

THE EXPERIMENTER

The Official Technical Newsletter of The ARRL West Central Florida Section



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Well, it's Hurricane Season AGAIN! Because of that fact, I have decided to put out a Special Hurricane Season Edition of The Experimenter. I have also just received a very outstanding article from Dennis, W4DG, one of our Technical Specialists and also an Assistant Section Manager for WCF. I have known Dennis for almost as long as I have lived in Florida. He is an outstanding TS and veritable fount of knowledge about Amateur Radio. Together with Dennis' article on standby generators, I have included a brief piece on being prepared before you get called out by your local ARES/RACES organization. You are a member of ARES, aren't you?

Is a Home Generator System Worth All The Time, Money and Effort?

By: Dennis Griffin, W4DG *
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For years, I have been evaluating the “real” need for an electric generator and have always ended up with the conclusion that having a generator was a luxury item and not something I could cost justify.

After retiring to Florida in 1996, from my original QTH in the Western New York area, I continued to dream about having an emergency generator.

My new QTH in Paradise is located on a sliver of land called a “barrier island”, as it is surrounded by water on all sides. The Gulf of Mexico is just 300’ west of my property which has a ground elevation of 3’. East and between the mainland and the barrier island is a body of water called the Boca Ciega Bay. A couple of draw bridges connect the barrier island to the mainland.

A single story house of about 2,000 sq. feet of living area, it was built on a 4’ craw-space foundation, not on a typical concrete slab on ground level. All the sub-floorings are pressure treated and except for the bedrooms being covered with carpeting, are covered with laminate plank flooring.

That puts my house floors at about seven (7') feet above the water mark and the entire QTH located in an "A" evacuation level, meaning you are the first to be advised to leave and generally the last to be permitted back on the island!

RETROSPECT

After last year's record four (4) hurricanes just missing my QTH, I re-evaluated my thinking regarding a generator. If a direct hit should occur and my QTH was still standing, I could clean the generator, after it was submerged in salt water, change the oil and crank it up and have emergency power!

Realizing too that while my QTH can be spared a direct hit, having to live without commercial electric service for a protracted period of time, can cause much anxiety and make living through the aftermath of such storms, a tough ordeal.

Those Florida residents that experienced some or all of these hurricanes last year, lived not too far south and east of me. They found damage or complete devastation of their homes and property. Even if their homes were spared a direct hit, they were without power and in some cases it took weeks for the public utilities, to restore their electric service. There were also cases where it took months to restore permanent service, as utility poles were snapped like tooth-picks and along with their wiring and had to be replaced before being re-connected, to the electric grid.

To buy, or not to buy that was the question

This year, I decided to bite the bullet and purchase an electric generator. But not before doing my research on the internet.

There were so many models with so many features. What size would I need? What source of fuel would it use - and the biggest factor - what would be the total cost! Not just the cost to purchase a generator but for it's routine maintenance, operating costs for oil, fuel and the initial installation.

I knew that to provide emergency electric with the capacity of my commercial electric service of 240 VAC at 200A, would require about a 50KW generator. \$\$\$\$ floated through my mind! I was dreaming again.

I had to evaluate what I wanted to power up and what I could "live" without, during a commercial power outage. These parameters would determine the size required.

Looking at the electric service breaker box would permit me to audit what appliances I currently powered, along with critical circuits like the ***Ham Shack***.

My XYL *announced* that the refrigerator, microwave and TV circuits would be included, which I assured her would be, along with those all important ham shack circuits!

Additionally, since we could use the microware for our cooking needs the oven/stove was deleted from the wish list and the central air conditioning system added!

As it turned out, even adding the A/C system with the circuits mentioned above, we had plenty of reserve for such items as the coffee maker, toaster and all the house lighting circuits.

Spending time on the internet researching the different types of generators made the selection process much easier. I concluded that I wanted a permanently mounted and wired system that would provide automatic start-up and transfer. I also wanted to avoid gasoline powered systems but there was no natural gas available, to my residence. But there can be LP gas!

I selected the model 4390-3 Guardian Plus Automatic Home Standby Electric Generator System manufactured by Generac Power Systems, Inc. (www.guardiangenerators.com) and sold by The Home Depot. This unit was rated at 15KW full load and met my load requirements. I downloaded their complete Installation and Owner's Manual (nearly 70 pages in .pdf format) and printed it out, to read carefully.

