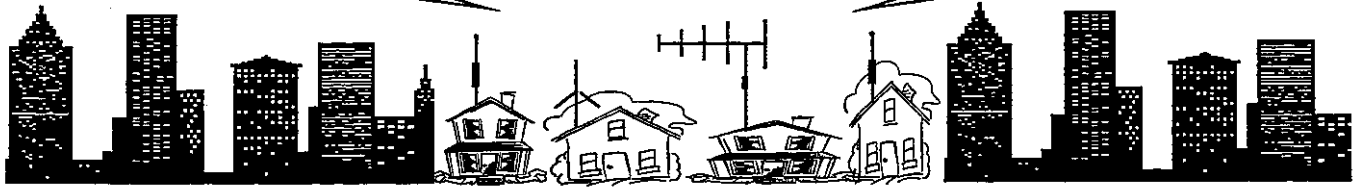
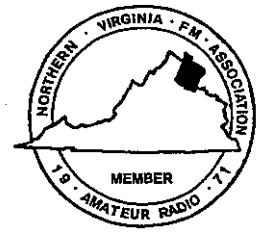


WATTS NEW

The Newsletter of the Northern Virginia FM Association
Fall 1998



The President's Notes

by Owen Wormser, K6LEW - President, NVFMA

It's really hard for me to grasp that the 1998 summer season is over and school has begun once again. It seems only yesterday that it was January and we were holding elections at our annual business meeting. Finally, most everything is up and operating the way it should. A couple of new locations for 146.91 remotes and most of our strategic plan will be completed. Next effort will be the 440 remotes.

The NVFMA is an organization providing VHF and UHF voice repeater services covering a considerable amount of Washington D.C.'s metropolitan and urban area. It is in this context of referring to "services" that I am directing my comments. There are those members that believe in exchange for their membership in the Association they have every right to expect "services". To a degree this is not an unwarranted expectation. I do not believe, however, any NVFMA member has a "right" to expect anything short of what NVFMA is capable of delivering. NVFMA functions on the backs of a number of volunteers who give freely of their time, away from family and other competing interests, to help NVFMA operate smoothly. It is in this context that I have great difficulty accepting the notion or view that a member has every "right" to expect any sort of "service".

My point is this: for all my years of involvement with NVFMA, I have seen the same people over and over again taking on the numerous jobs and tasks required to keep this organization functioning - technically and administratively. Somehow a very important message has not been conveyed in any of our literature - something I will attempt to correct - that being: NVFMA needs volunteers, people willing to assume responsibilities across a wide range of operating and administrative requirements. The connotation ought to be this: NVFMA services are open to all, members and visitors (with the exception of autopatch usage, and even that is open in an emergency). Membership in NVFMA is the means by which NVFMA acquires the resources necessary to operate its repeaters, publish its Handbook, modernize its equipment, and do a host of other things desired by the membership. Membership is not an action in return for which NVFMA provides customer-focused services. By being a member of NVFMA each of you have expressed your desire to support your organization. This is the minimum form of voluntary contribution a person can make to the continued operation of some of Washington D.C.'s finest voice repeater systems.

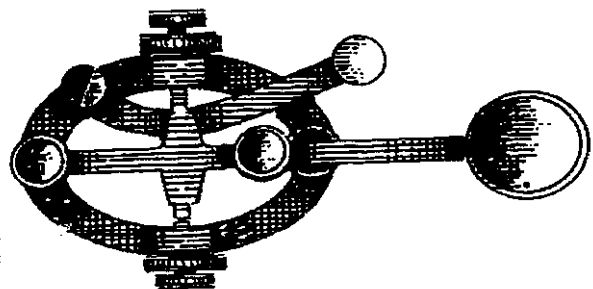
Prior to the end of October, we have to move the NVFMA 440 repeater, 146.79 NVFMA Remote and the other three repeaters located in the First Union Building at Tysons Corner. When things are challenging, such as this complex move, our consideration ought to be "What can I do to help"; bey-

support the organization. Rather than placing demands on the air and other places that something "ought to be fixed or taken off the air" call NVFMA's Tag Director, Sam Ruffin, KM4OI, or catch him on the air during the Wednesday night NVFMA bulletin and offer your assistance to whatever degree you feel comfortable. I know he needs everything from a "Safety Observer" when he is at a site, to equipment movers, antenna installers, all the way up to solid state, integrated circuit repeater controller repair people. There is NO skill set that would not be an asset to the NVFMA's Technical Activities Group, any and all are welcome. If you have a desire to provide more support to the NVFMA than just your annual dues please let Sam know about your desires. We need a lot of help to execute this challenging move out of the Tysons site.

