St. Joseph, 39°46'06.05"N, 94°50'47.81"W, SS-25, 550KT

MONTANA

Primary:
Glasgow AFB, 48°25'14.84"N, 106°31'36.59"W, SS-25, 550KT
Malmstrom AFB, 47°30'39.62"N, 111°11'05.00"W, SS-27, 1MT
Minuteman missiles,
46°3'3.14"N, 108°12'9.09"W, SS-24, 550KT
47°56'38.6"N, 108°54'36.29"W, SS-25, 550KT
47°14'10.78"N, 109°13'9.44"W, SS-25, 550KT
47°6'5.51"N, 109°53'36.64"W, SS-24, 550KT
46°7'6.93"N, 111°37'25.97"W, SS-25, 550KT
47°38'26.27"N, 108°44'30.53"W, SS-25, 550KT
47°49'34.36"N, 108°27'18.45"W, SS-25, 550KT
48°5'4.99"N, 110°44'30.56"W, SS-24, 550KT
46°24'16.44"N, 110°51'34.42"W, SS-25, 550KT
46°38'26.16"N, 110°12'8.52"W, SS-25, 550KT
47°58'39.76"N, 110°33'22.42"W, SS-25, 550KT
48°6'4.35"N, 109°36'25.74"W, SS-24, 550KT
46°4'3.34"N, 112°13'9.43"W, SS-24, 550KT
46°37'25.72"N, 109°12'9.64"W, SS-24, 550KT
48°6'4.93"N, 110°25'17.23"W, SS-25, 550KT

48°54.33"N, 109°47'32.04"W, SS-25, 550KT
46°48'33.76"N, 110°49'34.43"W, SS-24, 550KT
47°37'25.57"N, 110°55'37.96"W, SS-25, 550KT
47°9'6.16"N, 109°30'21.29"W, SS-24, 550KT
Secondary: none
Tertiary:
Butte, 46°00'11.95"N, 112°31'49.84"W, SS-24, 550KT
Billings, 45°47'02.77"N, 108°31'46.92"W, SS-25, 550KT
Helena, 46°35'30.87"N, 112°02'06.88"W, SS-25, 550KT
Missoula, 46°51'58.57"N, 114°00'58.60"W, SS-24, 550KT

NEBRASKA

Primary:
Minuteman missiles,
40°31'22.59"N, 102°12'8.37"W, SS-27, 1MT
41°31'22.43"N, 103°21'14.92"W, SS-25, 550KT
40°42'29.41"N, 103°4'3.12"W, SS-24, 550KT
40°54'37.17"N, 103°5'4.81"W, SS-25, 550KT
41°6'4.36"N, 102°45'31.84"W, SS-25, 550KT
41°34'24.35"N, 102°24'17.83"W, SS-25, 550KT
41°26'18.72"N, 103°49'33.71"W, SS-24, 550KT
41°25'18.36"N, 103°4'3.75"W, SS-24, 550KT
40°41'28.09"N, 102°21'15.46"W, SS-24, 550KT
41°25'17.66"N, 102°12'8.53"W, SS-24, 550KT
40°36'25.4"N, 103°54'37.2"W, SS-25, 550KT
41°10'8.17"N, 103°7'6.82"W, SS-25, 550KT
40°35'24.77"N, 102°58'39.23"W, SS-24, 550KT
40°57'38.22"N, 103°14'10.63"W, SS-25, 550KT
Offutt AFB, 41°06'56.77"N, 95°54'36.15"W, SS-25, 550KT
Secondary: none
Tertiary:
Lincoln, 40°47'50.11"N, 96°40'15.96"W, SS-24, 550KT

NEVADA

Primary:
Nellis AFB, 36°13'54.40"N, 115°02'11.93"W, SS-25, 550KT
Groom Lake (Area 51), 37°14'09.80"N, 115°48'42.05"W, SS-25, 550KT
Secondary:
Hawthorne, 38°31'28.26"N, 118°37'25.33"W, SS-25, 550KT
Tertiary:
Fallon, 39°28'24.18"N, 118°46'34.65"W, SS-24, 550KT
Reno, 39°31'43.05"N, 119°48'45.22"W, SS-24, 550KT

NEW HAMPSHIRE

Primary:
Pease AFB, 43°04'45.07"N, 70°48'54.28"W, SS-25, 550KT
Portsmouth Harbor, 43°04'07.69"N, 70°42'30.89"W, SS-24, 550KT
Secondary: none
Tertiary:
Manchester, 42°59'32.06"N, 71°27'40.58"W, SS-25, 550KT
Nashua, 42°45'58.41"N, 71°28'02.35"W, SS-25, 550KT

NEW JERSEY

Primary:
Fort Dix-McGuire AFB, 40°00'48.93"N, 74°36'38.45"W, SS-24, 550KT
Lakehurst NAS, 40°01'57.67"N, 74°21'12.04"W, SS-25, 550KT
Fort Monmouth, 40°19'05.82"N, 74°01'51.41"W, SS-24, 550KT
Perth Amboy, 40°30'27.48"N, 74°16'16.05"W, SS-25, 550KT
Secondary:
McKee City, 39°27'10.40"N, 74°38'34.45"W, SS-25, 550KT

