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Dear Dr. Orient:

Sorry to be so long in answering your letter of 12-8-04, but have been a little busy. My wife had a minor stroke, then a hip replacement and is still recovering. I spent a few days in the hospital with a minor heart problem. We're both 77. Please excuse any typos. It's been years since I've done any typing.

I'm a retired fireman and have served in positions from ordinary fireman to chief of department. Also did a stint as a foreman in a forestry camp and ended my career as an industrial fireman. My last 11 years I conducted classes for 200 members of the plant disaster team. I also held classes for a much smaller group where I had more latitude in the subjects covered. This was on my own time. I have'nt given a class in about 15 years.

At age 23 I organized a volunteer fire department in hte little town of Sherrill, Iowa NW of Dubuque. We started with a used truck in a rented garage and 10 men. In the mid 50's a new four stall station was built with almost all the labor provided by residents of the area. The department grew and in 2000 a 6 stall addition was added to the old station. Again, much of the labor was volunteer, and along with donations, the building was 60% completed without spending one cent of tax money. I 1957 I resigned as Chief and we moved to California where I became a paid fireman.

Today Sherrill has 40 firemen, including 4 paramedics and a number of EMT's. Apparatus includes 2 pumpers, 3 tankers, 2 ambulances, a brush fire truck, a Gator off-road vehicle that can carry 2 stretchers, and a well euippad rescue boat. One engine is a pumper/rescue rig that carries the "Jaws", air bags for lifting, and infra-red viewers that see through smoke. All, men and women, are still volunteer. There are 14 departments in the county,and 13 are volunteer. The county fire association has purchased two trailers, one for recharging air bottles and the other caeries medical supplies.

A city dweller might ask why would anyone risk life and limb for no pay as a volunteer fireman. I don't know what the present percentage is, but would guess 90% of fire departments are volunteer. Almost all their funds go for equipment. In a paid department, probably 90% of the funds go for wages and benefits. Firemen, both paid and volunteer have always been held in high esteem. The tragedy of 911 increased the respect. These will be your first responders in any small town or rural emergency, or possibly in city due to mutual aid.

The scenario I set up for the EMP class, was the high altitude detonation of a nuclear device that takes out all power and communications. Only vehicles with diesel engines still run. (Per Cikotas, most gasoline engines will also run) Only problem, power is required for both gasoline pumps and refineries.

Cities are evacuated, with the start depending on the amout of elevated water storage. If none, all you have is ahe water in your water heater, toilet tank, etc. How many will think of the water heater? How many know how to purify water with bleach? Even how long to boil water to make it drinkable? (EPA says one minute. Other sources give various times.)

The population in urban areas will be reduced due to violence, lack of water and sickness due to bad water, exposure and starvation. A lesser number will expire due to medication lack. Addicts will head for drug stores, doctor's offices and hospitals. No doubt some drugs and medicines will be destroyed in the hunt. Looters at first go after electronic gear, stereos and computers, but soon will switch to food and water. Liquor and cigarettes will also be targets. Even the normally non-violent honest person will change if they or their family is in need.

Emergency warnings are now given on TV but with power out, would have to go back to radio. Broadcasts promise restoration of power within days, but after 5 days the military takes over the broadcasts and announce the truth. That instead of days, it will be years before the power will come back on. Some still believe the power will come back on soon.

As the only entity capable of indepent operation, the military will take over and declare martial law. The previous government will still be hiding underground. Military veterans will be recalled for service in refugee management.

Telephone service fails after two days when generator fuel runs out. Gas service uses little electricity, mostly for computers. Do have emergency generators fueled by natural gas. Any radio controlled equipment would require towers and such would be subject to EMP.

I've set the attack in May. If in mid winter, survival would be much more difficult.

EVACUATION

In the larger cities, with the power off there is no lighting and looters set fires, but there is no water pressure for firefighting. By the second day, some are evacuating. Most aren't aware of the gasoline situation, naver stopping to think that gasoline pumps need electricity. Soon cars are abandoned along the highway. Out of gas and the occupants are forced to walk. Farmers are being offered huge prices for a fill-up from their tractor fuel barrels. Where highways run through small towns, there are soon roadblocks manned by armed locals after trouble with looters.