We only get things done through the efforts and contributions of those that volunteer to make things happen. Next time, before frustration and other evil thoughts overtake you to the point of leveling a blast at the "poor operating condition" of one or even several of NVFMA's systems consider first what you might do to volunteer to alleviate the problem. Take the positive or high road by understanding that we are lucky enough to have volunteers who have given so much for so long to keep our systems working. Our dues, yours and mine, do NOT buy services from a service provider, they are our expressions of support, doing what we can to assist the organization, within our means. If all of us could do more than simply pay dues so much more could be accomplished, until then keep my thoughts in mind before taking out frustrations against the very people we have counted on for years to keep what we have working and making improvements whenever possible.

Have a great fall season, see you at the October General Membership meeting, third Thursday, 1930 hours, VA Power, Operations Building, Route 50, west of Fairfax.

73. Owen - K6LEW



N V F M A

The Northern Virginia FM Association

Post Office Box 486 - McLean, VA 22101

Officers:

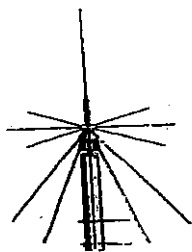
President:	Owen Wormser, K6LEW	703-684-6980
VP:	Phil Schroeder, KF4AJZ	703-764-1550
Secretary:	John Marino, KR10 (Temp)	703-691-0030
Treasurer:	Jeff McWhirt, KC4RON	703-330-7429

Board of Directors:

John Bartone, K4KXX	703-642-3138
Ed Harris, KE4SKY	703-280-1247
John Marino, KR10	703-691-0030
Jeff McWhirt, KC4RON	703-330-7429
Sam Ruffin, KM4OI	540-349-8833
Phil Schroeder, KF4AJZ	703-764-1550
Owen Wormser, K6LEW	202-362-8255

THE NVFMA Repeaters:

52.37/53.37	KM4OI/R
146.19/146.79	K4KXX/R
146.31/146.91	KR4MU/R
222.50/224.10	W4YHD/R
222.74/224.34	KB4CVL/R
442.025/447.025	KA3RQR/R
919.5/907.5	K6LEW/R
1272.1/1292.1	K6LEW/R



NVFMA Web Site:

<http://www.geocities.com/SiliconValley/Way/5337/>

NVFMA E-mail Address:

nvfma@juno.com

NVFMA-Sponsored Bulletin & Nets:

NVFMA Bulletin

Wednesdays at 8:00 pm on 146.79
Bulletin Station: Steve, W4FMD

QCWA Open Net

Sundays at 9:00 am on 146.79

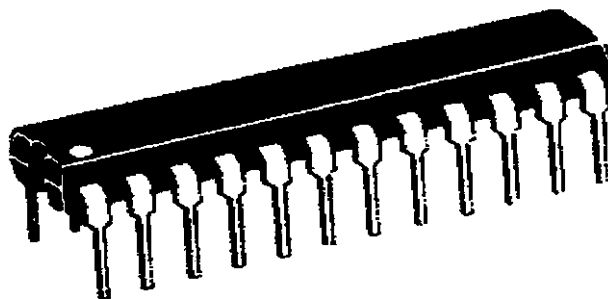
National Capital ARES

Regional Coordination Net
Sundays at 9:00 pm on 146.91



Status of the Apparatus

by Sam Ruffin, KM4OI - TAG Director



I hope everyone had a great summer. Mine was busy, to say the least. OK, the summer is over, so it is time to get back to the business of our repeater system. By the time that you read this we will either be planning our move from the Tysons site at the First Union Bank or we will have completed the move. This move was driven strictly by our landlord's business requirements: they needed the space we were occupying. Therefore, they exercised their option to terminate the lease. Not to worry, plans are being laid to move the equipment as I type this article. When all of the equipment has found a new home the information regarding the new site(s) will be disseminated.