Philadelphia, 39°52'21.14"N, 75°15'03.07"W, SS-25, 550KT
Rockaway, 40°54'05.80"N, 74°30'51.29"W, SS-25, 550KT
Trenton, 40°13'00.13"N, 74°44'31.07"W, SS-24, 550KT
Tertiary:
Colts Neck, 40°16'19.43"N, 74°09'37.05"W, SS-24, 550KT
Lakehurst, 40°00'42.68"N, 74°19'08.31"W, SS-24, 550KT
Long Branch, 40°17'54.51"N, 74°00'09.69"W, SS-24, 550KT
Middletown, 40°23'27.40"N, 74°06'40.02"W, SS-24, 550KT
Millville, 39°23'22.79"N, 75°02'54.65"W, SS-24, 550KT

NEW MEXICO

Primary:
Alamogordo, 32°53'33.83"N, 105°57'32.52"W, SS-25, 550KT
Cannon AFB, 34°23'10.69"N, 103°19'13.41"W, SS-24, 550KT
Kirtland AFB, 34°58'33.79"N, 106°30'08.43"W, SS-25, 550KT
Walker AFB, 33°17'52.65"N, 104°31'05.16"W, SS-24, 550KT
White Sands, 32°22'34.32"N, 106°29'49.20"W, SS-27, 1MT
Secondary:
Albuquerque, 35°05'41.26"N, 106°39'38.46"W, SS-25, 550KT
Tertiary:
Gallup, 35°31'39.49"N, 108°44'30.80"W, SS-24, 550KT

NEW YORK

Primary:
Griffiss AFB, 43°13'42.43"N, 75°24'44.10"W, SS-27, 1MT
Plattsburgh AFB, 44°39'17.50"N, 73°27'46.60"W, SS-24, 550KT
Secondary:
New York City, 40°45'18.35"N, 73°59'19.45"W, SS-25, 550KT
Buffalo, 42°53'07.30"N, 78°50'49.40"W, SS-25, 550KT
Syracuse, 43°02'24.94"N, 76°07'30.20"W, SS-27, 1MT
Watervliet, 42°43'23.93"N, 73°42'17.27"W, SS-25, 550KT
Tertiary:
Albany, 42°38'18.75"N, 73°45'03.78"W, SS-25, 550KT
Binghamton, 42°05'56.02"N, 75°55'00.23"W, SS-25, 550KT
Brookhaven National Laboratory, 43°17'19.40"N, 77°47'21.12"W, SS-24, 550KT
Schenectady, 42°48'47.74"N, 73°56'39.12"W, SS-24, 550KT
Troy, 42°43'34.77"N, 73°41'30.74"W, SS-25, 550KT
Rochester, 43°09'13.17"N, 77°36'55.48"W, SS-27, 1MT

NORTH CAROLINA

Primary:
Cherry Point, 43°54'01.36"N, 76°52'49.28"W, SS-24, 550KT
Pope AFB, 35°10'23.66"N, 79°01'07.20"W, SS-24, 550KT
Seymour Johnson AFB, 35°20'35.81"N, 77°57'50.11"W, SS-25, 550KT
Secondary:
Camp Lejeune, 34°43'07.32"N, 77°20'29.72"W, SS-24, 550KT
Fort Bragg, 35°08'19.51"N, 79°00'03.23"W, SS-25, 550KT
Southport, 33°55'14.63"N, 78°01'13.04"W, SS-25, 550KT
Jacksonville, 34°45'24.25"N, 77°24'23.12"W, SS-24, 550KT
Fort Fisher, 33°58'15.46"N, 77°55'08.73"W, SS-24, 550KT
Tertiary:
Asheville, 35°36'04.76"N, 82°33'15.74"W, SS-24, 550KT
Carolina Beach, 34°02'01.44"N, 77°53'52.74"W, SS-24, 550KT
Charlotte, 35°13'32.90"N, 80°50'45.93"W, SS-25, 550KT
Durham, 35°59'33.90"N, 78°53'59.37"W, SS-25, 550KT
Graham, 36°04'07.27"N, 79°24'03.64"W, SS-24, 550KT
Greensboro, 36°04'19.69"N, 79°47'39.20"W, SS-25, 550KT
Morrisville, 35°49'25.67"N, 78°49'37.91"W, SS-24, 550KT
Raleigh, 35°46'49.84"N, 78°38'20.83"W, SS-27, 1MT
Wilmington, 34°13'54.09"N, 77°55'50.78"W, SS-25, 550KT
Winston-Salem, 36°05'47.94"N, 80°14'36.97"W, SS-24, 550KT

NORTH DAKOTA

Primary:

Grand Forks AFB, 47°57'21.05"N, 97°23'30.94"W, SS-25, 550KT

Minuteman missiles,

46°33'22.12"N, 97°0'1.55"W, SS-25, 550KT
47°25'18.58"N, 97°27'18.98"W, SS-24, 550KT
46°42'29.32"N, 98°7'5.23"W, SS-24, 550KT
47°33'23.5"N, 97°56'38.77"W, SS-24, 550KT
47°1'1.76"N, 98°3'3.58"W, SS-25, 550KT
48°7'6.73"N, 98°8'6.97"W, SS-25, 550KT
48°25'17.46"N, 98°5'4.55"W, SS-24, 550KT
48°0'0.59"N, 97°20'14.75"W, SS-25, 550KT
47°14'10.49"N, 97°24'17.69"W, SS-25, 550KT
47°10'7.51"N, 98°54'37.12"W, SS-25, 550KT
48°22'16.33"N, 98°37'25.9"W, SS-25, 550KT
48°22'16.12"N, 98°19'14.02"W, SS-25, 550KT
47°15'10.95"N, 97°55'37.69"W, SS-25, 550KT
46°39'27.97"N, 98°8'6.47"W, SS-25, 550KT
48°0'1.39"N, 98°55'38.28"W, SS-24, 550KT
46°41'28.49"N, 98°18'13.64"W, SS-24, 550KT
47°19'13.49"N, 98°3'3.32"W, SS-25, 550KT
48°34'24.52"N, 98°6'5.59"W, SS-25, 550KT
46°52'36.65"N, 98°51'35.07"W, SS-25, 550KT
Minot AFB, 48°25'10.10"N, 101°20'08.84"W, SS-24, 550KT

