

# **Desert Moon House: Initial Planning**

*by Andrew Eriksen*

This is the first article in a series about the building of a less-toxic ultra-low EMF house in the high desert of northeastern Arizona.

The house was built using mostly widely available materials, that are familiar to most contractors, though some of the construction methods are a bit different. It has been designed to use the sun to help heat it in winter, and also uses solar energy to generate electricity.

This article covers the initial planning and considerations that were needed at the very start of the project, often even before buying the land. Subjects include considerations on where to locate the house, evaluating a lot, utility issues and house inspections. The following articles in this series will cover various aspects of the building project, such as what role the homeowner plays, dealing with contractors, designing the house, building the house, the heating system and the electrical system. The articles can be read individually, if the reader is only interested in one particular aspect of safer house building.

## **Temporary housing while building**

Some EIs camp while they build their house, living either in a trailer, a car, a tent or a garden shed. Sometimes it can be done in a friendly neighbor's yard, with access to their bathroom. Or a garden hose could be extended from a neighbor. There are many ways to do it.

Some counties require a permit to camp on one's own land for an extended period of time, and may only allow it for a year. This may be extended if they can see that a house is actively being worked on. Some areas may not enforce their own rules, at least if the neighbors are not complaining. Ask informally.

It may be possible to camp in one's own half-finished house. If it is a large house, one room could be finished before the rest is done. Counties often permit this in the later stages of construction. But moving in too early could seriously hamper the finishing of the house, as work around the inhabited area suddenly has to be done much more safely. It is then no longer acceptable to caulk something that needs to offgas for a week, for instance. It is best not to move in until the interior is finished.

Some people rent an apartment and sleep with their head in an open window, or rent a garage, or other marginal situations. If the place is only needed for the

summer, the windows may be kept open all the time, making more places usable. It is a lot easier dealing with a toxic place, knowing it is only temporary.

## **Where to live**

Deciding where to live is very individual. Besides all the “normal” preferences, there are also a lot of special considerations for people with environmental illnesses. Some do better in dry deserts, others in humid areas, or on the coast. Some need high elevations or cold climates, where there is no live vegetation most of the year. Some do best in a hot climate. We each have to find out what works the best.

To state the obvious: rural areas are usually better than populated areas, as they tend to be less polluted, chemically and electronically. Rural areas also tend to be much cheaper to buy land or a house in. Of course, some rural areas are polluted from agricultural spraying or mining operations.

Many EIs move to rural Arizona and New Mexico, but a few do better elsewhere and move again. Some prefer the heat of the southern areas, while others move to the cooler mountains in the northern parts of these states. Some avoid areas with junipers and pine, while others are not bothered. Some have a lot of problems with the dust.

A few decide to move to remote areas, beyond the reach of the utility lines, to really get away from it all.

It may be a lot easier to build, and later live, in an area with several EIs. Just the fact that local people may have met an EI before can be very helpful when having to explain a special need to a “normie”. And there can be other benefits as well, such as a social life and perhaps organized services.

This house was built in northeastern Arizona, near the town of Snowflake, in an area with about twenty other EI houses. It was an enormous advantage that contractors with experience building EI houses were available, and that there were several safe houses to visit to see how they did certain details. This project would have been much more difficult, and possibly failed entirely, without the advice and experience that was freely shared. These articles are an attempt to pass on some of that gathered information and experience.

## **Off the grid living**

The decision to build a house that is far from the electrical grid is a very big decision. As big as deciding to build in the first place. Off-grid living is different from normal living and should be considered very carefully. There are many

benefits to off-grid living, such as lower land cost, few and distant neighbors, amazingly little air pollution, less chance of development, and typically extremely low levels of electromagnetic radiation. But there are also several drawbacks that many people could not live with, such as difficult financing, bad roads, a less convenient lifestyle and a need to be more self-sufficient. People who cannot live without using a lot of electricity for cooking, washing, drying hair, etc. are not good candidates.

### **Are you ready?**

Building a house is a major undertaking that requires a fair amount of involvement by the sick person to be successful. The person with MCS must at a minimum participate in the selection of the building materials. Many materials that are safe for some people with MCS are toxic to others. It is not enough to rely on what works for other people.

It is very difficult, perhaps impossible, to test materials when in a permanent state of reaction and despair. Most of us are really fearful of the next reaction when we are in the early years of this illness, and that makes it really difficult to participate in a construction project.