The search is finally over; we have located and arranged for a replacement for our old 146.91 Burtonsville remote site. Pending Board approval and coordination we will be moving the old Burtonsville remote equipment to the new site in Rockville, MD near White Flint Mall. It is also our intention to co-locate a second 440 remote at this site. Our plan is try and accomplish all of the foregoing projects by the end of the calendar year.

Oh, I almost forgot. I also have a plan to complete a technical upgrade to the 146.79 machine by the end of the calendar year. Boy, all of this in three months?! This will not only require careful planning, but also manpower. If you would like to participate in this aggressive schedule of events, give me a call and volunteer to help. See you at the next membership meeting.

Battery Performance Measures

The following is the first of a series from a presentation at the ARES Institute, June 13, 1998. Virginia ARES gratefully acknowledges materials provided by the Battery Council International, Naval Facilities Engineering Command, Sandia National Laboratories and the U.S. Army Construction Engineering Research Laboratory. Thanks to Ed, KE4SKY for passing this material along.

Before buying a battery to power your station you must pay attention to how the battery performance ratings are measured. Cold Cranking Amps (CCA) used to rate starting batteries represent the current a battery can provide continuously for 30 seconds at 0 degs. F before cell voltage is depleted to 1.7V per cell, at which point it is fully discharged. For MCA or Marine Cranking Amps, the measurement is taken at 32 degs. F. Cranking amps tell nothing about how long a battery can run a transmitter. Reserve capacity is the length of time a starting battery can sustain a continuous 25 amp load before cell voltage is depleted to 1.7 volts per cell.

The performance measurements used for rating deep cycle batteries are amp-hour capacity and depth of discharge (DoD). Amp-hour capacity is total current available over time, measured at 80 degs. F. DoD is the percentage of battery capacity available during a charge-discharge cycle. Amp-hour ratings of deep cycle batteries are usually based upon a discharge rate at 1/20 of the battery's capacity, expressed as "C over 20". A marine battery rated 200ah at C20, discharged continuously at 10 amps, at 80o F., sustains that load for 20 hrs. "Starting" batteries are designed for 20% DoD, gel cells 25%, "deep cycle" batteries 50% to 80% and commercial aviation type flooded nicads 100%.

Starting batteries perform poorly for communications because they are designed for short periods of high load. Deep cycle batteries are much better and flooded NiCds best for communications because they withstand long periods of slow discharge. In a typical 25% transmit duty cycle, a 100w VHF repeater, drawing 20 amps on transmit, requires a minimum 100ah battery to stay within a C20 discharge rate, at 80o. F. At lower temperatures available capacity is reduced. Lead-acids lose 50% of their capacity at 32oF! More rapid rates of discharge, such as using a marginally sized battery for the load, further reduce available capacity and the number of charge-discharge cycles the battery will provide.

A rule of thumb which approximates C20 discharge is on amp-hour per PEP watt. This is adequate for 24 hours of typical CW or SSB duty cycle, or 12 hours of FM or digital. Estimate the amp-hour capacity required to run your station for 24 hours by summing all loads: transmit current times total operating time times duty cycle, plus receive current with squelch open times standby time and repeat for each piece of equipment. Then multiply the total loads by a 150% safety factor. If you are too lazy to actually run the numbers, use the "1 amp-hour per PEP watt" rule for each 24 hours of CW or SSB operation or 12 hours of FM or digital to ensure an adequate safety margin.

Flooded Lead-Acid Batteries

Lead-acid batteries are most common and consist of lead alloy grid plates coated with lead oxide paste which are immersed in a solution of sulfuric acid. Plates are alternated in the battery, with porous, nonconductive separators between them, or

with each positive plate surrounded by an envelope, open at the top.

A group of negative and positive plates with their separators makes up an element. When immersed in electrolyte, an element comprises a battery "cell."