The US government, using satellites, has ahe ability to detect evacuation in Russia. The problem is, will our government tell the people, or keep quiet, fearing panic?

Just because gas pumps won't work doesn't mean you can't get fuel from the underground tanks. Any positive displacement pump, a pump that will pump air or liquid. An ordinary barrel pump with a hose extension, dropped down a fill pipe will do the job. It is expected that all fuel supplies will soon be confiscated by the military, and thereafter rationed out only for critical uses.

If refugees can be collected, one possible way of moving them to an area where they could be self supporting, would be to have all ablebodied walk. Food, water, limited luggage and possibly a tarp if required to camp beside the road. Such to be caraied on a pickup that would leapfrog down the line, drive, stop, drive. Driver could be elderly and could carry passengers unable to walk. A crewcab pickup would be an advantage.

Can use busses, school and public, and semi trailers to evacuate hospitals and nursing homes.

If in the proper direction, walkers can follow railroad tracks. An easy path as grades don't exceed 3.5% (3½ foot rise in 100 feet. Walker's daily distance will improve as days go by.

In the case of evacuation due to EMP, will there be enough vital suppliesto support the survivors,? Is there enough room to resettle refugees? This means potable water, food, shelter and garden space. Some areas of the country will remain deserted due to the lack of water that is drinkable, or for irrigation.

WATER

Every potable water sourse will become a village. Water, or rather the lack of it, will be the main cause of evacuation. It is common to see elevated water storage tanks, often with the name of the town painted on the side in large letters. Not all cities have elevated storage. Some use a direct pump system with no reserve. In a power failure the faucet goes dry.

Out on the farms, most wells use a submergible pump. The pump is actually in the bottom of the well, with power fed down through a waterproof cable. Going through a rural area you may see a windmill here and there, but in almost all cases you'll find the mill has been disconnected in favor of a submersible pump. City well pumps are similar, but with the motor on top of the well, driving a shaft that turns the pump at the bottom of the well.

Ideally, surveys should be made of water sources, springs, artesian wells (really springs), hand pumped and windmill operated wells. In a pinch, could also consider ponds, lakes and streams where there is a wood supply for fires to boil water. Rain water can be collected and filtered for drinking.

The Israelis have come up with s solar still, about a 10'X10' trough with a gable roof of clear glass or plastic. Seawater is poured in the trough and condenses on the underside of the roof, running down to a collection trough. Produces 30 gal. of desalinated water per day. Not much, but enough for 30 people for drinking only.

FOOD

If the supermarket runs out of food, just head out to the rural areas where the farm wives have full fruit cellars. Actually, farmers get most of their groceries the same place you do, a supermarket. Canning isn't that popular anymore, and there are fewer farms today. Supermarkets have perhaps a 3 day food supply, but food may also be found in warehouses, in railroad cars and even semi trailers.

Depending on ahe time of year, farmers may have a large amount of field corn in storage. This corn would normally be fed to hogs or steers, or perhaps sold to an

elevator. Field corn is hybrid so can't be used as seed, but if there is fuel for a tractor, a hammer mill can be used to turn the corn into a course meal. Indian corn, or maize is open pollinated, and can be used for both food and seed. Corn is now harvested by a combine, but ears can be picked by hand as it was 100years ago.

Lach of power means no electricity to run milking machines, or keep the bulk tank cool. Milk goes directly from the cow to the bulk tank. Usually the tank is emptied once a day by a bulk truck from the dairy. Dairy farmers keep a generator driven by the tractor. What do you do when fuel runs out for the tractor? When I was a boy, almost all milking was donw by hand, morning and evening. Go back to hand milking? Common opinion among dairy farmers is that once a cow has been on a milking machine, she won't stand still for hand milking. As with humans, a full bag on a cow in painful, and if she isn't milked, she'll develop mastitis and go dry. In the worst case, the cow could die. Not sure if the meat would be edible.

An older tame cow might stand still for hand milking, especially with the pain of a full bag. A heifer will "come fresh" with her first calf. She can be milked by hand, never having been on a milking machine. As to building a future herd, most farmers no longer keep a bull, opting for artificial breeding.