Minuteman missiles,

47°17'12.03"N, 99°33'23.01"W, SS-25, 550KT
47°46'31.91"N, 100°43'29.79"W, SS-24, 550KT
48°25'18.08"N, 99°51'35.65"W, SS-24, 550KT
47°33'23.48"N, 99°55'37.66"W, SS-24, 550KT
47°46'32.6"N, 101°51'35.98"W, SS-24, 550KT
48°21'14.82"N, 102°18'12.09"W, SS-27, 1MT
48°28'20.62"N, 100°18'13.11"W, SS-25, 550KT
48°10'8.01"N, 101°9'6.77"W, SS-27, 1MT
48°23'16.49"N, 101°47'32.02"W, SS-24, 550KT
48°0'1.32"N, 101°43'30.35"W, SS-25, 550KT
47°57'39.36"N, 101°48'33.8"W, SS-24, 550KT
48°27'19.58"N, 100°9'7.92"W, SS-25, 550KT
47°24'17.01"N, 102°5'4.35"W, SS-24, 550KT
47°59'40.41"N, 100°25'17.41"W, SS-25, 550KT
47°40'28.35"N, 101°21'14.69"W, SS-24, 550KT
47°34'24.85"N, 99°42'29.84"W, SS-24, 550KT
47°47'32.93"N, 99°58'40.57"W, SS-24, 550KT
47°40'27.94"N, 101°36'25.87"W, SS-25, 550KT
47°24'16.09"N, 100°53'36.26"W, SS-24, 550KT

Secondary: none

Tertiary:

Grand Forks, 47°55'31.98"N, 97°01'58.26"W, SS-24, 550KT
Fargo, 46°52'37.79"N, 96°47'20.84"W, SS-25, 550KT

OHIO

Primary:

Lockbourne AFB (Rickenbacker AFB), 39°48'53.02"N, 82°55'41.55"W, SS-25, 550KT
Wright-Patterson AFB, 39°49'33.13"N, 84°02'32.22"W, SS-24, 550KT

Secondary:

Cleveland, 41°28'45.88"N, 81°40'42.68"W, SS-25, 550KT
Youngstown, 41°05'42.09"N, 80°38'51.77"W, SS-25, 550KT

Tertiary:

Akron, 41°04'54.13"N, 81°30'58.90"W, SS-25, 550KT
Bellaire, 40°00'54.21"N, 80°44'39.10"
Canton, 40°47'56.40"N, 81°22'28.37"W, SS-25, 550KT

Columbia, 40°34'36.92"N, 81°30'30.07"W, SS-25, 550KT
Dayton, 39°45'35.05"N, 84°11'54.57"W, SS-27, 1MT
Lima, 40°44'31.10"N, 84°06'18.81"W, SS-24, 550KT
Mansfield, 40°45'18.00"N, 82°31'15.71"W, SS-27, 1MT
Middletown, 39°30'12.14"N, 84°22'27.47"W, SS-25, 550KT
Miamisburg, 39°38'24.11"N, 84°15'31.06"W, SS-24, 550KT
Springfield, 39°55'22.60"N, 83°47'49.43"W, SS-24, 550KT
Steubenville, 40°22'09.31"N, 80°37'53.51"W, SS-25, 550KT
Windham, 41°14'31.33"N, 81°02'35.06"W, SS-24, 550KT
Toledo, 41°39'31.54"N, 83°32'26.22"W, SS-25, 550KT
Vandalia, 39°53'48.70"N, 84°12'16.78"W, SS-25, 550KT

OKLAHOMA

Primary:

Altus AFB, 34°39'17.91"N, 99°16'50.62"W, SS-25, 550KT
Tinker AFB, 35°25'15.56"N, 97°23'31.79"W, SS-27, 1MT
Vance AFB, 36°20'32.01"N, 97°54'35.37"W, SS-24, 550KT

Secondary:

Fort Sill, 34°39'32.76"N, 98°23'48.16"W, SS-24, 550KT

Tertiary:

El Reno, 35°31'57.30"N, 97°57'14.06"W, SS-25, 550KT
Tulsa, 36°09'23.33"N, 95°59'46.13"W, SS-24, 550KT
McAlester, 34°51'11.82"N, 95°34'43.68"W, SS-24, 550KT
Oklahoma City, 35°28'17.33"N, 97°31'11.06"W, SS-25, 550KT

OREGON

Primary:

Adair AFB,

Secondary:

Portland, 45°31'18.52"N, 122°40'41.43"W, SS-25, 550KT

Tertiary:

Canby, 45°15'58.64"N, 122°41'30.75"W, SS-24, 550KT
Eugene, 44°03'07.42"N, 123°05'18.33"W, SS-25, 550KT
Klamath Falls, 42°13'21.72"N, 121°47'01.81"W, SS-24, 550KT
Madras, 44°37'50.79"N, 121°07'55.11"W, SS-27, 1MT
Salem, 44°56'10.55"N, 123°01'44.71"W, SS-25, 550KT

PENNSYLVANIA

Primary: none

Secondary:

Pittsburgh, 40°26'25.41"N, 79°59'51.09"W, SS-25, 550KT
Philadelphia, 39°57'17.39"N, 75°09'28.61"W, SS-25, 550KT
Harrisburg, 40°16'15.31"N, 76°53'00.54"W, SS-25, 550KT
Scranton, 41°24'30.57"N, 75°39'45.97"W, SS-24, 550KT
Willow Grove, 40°08'24.43"N, 75°07'28.43"W, SS-24, 550KT

Tertiary:

Allentown, 40°36'47.98"N, 75°29'01.35"W, SS-25, 550KT
Altoona, 40°30'36.31"N, 78°23'57.27"W, SS-24, 550KT
Beaver, 40°41'41.40"N, 80°18'16.55"W, SS-24, 550KT
Bethlehem, 40°37'32.95", 75°22'12.11"W, SS-24, 550KT
Chester, 39°50'59.93"N, 75°21'15.97"W, SS-24, 550KT
Erie, 39°50'59.93"N, 75°21'15.97"W, SS-27, 1MT
Harrisburg, 40°15'53.61"N, 76°52'58.09"W, SS-24, 550KT
York, 39°57'47.11"N, 76°43'35.20"W, SS-27, 1MT
Johnstown, 40°19'30.08"N, 78°55'08.09"W, SS-27, 1MT
Lancaster, 40°02'20.58"N, 78°18'19.77"W, SS-25, 550KT
Natrona Heights, 40°36'38.02"N, 79°43'39.81"W, SS-24, 550KT
Mechanicsburg, 40°12'54.75"N, 77°00'36.53"W, SS-25, 550KT
Reading, 40°20'05.84"N, 75°55'19.61"W, SS-24, 550KT
Waynesboro, 39°45'12.96"N, 77°34'51.17"W, SS-25, 550KT

RHODE ISLAND

Primary: none

Secondary:

Newport, 40°28'40.33"N, 77°07'49.82"W, SS-24, 550KT

Tertiary:

Providence, 41°49'28.99"N, 71°25'14.11"W, SS-24, 550KT

Westerly, 41°22'51.23"N, 71°49'35.99"W, SS-25, 550KT

SOUTH CAROLINA

Primary:

Charleston, 32°51'45.11"N, 79°57'45.31"W, SS-25, 550KT

Myrtle Beach AFB, 33°40'32.45"N, 78°55'57.11"W, SS-27, 1MT

Shaw AFB, 33°58'20.44"N, 80°28'11.30"W, SS-24, 550KT

Secondary:

Parris Island, 32°20'01.25"N, 80°41'20.85"W, SS-24, 550KT

Tertiary:

Aiken, 33°33'35.98"N, 81°43'14.82"W, SS-24, 550KT

Columbia, 33°59'52.39"N, 81°01'35.46"W, SS-27, 1MT

Greenville, 34°50'57.30"N, 82°24'00.70"W, SS-27, 1MT

Greer, 34°56'04.48"N, 82°13'19.97"W, SS-25, 550KT

Hardeeville, 32°16'59.04"N, 81°04'41.38"W, SS-27, 1MT

North Augusta, 33°30'07.14"N, 81°57'54.63"W, SS-25, 550KT

SOUTH DAKOTA

Primary:

Ellsworth AFB, 44°09'15.69"N, 103°06'11.61"W, SS-24, 550KT

Minuteman missiles,

43°27'19.41"N, 101°5'4.17"W, SS-24, 550KT

44°14'10.8"N, 102°59'40.17"W, SS-24, 550KT

44°13'10.93"N, 102°15'11.16"W, SS-24, 550KT

44°16'12.3"N, 102°37'26.33"W, SS-25, 550KT

44°34'24.9"N, 101°22'16.01"W, SS-25, 550KT

43°40'27.26"N, 101°50'34.46"W, SS-24, 550KT

44°1'12.96"N, 103°55'38.52"W, SS-24, 550KT

44°36'24.91"N, 102°56'38.33"W, SS-24, 550KT

44°10'7.31"N, 102°4'3.03"W, SS-24, 550KT

43°53'36.05"N, 102°0'1.94"W, SS-25, 550KT

43°52'36.1"N, 101°53'36.69"W, SS-24, 550KT

44°30'21.71"N, 103°54'37.08"W, SS-25, 550KT

43°37'25.5"N, 102°58'40.73"W, SS-24, 550KT

44°5'4.54"N, 103°41'28.17"W, SS-25, 550KT

44°22'15.24"N, 103°54'36.25"W, SS-25, 550KT

45°1'2.4"N, 103°43'30.38"W, SS-24, 550KT

44°8'6.65"N, 103°36'25.05"W, SS-24, 550KT

43°58'40.72"N, 101°33'22.58"W, SS-24, 550KT

43°35'24.42"N, 101°45'30.55"W, SS-24, 550KT

Secondary: none

Tertiary:

Rapid City, 44°04'52.72"N, 103°13'39.35"W, SS-25, 550KT

Sioux Falls, 43°32'18.45"N, 96°43'54.45"W, SS-25, 550KT

TENNESSEE

Primary: none

Secondary:

Oak Ridge, 35°59'49.49"N, 84°20'00.45"W, SS-25, 550KT

Memphis, 35°09'19.84"N, 90°03'05.69"W, SS-24, 550KT

Tertiary:

Alcoa, 35°46'47.62"N, 83°58'45.75"W, SS-25, 550KT

Bristol, 36°35'41.28"N, 82°12'53.63"W, SS-24, 550KT

Chattanooga, 35°02'47.36"N, 85°18'38.05"W, SS-27, 1MT

Knoxville, 35°57'42.23"N, 83°54'55.63"W, SS-24, 550KT

Nashville, 36°09'57.70"N, 86°47'00.47"W, SS-24, 550KT

Signal Mountain, 35°07'42.60"N, 85°20'33.89"W, SS-24, 550KT

TEXAS

Primary:

Bergstrom AFB, 30°11'41.84"N, 97°40'33.53"W, SS-27, 1MT

Brooks AFB, 29°20'29.13"N, 98°26'23.37"W, SS-24, 550KT

Carswell AFB, 32°46'12.11"N, 97°26'18.04"W, SS-25, 550KT

Dyess AFB, 32°25'15.67"N, 99°51'09.91"W, SS-24, 550KT

Goodfellow AFB, 31°26'09.04"N, 100°24'09.23"W, SS-25, 550KT

Lackland AFB, 29°23'36.52"N, 98°36'28.94"W, SS-25, 550KT

Laredo AFB, 27°37'11.66"N, 99°32'40.51"W, SS-24, 550KT

Laughlin AFB, 29°21'32.83"N, 100°47'05.45"W, SS-24, 550KT

Randolph AFB, 29°31'55.44"N, 98°16'48.23"W, SS-25, 550KT

Reese AFB, 33°35'44.98"N, 102°02'08.61"W, SS-24, 550KT

Sheppard AFB, 33°59'01.88"N, 98°29'50.71"W, SS-25, 550KT

Webb AFB,

Secondary:

Beeville, 28°24'12.86"N, 97°44'59.66"W, SS-24, 550KT

Corpus Christi, 27°47'57.83"N, 97°24'33.97"W, SS-25, 550KT

Fort Bliss, 31°48'38.37"N, 106°25'42.52"W, SS-25, 550KT

Fort Hood, 31°08'13.83"N, 97°46'56.10"W, SS-25, 550KT

Houston, 29°45'58.89"N, 95°21'56.32"W, SS-24, 550KT

Kingsville, 27°30'55.99"N, 97°52'04.55"W, SS-24, 550KT

Sherman, 33°38'28.31"N, 96°36'32.94"W, SS-25, 550KT

Texarkana, 33°26'25.66"N, 94°02'47.87"W, SS-27, 1MT

Tertiary:

Alice, 27°45'03.70"N, 98°04'11.96"W, SS-25, 550KT

Arlington, 32°44'06.47"N, 97°06'34.88"W, SS-25, 550KT

Beaumont, 30°04'46.83"N, 94°06'26.31"W, SS-24, 550KT

Brownsville, 25°55'08.37"N, 97°28'31.26"W, SS-24, 550KT

Bryan, 30°40'30.68"N, 96°22'14.63"W, SS-27, 1MT

Caddo Lake, 32°45'01.46"N, 93°58'29.91"W, SS-25, 550KT

Dallas, 32°46'56.45"N, 96°47'59.72"W, SS-27, 1MT

Freeport, 28°57'17.76"N, 95°21'41.27"W, SS-27, 1MT

Galveston, 29°22'19.16"N, 95°00'26.88"W, SS-24, 550KT

Lake Jackson, 29°02'01.11"N, 95°25'47.44"W, SS-24, 550KT

Longview, 32°29'44.47"N, 94°43'35.83"W, SS-24, 550KT

McAllen, 26°12'48.67"N, 98°14'16.27"W, SS-25, 550KT

Midland, 32°00'06.88"N, 102°05'19.15"W, SS-25, 550KT

Odessa, 31°51'34.67"N, 102°22'29.10"W, SS-25, 550KT

Tyler, 32°19'58.55"N, 95°18'04.26"W, SS-24, 550KT

Waco, 31°33'11.02"N, 97°08'38.68"W, SS-24, 550KT

UTAH

Primary:

Hill AFB, 41°07'10.33"N, 111°58'45.63"W, SS-25, 550KT

Secondary:

Dugway Proving Ground, 40°11'25.73"N, 113°17'55.46"W, SS-25, 550KT

Tertiary:

Salt Lake City, 40°43'08.66"N, 111°57'54.68"W, SS-24, 550KT

Provo, 40°13'21.13"N, 111°39'42.51"W, SS-24, 550KT

VERMONT

Primary: none

Secondary:

Tertiary:

Burlington, 44°28'31.69"N, 73°11'45.82"W, SS-24, 550KT

VIRGINIA

Primary:

Mount Weather, 39°03'44.77"N, 77°53'19.55"W, SS-25, 550KT

Berryville, 39°09'09.13"N, 77°58'57.85"W, SS-25, 550KT

Cape Charles, 37°15'45.01"N, 76°00'52.92"W, SS-25, 550KT

Dulles Airport, 38°56'27.49"N, 77°26'33.78"W, SS-25, 550KT
Langley AFB, 37°05'17.29"N, 76°20'23.40"W, SS-25, 550KT
Norfolk, 36°50'30.67"N, 76°17'38.00"W, SS-24, 550KT
Oceana NAS, 36°49'02.59"N, 76°01'31.19"W, SS-27, 1MT
Secondary:
Richmond, 37°31'55.80"N, 77°25'12.59"W, SS-24, 550KT
Newport News, 37°07'17.78"N, 76°29'47.37"W, SS-24, 550KT
Mount Vernon, 38°42'37.35"N, 77°05'15.73"W, SS-24, 550KT
Radford, 37°07'35.39"N, 80°34'31.40"W, SS-25, 550KT
Tertiary:
Blackstone, 37°04'31.64"N, 77°59'34.93"W, SS-25, 550KT
Chincoteague, 37°56'19.89"N, 75°25'25.87"W, SS-25, 550KT
Fort Eustis, 37°09'25.44"N, 76°35'05.44"W, SS-24, 550KT
Hopewell, 37°17'59.77"N, 77°17'59.42"W, SS-24, 550KT
Lynchburg, 37°24'20.52"N, 79°09'10.05"W, SS-25, 550KT
Manassas, 38°46'01.54"N, 77°27'48.08"W, SS-25, 550KT
Petersburg, 37°13'41.41"N, 77°24'48.41"W, SS-24, 550KT
Quantico, 38°31'46.35"N, 77°26'41.77"W, SS-24, 550KT
Roanoke, 37°16'44.51"N, 79°56'53.88"W, SS-25, 550KT
Yorktown, 37°12'36.87"N, 76°29'25.72"W, SS-25, 550KT

WASHINGTON

Primary:
Puget Sound Naval Shipyard, 47°33'43.85"N, 122°37'44.23"W, SS-25, 550KT
Fairchild AFB, 47°37'41.23"N, 117°38'42.26"W, SS-25, 550KT
McChord AFB, 47°08'31.34"N, 122°28'58.37"W, SS-25, 550KT
Secondary:
Everett, 47°56'49.06"N, 122°12'36.78"W, SS-24, 550KT
Oak Harbor, 48°17'34.63"N, 122°39'13.19"W, SS-25, 550KT
Richland, 46°30'21.11"N, 119°33'19.26"W, SS-24, 550KT
Seattle, 47°40'46.08"N, 122°15'49.67"W, SS-25, 550KT
Fort Lewis, 47°05'23.37"N, 122°35'10.96"W, SS-24, 550KT
Walla Walla, 46°03'59.17"N, 118°20'25.03"W, SS-27, 1MT
Tertiary:
Copalis Beach, 47°06'52.22"N, 124°10'32.75"W, SS-25, 550KT
Spokane, 47°39.40.18"N, 117°25'09.75"W, SS-25, 550KT
Vancouver, 45°37'21.94"N, 122°39'49.03"W, SS-24, 550KT

WEST VIRGINIA

Primary:
White Sulphur Springs, 37°47'15.49"N, 80°18'16.85"W, SS-24, 550KT
Secondary: none
Tertiary:
Charleston, 38°21'07.25"N, 81°38'05.51"W, SS-24, 550KT
Cedar Grove, 38°13'09.30"N, 81°25'38.39"W, SS-24, 550KT
Huntington, 38°25'16.99"N, 82°25'54.30"W, SS-24, 550KT
Wheeling, 40°04'01.26"N, 80°43'24.27"W, SS-27, 1MT

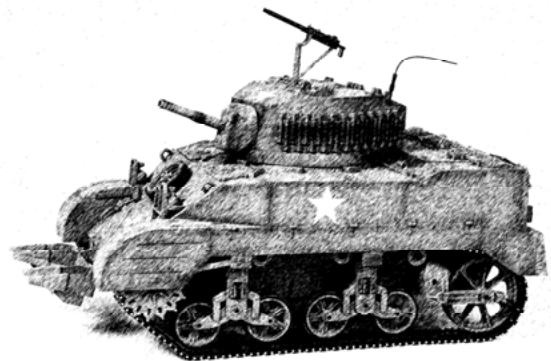
WISCONSIN

Primary: none
Secondary:
Madison, 43°04'11.38"N, 89°23'50.16"W, SS-27, 1MT
Tertiary:
Appleton, 44°15'47.21"N, 88°24'32.02"W, SS-24, 550KT
Eau Claire, 44°48'43.11"N, 91°29'56.79"W, SS-24, 550KT
Green Bay, 44°31'01.90"N, 88°00'39.43"W, SS-25, 550KT
Kenosha, 42°34'58.28"N, 87°50'28.03"W, SS-25, 550KT
Mequon, 43°13'59.99"N, 87°58'54.48"W, SS-25, 550KT
Milwaukee, 43°02'12.11"N, 87°54'32.32"W, SS-25, 550KT