The completed house is likely to be much better if done when the MCS-sufferer's situation and condition is stable. Of course, that is often what is hoped to be accomplished with a new safe house, but it may be wiser to settle for a temporary setup for a couple of years, rather than go ahead in a hyper-reactive state. A failed building project is a very expensive mistake.

### **Where to build**

Most people want to build right on top of a hill, to get the widest view and ensure drainage. But such a location can also produce a lot of annoying wind and be an eyesore. A hilltop is generally also a bad location for people concerned about present and future cell towers. Placing the house at the bottom of a hill is even worse, as there may be danger of flooding and on calm winter nights the cold heavy air will settle down there, while those living just a little higher up the slope enjoy air that can be several degrees warmer. Air pollution from wood stoves and other sources also tends to gather in low spots. North facing slopes should also be avoided, as they tend to be colder in the winter. The best location for a house is usually somewhere in the middle, on a gentle slope, but on a level building site. Even the ancient Chinese tradition of Fung Shui prescribes such a location.

When building in a rural area, stay at least a mile (1.5 km) from any large power lines. Only the most electrically sensitive people would need to be further away, perhaps two to three miles (3 to 5 km). If choosing to live in a built-up area, the

electrical pollution from the neighbors will be a larger issue than any power line further away than about 1/2 mile (700 m). Perhaps much less.

In a rural area, it is best to be at least a couple of miles or more away from cell phone and other transmission towers. The towers in rural areas are more powerful than those in the cities, as they have to reach a much larger area.

It is a very good idea to check out the neighborhood for any agricultural farms, pig farms, mining operations, industries, wood burners, etc. In a city and suburbia there are so many sources of pollution nearby, it would be very difficult to evaluate a site properly. There it hardly makes much sense to be concerned with most sources of pollution that are more than a few miles away, as their contribution to the overall level of air pollution will be drowned out by all the small sources, such as vehicles and nearby households.

Keep in mind that things usually change over a decade or more. The quiet little dirt road may one day have more traffic on it, and one day it may even be paved. It is best to set the house back from a road that may later see more traffic, especially if downwind from it. Unpaved roads in dry areas can produce an amazing amount of dust from fast-moving vehicles, which can be a real problem if living downwind.

### **Lot size**

Distance to neighbors is important to cut down on toxic drift from clothes dryers, wood stoves, barbecues, pesticides, paint projects, etc. It also helps with electrical pollution, such as ground currents and wireless gadgets. The bigger the lots in the neighborhood, the better. A compromise is a lot size of five acres (two hectares). That is large enough that the wind has to be moving in your direction for the toxins to really be a problem, while they may not drift over on a calm day and just hang there. A subdivision with 20-40 acre lots is of course much better, but no practical size offers full protection. A wood burner can still be smelled even a mile (1.5 km) away, though the chance of being right in the path of the smoke is much less.

Some people have bought land next to empty public lands, which are abundant in many western states of the USA. There are maps available from the local BLM office that show what is owned by various public entities (states, BLM, parks, etc.) Some live in a community of vacation homes, so the neighbors are rarely there.

### **Easement**

It is absolutely essential to check for access to the lot from the public road. Make no assumptions; get the plat maps and check for yourself on site.

A friend bought a lot with no road to it, but there was an easement (right-of-way) across a neighbor's 40-acre parcel. Unfortunately, a fence blocked access to this public easement. The owner was totally unwilling to move his fence, nor would he accept cutting a hole in it. The county authorities said to just cut a hole, after hiring a surveyor to verify the situation. But, they would in no way help if the neighbor caused trouble. And the neighbor promised all sorts of trouble. In the end it was cheaper to hire a fence company to move 400 yards of fence, than pay the \$5,000 to \$10,000 or more it would take to go to court, which was the only alternative. The legal way was also uncertain in that rural and very conservative area, and it would take a long time. A lawyer could tell of some bizarre lawsuits that had happened over such issues recently. And an irate neighbor is never a good thing to have, especially for an EI who is vulnerable to all sorts of chicanery. Some people live in remote areas simply because they cannot get along with other people very well.