Milk can be pasturized by heating, 170 degrees if I remember right. To keep milk cool, spring water is always about 48 degrees.

Everybody will become a gardener and learn how to store food. Half the Pilgrims died the first year. They were city dwellers, not farmers. Canning jars will be hard to find, so will have to use other methods. One alternative is drying, but will need screening to build drying racks. Racks have to be taken indoors at night or the damp air will undo the days drying. I can remember my mother drying apple slices in the oven of a castiron cook stove. Salt can be used to preserve such as meat, but salt may be hard to come by.

What to plant? I've read that potatoes produce the most food value per acre, but just recently I've seen the same claim made for corn. Is said the Mayans ate beans and corn for complete protein, the same as a beans and rice diet. In the Irish famine, they cout out the potato eyes for seed and ate the rest. Is claimed five or six people can survive on an acre of potatoes.

HOUSING

Wherever man has settled, he has built shelter from the materials at hand, from the eskimo igloo to the adobe brick and the log cabin.

When the unibomber was captured he was living in a cabin in Montana that had no electricity or indoor plumbing. I have to laugh when the lack of utilities is stressed. When my wife and I were kids, lighting was from kerosene lamps and lanterns, and toilet facilities were outside. We survived. Today if the electric blanket doesn't work it's considered a disaster.

You can live in a tent in winter, but not without some sort of heating. Back in the 1800's a Gen Sibley designed a stove for tents, but I doubt you could find one. Better forget the tent and put something a little for substantial. Fireplaces are inefficient. A stone stove, similar to those you see in park picnic areas is more efficient. The most efficient is the Scandanavian tile stove that first burns the wood, then burns the fuel gasses in a second chamber.

MEDICAL

Most hospitals have some type of emergency power generators, but does it supply complete power? Will the elavators work? The ER is probably on the first floor, but the OR on a higher floor. Can such as surgery be done in the ER? Will the emergency power last long enough to evacuate patients? What do you do with patients on life support? In CD preperation, the Swiss have more beds underground than we have above ground.

Public health is doubly important after a disaster. You may not be able to get to a doctor, and there may be a lack of needed medicines and drugs. Is possible will have to go back to herbal medicine, like willow bark for aspirin.

Portable Xrays are charged on 110Volt power, and can be used if have a 110V generator. Many motorhomes have such generators. Many years ago the CD program included packaged hospitals, but now understand much of the equipment has been removed.

COMMUNICATIONS

Recovery would depend on some form of communications. It's the basis for the distribution of information, and for trade. Might start with word of mouth on foot or with a bicycle. Two-way radio would be a more efficient method. I relize ham operators consider CB radio to mundane. CB does have its limitations, but it is the most common type of 2-way radio. Is used by truckers, farmers, fishing boats and ordinary drivers.

I learned the value of CB some years ago when we had seven major grass and brush fires at the same time in Sonoma County. Under mutual aid I was given the job of covering the south end of the county. We had units coming in from Marin County to help, but they were on a different radio frequency. We had an active CB club in town, and they sent one of their members out with each Marin unit to act as guide and communications.

I don't know what the range is on a CB. Perhaps 10 miles line of sight. Though it's illegal, CB range can be greatly incleased by what is termed a linear. Would need batteries and a bicycle or hand powered generator. Need power for both a base station an to recharge batteries for portable units. Remember a TV news item, think Kosovo. Someone had rigged an automobile alternator on a float and moored it in the river. The alternator as rigged to catch the current and produced power.

TRANSPORTATION

Recovery will depend on trade, and trade will depend on transportation. A kids coaster wagon with sideboards will haul a load of potatoes you want to sell (trade) Even better, a wheelbarrow. With a wagon you could haul hundreds of pounds of vegetables. There are probably some farm wagons around and all the abandoned autos could be stripped down to frame and wheels. Add a few planks for a box and you have a wagon.

Fine, you have a wagon, but you need a way of pulling it. How about using steers as oxen. A steer is a castrated male calf. Farmers can't ship steers to market, so

there should be plenty available. You could try to train steers as oxen, but it might be best to start when the steer is still a calf.