It's a good thing I did gather this information before I took a trip to my local Home Depot Store as after I read everything in the manual, I had many more questions, to be asked and to be answered!

OPENING A "CAN OF WORMS"

Being activity involved in the ARRL West Central Florida Section, I was known in my home "Town", as the guy with all those towers and antennas. But I was also known by first and last name, at the Town and County Government levels as an ARRL LGL (Local Government Liaison), as well as holding other ARRL WCF Section appointments. This made it easy for me to traverse the stumbling blocks sometimes encountered with government entities and their red tape.

My involvement as an ARRL LGL, proved to be as important as being completely prepared!

It was necessary for me to pay a visit to my local "Town" officials who gladly gave me the necessary permit application forms to complete. These completed application forms went to the Town "Building Commissioner" for approval. After his approval, I "walked" them down to the County of Pinellas, Florida Building

Department, located at the County seat in the city of Clearwater. I submitted them and watched as they read the permit applications, looked at my site plan survey and the generator specifications sheets that were attached.

Since I live in an “A” evacuation level, I was told that my new generator has to be physically installed above the Federal FEMA flood plan level of thirteen (13) feet above sea level!

I commented to them that this would place the generator above my existing roof and it would be very hard to work on it - and not so nice to look at, through my neighbor’s windows! But they were adamant that all generator manufacturer specifications stated they **MUST** be installed at this height!

Not being one to argue, but having read the Installation and Owner’s Manual cover to cover, I stated that the manufacturer of this generator stated in their installation instructions, to mount their unit on “*high ground*” to prevent it from being submerged in water. There was no absolute – must be – height mandated.

They asked me to show them that text in the manual. I did. Discussion concluded!

I was prepared with the facts and all the permits were issued!

Now, it was off to the community’s natural gas supplier, to question the availability of fuel.

I knew that the local gas utility was installing new natural gas mains on the barrier island and found out that indeed they have, but not yet on my street.

The answer was for them to supply me with LP gas until their natural gas service was installed on my street, scheduled for this fall. They would install the gas service lines to the generator, as well as an outside hook-up to my gas grill and supply LP gas now. Then in the fall, switch it over to natural gas! And the LP tanks would supply nearly four (4) days of fuel running the generator at full 100% load. Knowing that I was going to load it to about 50% of its rated capacity at any one time, would give me almost a week of operation before I would require the tank to be re-filled.

Wow.....now I could cook on the outside grill and have my natural/LP gas emergency electric generator too!

Light at the end of the tunnel

The big Generator was delivered - It was now crunch time!

It was time to decide where to mount the new generator and associated load – transfer switch equipment and hook things up.

NOTE: > I chose to install the transfer-load equipment into my existing house electrical system, as I have had extensive electrical wiring experience, as well as a complete understanding of how this system is to be interfaced. It is important to maintain a “circuit load balance” when moving house circuits from their location in the main electrical distribution panel, to the emergency load center. I would highly recommend that a licensed electrician or individual with complete knowledge of electricity perform these tasks.



Existing 200A Electric Service Switch



New load auto-transfer

Along the North side of my house is located one of my towers. A small 4' X 8' deck was installed there for access to the side entrance door, as well as a mounting platform for my central air conditioner compressor. It is about 4' above ground level and “generally” keeps the salt and rain water from entering that unit. There is also about five (5') feet of space located between the end of this deck and the location of my side yard tower and I determined that this space could easily be used to mount the generator.

Extending the existing deck would keep the new generator off the ground and its physical location would be within ten (10') feet from the house main distribution panel. There was ample space, on the other side of the tower, for the LP tank to be placed and could be easily filled and removed when the natural gas line service was installed, from the street.

A new PT 4 'X 6' addition to the existing PT wood deck was installed and the generator mounted on top of its composite mounting pad, all bolted through the pressure treated deck floor boards. The generator bottom is located at seven (7') feet above sea level.



Next, a ground just isn't a ground!

Located near the center of the lightning capital of North America, an elaborate station DC and RF grounding buss system was installed when I first moved in my QTH. Using three (3) 20' x 1" diameter pieces of copper tubing, as ground rods, spaced 1' apart, interconnected with 1" copper flashing, they are connected to the electrical power service entrance ground buss and with the telco and cable system grounds. Inside the shack, all equipment is independently grounded to this common grounding system buss via 1" copper flashing.

