

## How *Not* to Build a Remote SO2R Contest Station — Part 1

If you've ever had thoughts about a building a remote contest station, this article may provide some additional food for thought to guide your decision-making and planning — whether for an SO2R or a traditional SO1R venue. It's my sincere hope to keep you from making the sorts of costly mistakes I have made to date in my seemingly never-ending project — the solar/battery powered Locust Peak SO2R remote contest station.

### Proverbial Questions

To paraphrase Shakespeare, "To remote or not to remote, that is the question." Another age old adage also applies: "Everything always takes longer and costs more than expected." Just how expansive your new remote station setup will be depends upon the size of your dreams, the amount of effort and time you are willing to expend, and of course, the "B" word, *budget*. If you need any bulldozing or tractor work done, I suggest you look into the costs *now!*

The \$128,000 question is will your remote station be strictly remote controlled or will you (or do you want to be able to) operate from the remote site in-person, weather permitting. For me, it was the latter. The new, almost-completed mini-barn shack has a window over the built-in operating desk offering a scenic view that includes the nearby reservoir.

Thanks to some pretty amazing technological developments, remote station contesting is no longer a pipe dream, and it's potentially affordable to all at some level. The Internet has facilitated many new remote stations. The nasty "L" word (latency) still poses some challenges, however, especially for QRQ CW contesters. My objective was to realize a 5 ms or less latency factor, so I was exuberant to end up with a very low 1 ms (I'll share in Part 2 of this article how this was miraculously accomplished).

What follows are some important things to consider *before* deciding to embark on a remote station adventure (although

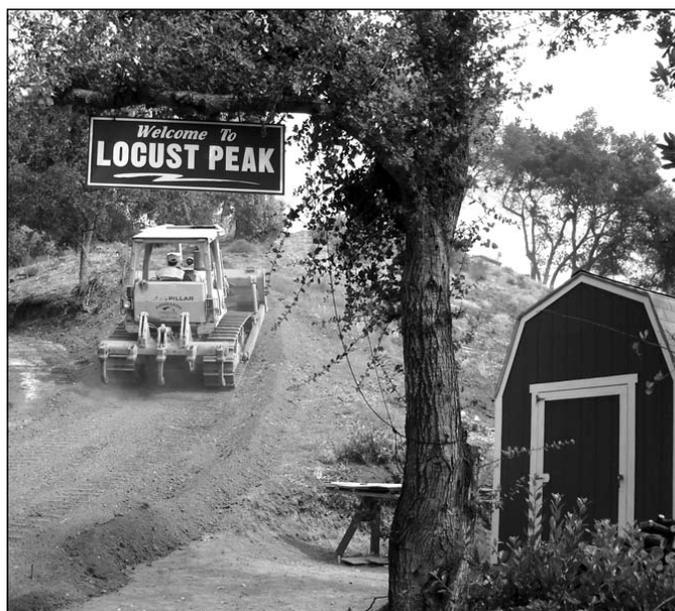


Figure 1 — Welcome to Locust Peak



Figure 2 — A reminder of why one must consider ingress/egress problems

for me it's been more like a bad horror movie at times, due to perpetual road repair issues).

### Purchase vs Rent or Lease

Nowhere is it written in stone that one must purchase land in order to implement a remote contest station. Ownership provides greater control over circumstances, however. If purchasing is not in your budget, though, consider locating a workable site and entering into a rent or lease agree-

ment. This contract should be prepared by a competent real estate attorney who fully understands *your* needs, *your* investment of time and money and *your* best guesstimates to identify future "what if" scenarios that may need to be addressed.

You may know an old friend, work associate or even a relative with a possible location with whom you could work out some type of arrangement. Even a remote tri-bander painted stealth green to blend in with the trees and a few wire antennas are much more competitive than a single attic dipole in a condo.

### 24/7/52 Paved Road Access

Access is one of the most important aspects, and it's an even more critical factor if you are in an area of the country that experiences severe winter weather. If the remote site is in a high fire risk area, make sure there is more than one means of ingress and egress. You may even want to re-think your interest in such a property. Unfortunately, I did not, since the Locust Peak property is family-owned land and my tunnel vision was focused upon eventually seeing many antennas along the 1400 foot ridgeline. I failed to give ample consideration to potential (and perpetual) road problems. Indeed, these have hindered my ability to get up there during inclement weather, although the problems should have been obvious from the start. Having only one means of ingress and egress at Locust Peak does not give me the warm fuzzies, especially after some close calls during the last two fire seasons.