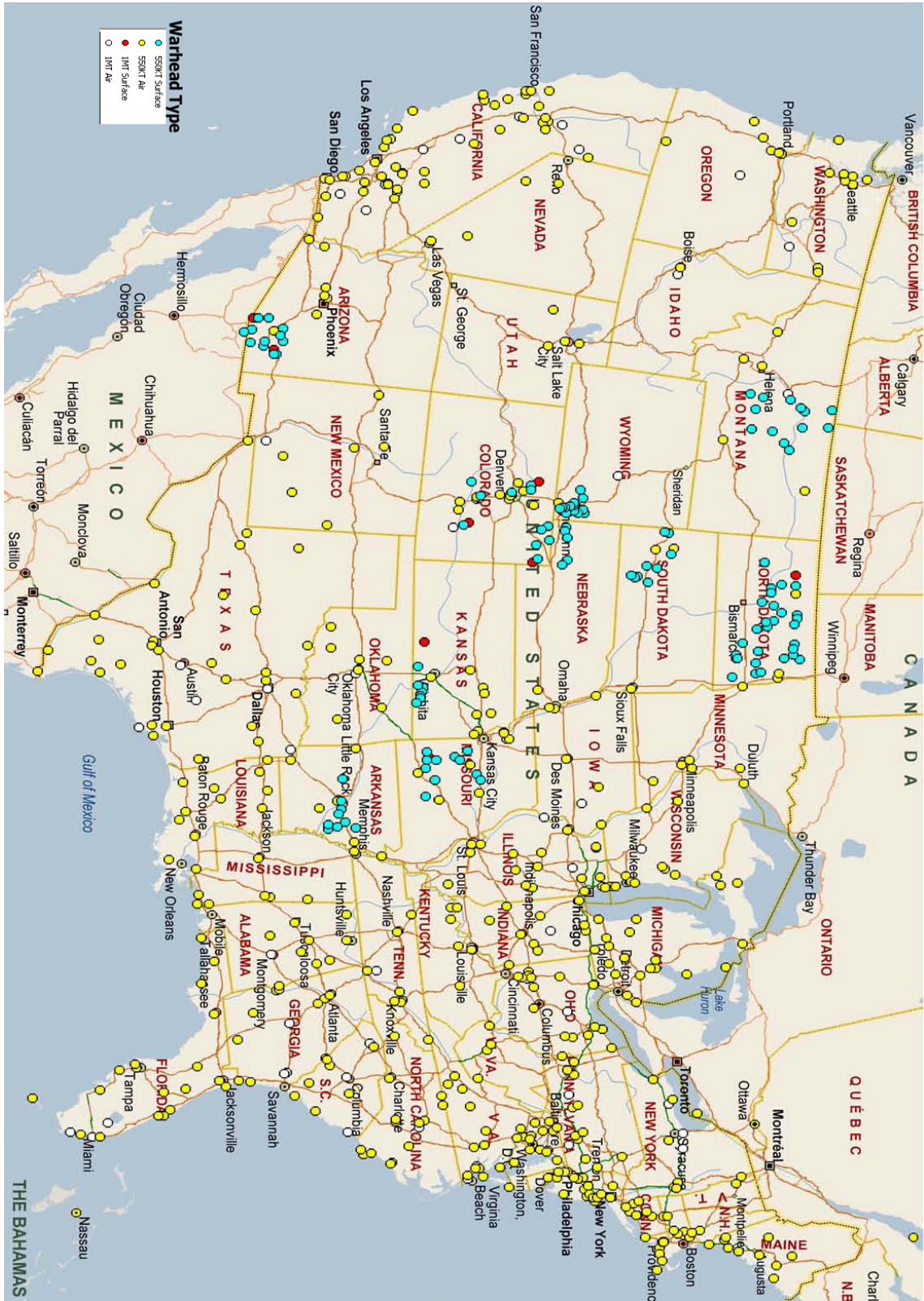
Onalaska, 43°52'52.94"N, 91°13'50.99"W, SS-24, 550KT
Oshkosh, 44°01'03.89"N, 88°32'44.97"W, SS-25, 550KT
Racine, 42°43'34.00"N, 87°48'21.00"W, SS-24, 550KT
Superior, 46°42'50.48"N, 92°05'39.81"W, SS-24, 550KT
Waukesha, 43°00'42.02"N, 88°14'04.30"W, SS-25, 550KT

WYOMING

Primary: Warren AFB, 41°08'47.88"N, 104°51'59.67"W, SS-25, 550KT
Minuteman missiles,
41°4'4.05"N, 104°26'18.32"W, SS-25, 550KT
41°46'32.25"N, 104°29'20.89"W, SS-25, 550KT
41°57'38.72"N, 104°32'22.28"W, SS-25, 550KT
41°8'6.72"N, 104°58'40.51"W, SS-27, 1MT
41°24'16.49"N, 104°27'18.07"W, SS-25, 550KT
41°36'24.81"N, 104°57'39.66"W, SS-24, 550KT
41°7'5.49"N, 104°54'36.41"W, SS-24, 550KT
42°7'6.17"N, 105°1'1.89"W, SS-27, 1MT
41°37'25.04"N, 104°48'32.33"W, SS-24, 550KT
41°37'26.94"N, 104°34'23.46"W, SS-25, 550KT
41°40'28.81"N, 104°51'34.54"W, SS-24, 550KT
41°12'8.54"N, 104°31'22.58"W, SS-25, 550KT
41°4'4.35"N, 104°59'40.96"W, SS-24, 550KT
41°13'10.62"N, 104°37'26.55"W, SS-25, 550KT
41°13'10.09"N, 104°37'25.22"W, SS-25, 550KT
41°54'37.77"N, 104°39'27.81"W, SS-25, 550KT
41°21'14.73"N, 104°42'28.91"W, SS-25, 550KT
41°25'18.45"N, 104°26'18.92"W, SS-24, 550KT
41°17'12.75"N, 104°31'21.66"W, SS-27, 1MT
41°4'4.05"N, 104°26'18.32"W, SS-25, 550KT
42°7'5.44"N, 104°45'31.8"W, SS-25, 550KT
42°8'6.94"N, 104°34'24.87"W, SS-25, 550KT
41°52'35.16"N, 105°1'1.62"W, SS-24, 550KT
41°45'30.86"N, 105°3'2.01"W, SS-24, 550KT
41°30'20.22"N, 104°47'32.09"W, SS-24, 550KT
41°16'12.22"N, 104°40'28.19"W, SS-25, 550KT
Secondary: none
Tertiary:
Casper, 42°50'41.12"N, 106°19'13.96"W, SS-27, 1MT



Nuclear Strike map in the US



Appendix 8: Universal Collapse B.O.B. Checklist

Here is a checklist to help assemble a BOB.