In lead acid batteries each cell is nominally 2 volts. Multiple cells are connected in series to increase voltage. Larger or more plates increase amp-hour capacity, but not voltage. Thicker or fewer plates per cell allow more cycles and longer life for the battery. The lower the antimony content in the plates, the lower the internal resistance and the less resistant the battery is to charging. Less antimony also reduces water consumption through electrolysis. However, pure lead has low strength and may break during transportation or service operations requiring removal of the battery. More antimony allows deeper discharge without damage to the plates and longer service life. The plates in most automotive batteries are 2-3% antimony and deep cycle batteries 5-6% Sb. Calcium or strontium are used in sealed lead-acid batteries, and offer the same benefits and drawbacks as antimony, but reduce self discharge when the battery is stored without being used. Do not exceed 25% DoD with Pb-Ca batteries.

Cells in lead-acid batteries are vented to permit hydrogen and oxygen to escape during charging and to provide an opening for replacing water lost due to electrolysis. The percentage of acid in battery electrolyte is measured by its specific gravity (Sg). Measuring Sg of a wet, lead-acid battery during discharge is a good indicator of its state of charge. A fully charged battery has an Sg of 1.265 grams per cubic centimeter, at 75% charge 1.225, 50% charge 1.19 and fully discharged 1.120. Sg is not an absolute measure of capacity, but is considered in combination with load testing and open circuit voltage. Lead-acid batteries normally accept only about 1/10 of the charging current at 30 degs. F which they will accept at 80 degs. F. Correct charging current for lead-acid batteries at normal ambient temperature is between 1/10 and 1/20 of battery capacity.

When not in service, all lead-acid batteries self-discharge at rate of about 5% per month. The rate of self discharge increases with the temperature. If a lead-acid battery is left in a deeply discharged condition for a long time it becomes "sulfated" as sulphur in the acid combines with lead from the plates to form lead sulphate. If water is lost during charging and not replaced, sulfation is accelerated in those plates which are partially exposed to air.

If you power your mobile transceiver directly from the car battery, take care to run the engine for ten minutes out of every hour to keep the battery charged.

Continued on Page 4

Battery Performance Measures

(Continued from Page 3)

Facts about "Gel Cell" Batteries

Sealed lead-acid (SLA) batteries with stabilized or starved" electrolyte include gel cells and absorbed glass mat (AGM) types, which are valve-regulated and sealed. Since there is no free liquid electrolyte to spill, the battery can be used safely in any position.

SLAs are much safer than flooded types for indoor use and in sensitive equipment such as uninterruptible power supplies for computers, which would be damaged by acid spills or exposure to acid fumes. Any sealed battery will vent if overcharged to the point of excessive gassing, because the valves are designed to purge extreme pressure building up inside the battery case. Self discharge of gel cells is minimized by storing them in moderately cool areas of 5 to 15 degs. C.

Gel cells are NOT deep cycle. A Depth of Discharge (DoD) of greater than 25% significantly reduces their life. They must never be used below -20 degs. C, in the engine compartment of vehicles or in uses subjecting them to temperatures above 50 degs. C. Their chief advantage for amateurs is the ready availability of inexpensive "UPS pulls" which are rotated out of service on a fixed maintenance schedule before they are truly "bad."

A 33 amp-hour gel battery of the type used to power wheel chairs weighs about 26 pounds and will power your typical 50w VHF mobile rig all day, or will run a 100w HF rig on SSB at a Field Day duty cycle for about 6-8 hours. Used at hamfests they run about \$15-20, about 1/3 the cost of a new one.

Using a Hydrometer To Check Flooded Batteries

When using a hydrometer you are working with strong acid. Wear eye and face protection and rubber gloves. Have baking soda and plenty of fresh water ready to neutralize spills. To use a hydrometer, squeeze the bulb while the inlet tube is still above the electrolyte level.

Then lower the hydrometer into the electrolyte and slowly release the bulb to draw in the electrolyte. At the first cell being checked, fill and drain the hydrometer three times before removing a sample. This brings the hydrometer to the same temperature as the electrolyte. Take a sample and allow the bulb to fully expand. The sample must be large enough to completely support the float.

Hold the hydrometer straight up and down, so that the float does not touch the sides, top or bottom of the tube. Look straight across the electrolyte level to read the float. Ignore

for 5 minutes, read it and then rinse in clear water. For every 10 degs. F above 80 degs. F a factor of 0.004 must be added. Subtract the same factor for each 10 degs. below 80 degs. F. As an example, if a battery at 30 degs. F has an Sg of 1.240, the battery is 50 degs. below the standard, so the compensation is subtracted from the specific gravity. The compensation to be subtracted is $.004 \times 5 = .020$; $1.24 - .020 = 1.220$.