As Figure 2 shows, the historic washout area on the very lower part of what becomes a steep, winding, mile-long dirt road up the mountain should also have been a clue to problems ahead. I ended up installing a two-foot diameter culvert and deploying countless sacks of concrete and rebar to reinforce this part of the road. The time I spent doing this work alone could have been more constructively devoted to putting

up more antennas. The road's condition should have been a big red flag prompting me to run in the opposite direction *before* beginning costly bulldozing and other road repairs just to get to the site. In short, the Locust Peak road has been the source of never-ending trouble and travail.

The "Locust Peak Shuttlecraft" is my dad's 1985 Chevy pickup with a rack on top. Standard must-carry items for each trip include a pick, rake, sledgehammer, shovels and at least one chain saw, plus lots of bottled water and Gatorade (especially during the summer). Road problems confront us during each trip, such as the "Indiana Jones Territory" portion where perpetual rockslides have required lots of shoveling to pass through.

Last fall I had to haul more than 200 sacks of concrete, rebar and water in plastic cat litter containers halfway up the mountain to repair another section of the steep road that had slid some 700 feet almost straight down as a result of 11 inches of rain in a 24 hour period. The lower road's two-foot culvert became completely plugged with part of the hillside above. *But wait, there's more!* Several other areas of the road *still* need concrete and rebar, and there will undoubtedly be more to come. Please do *not* make this same mistake when it comes to evaluating remote site accessibility, unless you are a complete masochist.

### Existing Power and Telephone

At this point I'd give just about anything to have started at a remote station site with existing ac power and telephone lines. Unfortunately, the rural, rugged Locust Peak site had neither, so I embarked upon solar panel/battery route, about which I knew absolutely nothing. Part 2 will provide some technical references to help anyone considering a similar approach to avoid more costly mistakes, such as underestimating actual power needs as I did. Due to the way-over-budget costs related to road repair, I am now exploring diesel and propane generator options for eventually adding an amplifier or two into the mix, as opposed to adding more solar/battery capacity.

I should point out that I am a technical zip-squat and consider it nothing short of a miracle that I actually have a functioning SO2R remote contesting station that really works (albeit still at low power and still lacking the other antennas/towers still lying on the ground at home). Also to be installed

is additional SO2R automation gear and antenna switching units.

### Site-Ready vs Site Prep Needed

Locating a suitable turnkey remote site or one requiring minimal or no site preparation should be a high priority — unless you really enjoy clearing brush, cutting down trees, bulldozing and expending massive amounts of physical labor and capital (if also hiring additional equipment and worker bees as I have).

### Existing Tower or Shack

A remote station dream site to purchase or lease might be a now-dark commercial communication site with a 140 foot self-supporting tower, 800 square foot concrete building and electrical power available, all on a 2800 foot high mountain with moderate downhill sloping terrain in all important

real crowded once additional batteries and a second radio arrived. The new mini-barn shack will be much more comfortable for on-site contesting, assuming, of course, that I can actually get up the road. If you do have to build a shack, factor in *all* of the costs of doing so.

### "KB" Terrain Considerations

One possibility for a "kick butt" remote contesting station site would be a ridgetop location with gentle downhill sloping terrain in all directions — unless you are a low band contester who wants to put up a 160 meter four-square in the middle of a salt pond. Locust Peak does not offer the most ideal terrain, since much of the ridgeline drops off sharply. A higher ridgeline obstruction on adjacent property fortunately lies in a noncritical direction. The entire ridgeline is mostly limestone, and I took the liberty of dubbing it a "peak," because it's just that. At what I refer to as the hub — a lower area between two peaked ridge tops that resembles two humps on a camel — the maximum available semi-flat area is about 60 x 20 feet. Any future installation of Yagis (mono-banders and tri-banders) will require that these overhang parts of the ridgeline — not the most ideal situation. Stacked Yagis appear to be out of the question at this point, but I'm still brainstorming.

Prior to starting the Locust Peak project, I seriously considered relocating to the family wheat farm in Eastern Washington with its gentle rolling terrain. The county planning director there told me I could put up 200 foot towers without a permit. This was very appealing, but I decided I was not ready to deal with snow again. I now believe I *should* have

moved there and bought a snowmobile. In my mind's eye, I can picture all those multiple 200 foot towers with stacked Yagis on 40, 20, 15 and 10 meters and at least a 3 element beam on 80 — plus, of course, a full-sized four-square on 160. *In my dreams!*

Your new remote station may involve perfectly flat land, the rooftop of an office building or a friend's home on a hill with room to put up some antennas and a place for your radio equipment. If you are currently a dipole-in-the-attic contester, then any halfway decent remote location where you can put up a tri-bander and wires probably should work, as long as you are not at the base of hills or mountains that might block the RF.