Survival Backpack

- Backpack
- Food
- Water
- Water purification tablets
- Water filter
- Shelter
 - Poncho
 - Pack hammock
 - _____
- Tools
 - E-tool
 - GPS
 - Compass
 - Flashlight
 - First Aid Kit
 - Fire Starting Tools
 - Matches
 - Fire sticks/tinder
 - Flint/steel
 - Lighter and Fuel
 - Duct Tape
 - Fishing Line
 - 550 cord
 - Super Glue
 - _____
 - _____
- Communications
 - Cell Phone
 - Sattelite Phone
 - FRS/GMRS Radios
 - Private Frequency Radios
 - Police Band Scanner
 - AM/FM Radio
 - Spare Batteries
 - Car or Solar charger
 - _____
- Documents
 - Copy of IDs
 - Copy of Title to House
 - Copy of Insurance Policies
 - Inventory of Household Goods
 - Wills and Contracts
 - Copies of recent Tax Returns
 - Copy of weapons paperwork and permits
 - Disaster plan
 - Survival Guide
 - This Book!
 - Phone and address list of Family and Friends
 - Emergency Manuals
 - Extra House Keys
 - Extra Cash
 - Checkbook and Credit Cards
 - List of all Bank and Credit Card Accounts
 - List of all Investments
 - Contact information for your employer, boss, and HR Department
 - Indelible Marker
 - Notepad and waterproof pen

- Disposable camera with flash
- Maps of the area with pre-selected shelter locations and travel routes
- Ziptop bags
- _____
- _____
- _____

- Hygiene Kit
- Spare Glasses
- Bug Spray
- Sewing Repair Kit
- Condoms
- _____
- _____
- _____
- _____

Pocket Survival Kit

- Tin
- 15 strike anywhere matches
- 3 bullion cubes
- X-Acto #11 blade
- P-38 can opener
- Magnesium Fire Starter
- 8 fish hooks, 5 sinkers, cigar float
- 100' 10lb fishing line
- Fire Stick
- Sewing Repair Kit
- _____
- _____
- _____
- _____

Weapons Kit

- Pack/Bag/Case
- Rifle
- _____ Rifle Magazines
- Pistol
- _____ Pistol Magazines
- Knife
- Ammunition
 - Rifle _____ rds
 - Pistol _____ rds
- Load Bearing Equipment
- Weapon Cleaning Kit
- Protective Gear
- _____
- _____
- _____
- _____
- _____
- _____

Clothing

- Pack/Bag
- BDUs
- Boots
- Hat
- Field Jacket
- Thermal Underwear
- Extra Socks
- _____
- _____
- _____
- _____

Camping Kit

- Pack/case
- Tent
- Ground Cloth
- Cooking Equipment
- Sleeping Bag
- _____
- _____

NBC Kit

- Pack/Bag
- Bio Protection
 - NBC Suit
 - Gas Mask
 - Gloves
 - Boot Covers
 - Extra Filters
- Shelter-In-Place
 - Garbage Bags
 - Tarp
 - Duct Tape
- Detection Gear
 - Geiger Counter
 - KFM
- Documentation
- Antiseptic wipes
- Potassium Iodide pills
- _____
- _____

Car Kit

- **Never Let your fuel tank go below 1/2 full.**
- Bag
- 3600 Calorie Ration Bar
- Water
- First Aid Kit
- Survival Blanket
- Jumper Cables
- Road Flares
- Tire Repair Kit
- Caution Tape
- Duct Tape
- Snow and Ice Gear
- _____
- _____
- _____

Optional Gear

- Binoculars
- Body Armor
- Helmet
- Water Filtration System
- Night Vision Gear
- Spare parts for firearms
- Extra food
- Extra water
- Extra ammunition
- _____

Travel Kit

Carry On Kit

- 1200 Calorie Ration Bar
- Snack or Protein Bars
- Survival Blanket
- Mini First Aid Kit
- USB Jump Drive with copies of documentation
- Small roll of Duct Tape
- Mini flashlight

Checked Bag Kit

- 3600 Calorie Ration Bar
- Multi-tool
- High Intensity Flashlight
- Mending Kit
- Emery Boards and Nail Clippers
- _____
- _____
- _____

Shelter-In-Place Kit

- Food for 7 days
- Water for 7 days
- Pre-cut plastic sheeting
- Large roll of duct tape
- Sleeping bags and inflatable beds
- Spare clothes
- Hygiene items
- Black plastic garbage bags
- Some form of waste disposal
- Bucket
- Extra rechargeable batteries and charger
- Power strip
- Cell phone charger
- Portable TV or laptop with TV adapter
- Internet Access
- AM/FM Radio
- _____
- _____
- _____
- _____
- _____
- _____
- _____