ALL antennas systems are also grounded to the station system ground buss when not in use by vacuum relays. An ICE manufacturing RFI/GROUND fault system block assembly is used at the service entrance.

ALL service entrance drops for power, telco and cable run, from their service pole, underground, in PVC tubing, to the service equipment located adjacent to the station system ground buss. RFI brute-force filter networks are utilized at the power plugs of each RF exciter and the main 240VAC power supply connections to the RF amplifier HV power supplies.

This "single point" grounding system is located directly below the new generator's deck location! My side-lot tower system is directly next to this new deck.

After completing the wiring to the automatic- disconnect and transfer switch panel and testing for proper operation of the generator system, it is time to get a final electrical and building inspection, from the County.

Final Thoughts

This entire process took place in a time frame of less than a month. While I did all of the electrical work myself, and contracted out the deck expansion, the total time for this project was much less than I had expected.

It is a good feeling to know that I will have emergency electric power, in case of a power outage. It's also good to know that my amateur radio emergency operating activities can continue, as long as my house and generator are still located on Redington Beach after a hurricane!

The total costs for the deck expansion, generator and gas line installation was just under \$6000.00. I figure that I saved at least another \$1000.00 by doing the electric wiring. Still, many hams have spent more on just a transceiver!

Was the Home Generator System Worth All the Time, Money and Effort? –

YOU BET it was!

[* Dennis Griffin, W4DG, was first licensed in 1958. He is an extra class operator, is an Assistant Section Manager (ASM) in the ARRL West Central Florida Section where he holds additional section appointments of LGL, NM, OBS, ORS, OES, OO, PIO, TS, and is an ARRL VE. He is also the webmaster of the section web site: www.arrlwcf.org. Dennis was elected an ARRL Life Member in 1973.

In addition to spending most of his adult life in the Law Enforcement profession, Dennis holds a BSEE degree. He also owned and operated a commercial 2-way Radio, telephone interconnect and security sales and service corporation, for over twenty (20) years in Western New York, before his retirement to Florida in 1996. For additional information, visit his webpage at: <http://web.tampabay.rr.com/dgriffi9/> , or contact him via email: w4dg@arrlwcf.org].

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EQUIPMENT LIST FOR EMERGENCY DEPLOYMENT
By Geoff Haines, N1GY, WCF Section Technical Coordinator

ARES/RACES ID

Handy-Talky with Flexible Antenna

Speaker Mike or Headset for HT

Magnetic Mount Antenna to match HT

Any Necessary Adaptors to connect HT to Mag-mount Antenna

Power cord to power HT from Vehicle Cigarette Lighter Socket

Adapter to use power cord direct to battery

Gel Cell or Motorcycle Battery 13.8 Vdc

Trickle Charger for Battery

Street Map of County

25 feet of Coaxial Cable with connectors installed

"Barrel" Connector to mate coax to Mag-mount Antenna

Small Tool Kit

Flashlight and spare batteries for it

Pen and Paper

Personal First Aid Kit

Personal Medications and Hygiene Items

Sunscreen

Change of clothes

Rain Gear

Insect Repellant

All of this equipment should fit in a moderately sized gym bag or back pack. The electronics and electrical devices should be routinely tested and cycled on a regular basis so that when needed, sometimes at a moments notice, they will be ready to use.

Useful additions might be items such as a "Hard Hat", a flashing personal light such as bicyclists use when riding at night, and Trail Mix or other easy to store food items. Another useful item is a short list of important frequencies, phone numbers, and e-mail addresses for local police, fire, hospitals, EOC's, weather service, relief agencies and the like. This should be laminated for all weather protection.

An excellent article on an antenna to improve your HT's range can be found at the following web address: www.athensarc.org/portable.htm

Your local ARES/RACES organization can provide you with other information such as the location of designated shelter sites together with the capacities of each and available emergency communications equipment such as pre-mounted antennas, coax and the like.

All of this gear is nice, but unless you train with it on a regular basis, and maintain and update it as well, you may be disappointed when the need for it arises. Attend training from your local organization regularly and participate fully in events throughout the year.

That's about it for now. Keep your radios dry and your gear ready.

73

Geoff, N1GY