## **Telephone**

Check in advance whether telephone service is available in the area. Without a land line, a cell phone is the only alternative. As more research points out the dangers of long-term cell phone usage, even for healthy people, reliance on cell service as the only connection to the world is not a good idea.

If the nearest phone pedestal is less than a mile away, there is probably not a problem. If it is more, the policies of the local phone monopoly should be looked into. In this case, the phone company was unwilling to say anything about cost in advance, until service was actually requested. There were three miles (5 km) to the nearest phone pedestal, and the company deemed the area low growth, and was not much interested in extending the lines. They quoted a price of \$23,000, then later revised that to about \$16,000.

In some areas, the cell phone competition is too strong, so companies no longer extend their service net.

Another issue is access to the internet, if desired. Even if a phone line is installed, it may be too far from the nearest line concentrator to be able to carry fast internet access (DSL/ADSL). The alternative would then be slow modem service or some sort of wireless access, possibly via satellite.

## **Electricity**

Also check in advance of buying land what the current cost is for extending electrical service to a rural house. The utilities often provide a short line extension and transformer for free, but not always. They do not in this area. It can be quite

costly to even bring in power from the corner of a 40-acre (16 hectare) lot to the house in the middle of the land, if the utility company doesn't cover some of the cost. If the line must be extended down the road, the cost can be very substantial.

## **Water**

Most rural houses need a well. If the water table is far down, that can be a very substantial cost. In this area, water is typically pumped from wells deeper than 200 ft (70 m), and such a well hole and pump cost around \$10,000 in this area (2007 prices). In some parts of Arizona, wells are 600 to 1000 ft (200 – 500 m) and extremely costly. Check on typical well expenses in the area before buying land.

## **Is an architect needed?**

An architect designs the house based on the wishes of the owner, and produces the drawings that are used to build the house. The architect may also specify the materials and specific construction details, though mostly they rely on default industry standards and practices.

With a large and complicated house, or a hands-off owner, an architect is probably a good idea. In many cases, one is not necessary; the owner can make the necessary drawings. It is then a good idea to use someone else's drawings as a template, preferably someone who built in the same area, so the drawings will be acceptable to the local authorities who will approve the plans before issuing a building permit.

If you are not comfortable making your own drawings, you could hire a drafting service to do them from your write-up.

Ask the local building inspection office what particular drawings are required, and whether they demand an architect to do them.

## **Permits and house inspection**

The purpose of house inspections is to ensure that the house minimally conforms to a building code. The purpose of the building code is to ensure that all houses are reasonably safe to live in (meaning fire safety and safe from collapse, etc.), are built reasonably well and have a number of features that most people would need. The inspectors are basically protecting all the future owners against a lot of problems.

This is a very laudable principle, and it generally accomplishes it well. No system is perfect, of course. There can be times when the building code is a problem, and

the individual inspectors can be a problem too. Building special houses for people with chemical and/or electrical sensitivities sometimes requires a compromise. A reasonable inspector, who sees a builder trying to do things right, will often be willing to compromise on small things. The inspectors generally have a lot of leeway in making judgment calls. But what one inspector agrees to during a visit, the next may frown upon, so it pays to make sure it is the same one that comes each time. Find one that is agreeable, and then make sure he or she comes every time, by scheduling inspections on the days he covers your area.

Sometimes the issue is a little bigger. One example is a county in Arizona, which recently banned new construction using steel siding. This was done since they were thought unsightly, and apparently was put in place at the urging of some big-money developers. Many EI houses use steel siding, as it is reasonably priced, requires no maintenance and is safe right away.

Another example is that the National Electric Code has a few stipulations that are problematic when creating a low-EMF environment.

If one needs to get past such a problem, one that the inspector cannot help with, it is possible to go to the local zoning board and ask for a variance. Another method is to wait for the final inspection, and then make the needed changes afterwards.

There can be special local rules. In this county, a house must have a stove. Since the author only cooks outside, a broken stove was bought cheaply and now serves as extra counter space.

It is probably much easier to get away with things in a rural area with no neighbors nearby, than it is in a more built-up area. Inspectors may not be professionals, and a few may not even have building experience, though most do. Some do not even know their own building code well, and can issue arbitrary rulings. An incompetent inspector, especially a vindictive one, can cause a lot of trouble. It really pays not to argue with them, even when they are clearly wrong.