The problem with oxen is that they're slow, about 3 MPH or less. About the speed a man can walk. Also, an ox has to graze at noon when working. As with oxen, horses eat hay, but don't have to graze at noon. They should be given a little oats after a work day. Horses move up to four times faster than oxen. There are still a lot of horses in this country, but they may not be where they're needed.

PLANNING

As I've said previously, mch of the old CD planning was pure "Alice in Wonderland". A good example was the idea of a quick return to the cities. Guess they never heard of logistics.

Local governments also exhibit lack of planning. Some years ago while preparing a class I called our city water department (not Garden Grove) to ask if any of the wells had a power source other than electricity. Yes, they had one well with a diesel engine. They'd thought about getting some generators to run some other wells but never got around to it. They were running a direct pump system with no reserve. The same city nas a seven million gallon ground level reservoir that could have been designed to feed directly into the water mains, but instead the water had to be pumped out with an electric pump.

After the 1994 Northridge quake, the LA fire department had problems fighting fires because of broken water mains. Rural departments don't have hydrants, but they do have water tankers. They collapsible canvas tanks. Water is dumped into the tank and the truck takes off to get another load. I wondered why LA didn't call on grading contractors for water tankers. It was 3 days before TV showed a fire truck being followed by a contractor's tanker.

California's San Joaquin Valley produces 25% of the US food supply, yet the state doesn't know what effect a power loss would have on food production. The valley is dependent on irrigation and electricity to operate the pumps.

The Soviet Union trained a huge number of CD workers so there would be at least one trained person in any group of people. We provide shelter for our leaders, but little for the average citizen. Leaders are of little use without a population to lead.

With wood as the only source of energy, some areas will be denuded soon. A replanting program will have to be started as soon as possible, with two or three new trees planted for each one cut down.

Save the libraries, and the elderly, especially the elderly with a rural background. They can tell you how things were done in "old days." In the library look for old dictionarys. The old ones often tell you not only what an item is, but also how to make it. Look for books on surviving in the wilds, such as the Boyscout Manual and survival subjects such as gardening, animal husbandry, etc., etc., etc.

Survival will come from 1800's technology and most will live a rural existence, even going back to the one-room school. Schools should be started as soon as possible. Survival subjects would replace some of the present subjects that have doubtful value.

Will need a record keeping system for births, marriages Deaths, etc. All electronic records will be lost. Paper lasts 500 years.

RECOVERY

In a few years will have water power for such as sawmills and housing will improve. Wagons will be built, first pulled by oxen, and later by horses. Such necessary for trade. Eventually be coach service using converted vans. Many areas will remain deserted ubtil piston well pumps developed.

Will be a draft using the Swiss system. Two years of service at age 18 with periodic refresher courses to age 45.

In Vaca's THE COMING DARK AGE, the author says people will no longer be willing to live in large cities where they have no control over systems they rely on. Once recovery comes, I doubt the majoriay will move back to the city if they can survive comfortably where they're at.

In California, the water is in the north while the people are in the south. I would guess that 2/3 of the state is desert, including the Great Central Basin once the irrigation pumps are off. There are rivers flowing out of the Sierras on the west, but without pumps, only a narrow strip alongthe rivers could produce food. Except in the foothills there would not be enough wood for boiling water. Solar stills would be the only option. Northern California and the west Sierra foothills would have water for drinking and irrigation, but you'd have to get the people there.

In the EMP class for my smaller group, we did actually draw up a plan for evacuation, on foot, laying out a route following water sources, from Southern California to Northern California. Evacuation would be much easier in the Midwest.

Here are a few of the classes I conducted:

Lost in the wilds	Land navigation	Camp sites
Hunting and fishing	Game snares	Nutrition
Body in survival	Weather predicting	Trash bags
Psychology for survivalists	Shelter	Sleeping in the wilds
Death and dying	Past disasters	Public health
Gardening	Storing food	Pests and predators
Animal hazards	Dowsing	Water
Fire making	Lamps and Lanterns	Shelter construction
Water power	Record keeping	Animal husbandry

Yours truly,

Bud Baal

Clarence C. Baal Jr.