### Geological Observations



Figure 3 — The "Indiana Jones Territory" portion of the Locust Peak road (straight downhill on one side)

directions. Sound good? Two fellow NCCC members and I spent several years trying to buy such a location, but we were frustrated beyond belief by what turned out to be a very flip-flop seller. At one point I was on the verge of concluding a lease agreement with an option to purchase, but that went belly up after some months. You need to prepare yourself for some disappointments along the path to developing your remote station. It's okay to think big out of the gate, but keep in mind that you need to take small steps.

I had identified a number of possible remote sites, but almost all of them required pretty much from-the-ground-up infrastructure. The initial Locust peak SO1R remote station was housed in a small Six-Pac camper I'd bought used. I was also able to operate from there in person, but it got

Whatever you do, thoroughly check out the geological characteristics of any potential remote station land you consider. Look for evidence of earth or rock slides and washouts. I always did this for my real estate clients, in addition to obtaining formal geological reports, but I failed to do this for myself (*duh!*). My tunnel vision was on the final prize — Locust Peak — and on the fact that I didn't have to purchase, rent or lease property for my remote station.

Of course, we all know there ain't no such thing as a free lunch. All the road repairs and site preparation costs to date could have paid for a nice multi-multi setup with six fully loaded K3s and six Alpha 9500 amps.

### Insurance and Security

Unfortunately, the criminal element persists, and stuff happens. Whatever the size of your remote station setup, do not neglect insurance and security. If you have a good homeowner's policy, it *may* cover your away-from-home antenna and radio equipment as mine does. The ARRL-sponsored "All-Risk" Ham Radio Equipment Insurance Plan is another option to consider.

In terms of security, there was only a single chain gate at the entrance to the Locust Peak road. A multi-panel security fence was installed just ahead of the culvert area with razor wire welded all around the top and sides. Long, pointed steel rods also were welded on the gates to pierce the radiator of any vehicle that might try to ram its way through. Once this was installed, I felt much better. Then I realized I had forgotten about an old, no-longer-maintained fire road that still might give motorcyclists access closer to the top.

Figure 4 shows the second, heavier-duty security gate with added razor wire and steel radiator thrashing rods that was installed not far from the Locust Peak hub. If you look closely at the higher support pole on the left, you can see a security camera.

The new mini-barn remote shack is a Tuff Shed, which has been fully insulated. A loft was installed for sleeping plus an interior room with built-in operating desk and window view. A rear room with overhead storage shelves accommodates the solar batteries, miscellaneous remote link Ethernet and coax switching gear and an honest-to-goodness RV-type Porta-Potti. Some things remain to be completed.

Unique internal security shutters also were installed to deter possible entry via the window, and a solid-steel bar was secured across the FanTastic Vent portal. This RV vent has a built-in thermostat and can be set to automatically open and exhaust hot air during warm weather. At the flip of a switch, it can provide additional internal cooling. It runs on 12 V, and ad-



Figure 4 — The Locust Peak Road upper security gate

ditional wiring was run that lets me make modifications to remotely control the vent's operation from home, if desired.

The remote security webcam originally in the camper (I used it to look for mountain lions via the computer at home) still needs to be re-installed. I also plan to install a separate alarm mechanism to notify me via the remote link of any unwanted visitors. Spook demonstrated his carpentry genius by installing heavy-duty carriage bolts through both sides of the door's hinges as well as through a second heavy-duty lock mechanism on the front door for additional security. For the second door lock, I chose a round, keyed lock made of a tough alloy that bolt cutters cannot deal with easily.

### Personal Safety

You also have to consider personal safety while at a remote station site as well as on the way to and from it. In my case, Locust Peak is in rattlesnake and mountain lion territory. The general area is also known to be infested with illegal drug labs and growers of illegal substances. I carry at least one pistol on my belt with "snake shot" as the first loaded rounds, followed by jacketed hollow points. Until after I get off the paved county road that's a bit less than three miles from the site, the firearm is kept in a locked case in my must-carry backpack.

Also in the backpack is a first aid kit, snakebite kit, flashlight, digital camera, water, munchie bars and my Kenwood TH-F6A hand-held transceiver. Unfortunately, I cannot access the local repeaters until I am near the top of the mountain,

but it's still a comfort to have it along. Amazingly my cell phone does work at the camper and new mini-barn, once I find the "sweet spot." Once I turn off the paved road, however, communication with the outside world is mostly QRT until I reach the top. For a number of reasons (especially my age), friends have recommended that I always have someone with me on the trek to Locust Peak. Generally I do, especially when earth and rock slides or fallen trees must be dealt with along the road to the top. Since I am a member of the CALSTAR emergency medevac helicopter organization, we widened the road part of the way up to create a small helicopter landing zone, and I plan to finish another small LZ on the top. I hope it never becomes necessary to use either of them, however.

### More to Follow

The next installment will focus on the remote radio-related equipment, including various direct Ethernet remote control devices. I'll provide a URL to a reference list that you may find useful in your remote station project planning.

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