Getting a copy of the building code is a very good idea. If you use unlicensed contractors, then you need to check that the code is followed. An unlicensed contractor is less likely to read up on the code changes.

Building a house without a building permit may be possible in some very rural areas, but is rarely a good idea. Some counties use photo airplanes and satellite pictures to catch illegal builders.

The final inspection on this house took about 15 minutes, which is typical. The inspector arrived reeking of strong after-shave, despite being given a doctor's note

in advance. He was only inside for about five minutes, while all windows were open and a big fan running.

### **Start with a simple shed**

Building a simple shed first can be very helpful. It can store a lot of building materials that are waiting to be used, both to keep them out of the rain and to discourage thieves.

Afterwards, it can store spare parts, such as replacement tiles. If a tile later breaks, it may be impossible to find a matching one in the stores. A shed can also be used to store things too toxic to keep in the house, and things that need to be offgassed.

A shed can be used to sleep in, or as a living room while camping on the land. A shed can be very useful in many ways.

Steel sheds are available as kits from hardware stores and can be erected in a couple of days. It can be helpful to wash the parts with hot soapy water before erecting the shed, to remove oils from the manufacturing. If needed, a little insulation can be added, using Reflectix or Astro Foil.

If you live in an area with high winds, it is best to reinforce the flimsy walls with a horizontal 2x4.

Check your local regulations for what size shed requires a permit. In some areas, max size is 144 sq ft, in others it is 200 sq ft.

It is much preferable to erect the shed on a concrete slab. The slab can be poured the same day concrete is poured for the foundation of the house (or the footers, if doing stem walls). Let the slab extend three ft (1 m) in front of the door, to create a place to sit or store things and to contain mud.

### **Take pictures**

Take a lot of pictures of the house during construction, especially of the hidden features before the walls are closed up. Make close-up pictures, as well as overview pictures. This will make future maintenance much easier and less destructive.

Examples of important things to take pictures of:

- Pipes laid in the ground
- Pipes under the foundation

- Pipes in walls and ceilings
- Wires in walls and ceilings
- Other details that will be closed in

## **Building cost**

It appears that most EI houses cost more than expected. This house was no different. This author had no prior experience in construction, so that is not surprising. Even professional contractors frequently underestimate the cost, perhaps because it is to their advantage to do so. Cost overruns of 20 percent are standard, and 50 percent is not uncommon. Plan ahead accordingly.

Before starting on this project, a person who had just finished an EI house of similar size was consulted, and still the final cost was higher than expected. There were many reasons: the sudden significant increase in the cost of copper for pipes and wiring, steel for siding and roof, and for lumber. Also, this was a more complicated project, with an outbuilding and extra features.

The heating system was a major extra expense, which added about 25 percent to the cost of the foundation, besides the system itself.

There was a lot of tile work in the house, which is very labor intensive. Even when using budget tiles, it is expensive.

Finishing the interior walls is more costly than in a conventional house, as there are much more labor costs.

The cost of the electrical system is difficult to compare with a regular house. There were extra cost because of the solar electric system, though there was also a savings, since there was no utility hook-up.

The price of the land was low because it was remote and there was no electrical service available, and won't be for many years.

There was a substantial unexpected cost for fencing. First to move a neighbor's fence, which was much cheaper than taking him to court. Then to hastily erect a fence around the house when 150 cows were suddenly deposited next door. In most western states, cattlemen lease grazing rights at nominal cost, while it is up to the homeowners to erect fences to keep the cows out. Cows can damage many things.

The electrical wiring in the house was more costly, as it is almost double the system of other houses. It has both AC and DC wiring, a feature very few EIs would ever need or want.

The house was otherwise built pretty much as a typical American wood-framed house, with extra attention to details and materials. The vast majority of the EI houses built in Arizona use rather conventional building methods. Other articles in this series cover the details of this house.

### **Alternative building methods**

It was enticing to look into alternative building methods, such as straw bale, adobe, cob, rammed earth and earthships. These are built of natural materials, except the car tires used in the earthships, which disqualifies them as candidates. It is sometimes promised that using these methods, a house can be built for a very low cost. In practice, the cost savings are minor in many situations. If the building is expected to meet building code, then the cost of the foundation, sewage, well, electrical, plumbing and roof are basically the same. Since these natural building methods are all very labor intensive, they may be more costly than conventional housing, if you have to hire labor.