TROUBLE SHOOTING BATTERY BANKS

Accurate trouble shooting requires that all batteries in a bank and individual cells of unsealed, wet-type batteries be numbered. Recording a system history identifies patterns and trends and is a great time saver for others who may service your system in an emergency, because they can focus first on the most frequent problems and can anticipate the proper tools and materials to bring. Battery systems which are not used on a regular basis must be checked in the spring and fall, at minimum. Monthly is recommended.

First disconnect all loads. If battery tops are wet or dirty, remember that fluid on top of the battery is highly acid electrolyte! Clean battery tops with a cloth or brush and a baking soda and water solution. Rinse with clean water and dry with a clean cloth. Remove the caps from all cells, check the electrolyte level of every cell in every battery and add distilled water to the fill line on the battery, or 1/2" above the top of the plates. Determine the battery's state of charge with a hydrometer. Discolored, odorous electrolyte indicates contamination caused by adding other than distilled water, which results in battery failure. Inadequate charging without adding water can result in lead sulfate shorts between the plates, cracked partitions between cells and leakage which require the battery to be replaced.

NEVER hammer cable connections onto terminal posts !!! This breaks fragile spot welds between terminal posts and plates, causing shorts, which could cause a spark and ignite free hydrogen gas, causing an explosion! Inspect all caps for sound good condition, replace and tighten securely by hand only. Tighten battery tie-downs securely, but not so tight as to distort the case. Batteries that will not accept a charge may be rejuvenated for a short time by adding a conditioner available from marine and auto stores, but this is only an emergency measure until they can be replaced. Such batteries have had their electrolyte boiled off from prolonged overcharging, or become sulphated by being left at a low state of charge for too long or have suffered physical damage and should be replaced.

Continued on Page 5

Continued from Page 4

Inspect and repair any corroded, loose or burnt connections and blown fuses. Cartridge fuses don't look different when they are blown, so remove them and check continuity with an ohmmeter. A blown fuse shows an infinite reading, a zero reading means it is still intact. Always determine why a fuse blew before replacing it. Proceed logically and check the most obvious things. Check for excessive voltage drop at the load. Knowing what failed is necessary to avoid repeating the condition that caused the failure. If the same fuse blows again, don't consider the system operational again until everything has been checked out.

PORTABLE GENERATOR SAFETY

If you can't recharge your batteries when the "grid" is "down" after a disaster, they are useless. Generators frequently come to mind, but are not the only answer. If you don't know what you are doing, stay away from generators, because a screw up may kill you!

NEVER connect a portable generator to the house wiring unless a transfer switch has been hard-wired into the breaker panel to disconnect the house wiring from the AC mains to prevent back-feed when they come back up. Installing one is a job for a licensed electrician. Ensure adequate earth ground for your personal safety. Never run a generator in standing water or work on the generator or feed lines while standing on wet ground. Never run a generator inside an enclosed building because it is impossible to adequately ventilate carbon monoxide and fumes. Use only UL-listed 3-wire extension cords. Always

plug cords into equipment first before connecting them to the generator feed. Medical devices and computers require "clean" power and should never be run directly from unconditioned generator feeds.

Gasoline generators produce about 600w at 120 volts AC for each engine horsepower. A typical HF transceiver requires about 1200 AC watts at 120 volts. Generator capacity must be sized to not only the running wattages of the equipment, but also the starting loads. A 3.5 HP generator is about the minimum recommended for ARES/RACES use.

It can be carried by one person, uses 5 gals of gas every 24 hours and produces about 2 kW, enough to power a modest station, such as your "barefoot" 100w-SSB or dual-band FM mobile, laptop, TNC, a couple HT dry nicad battery chargers, 10 amp auto battery charger and minimal emergency lighting. Light-duty generators are not rated for continuous duty.

The minimum generator to power an average house or a mbile emergency command post is 4.5 to 5kW. A commercial grade, continuous-duty generator of this size has an 8 HP engine, weighs 200 lbs., produces 32A at 120 volts and runs 8 to 10 hours on 5 gallons of gas and uses a 55-gal drum of gas every three days.

Stored gasoline goes bad in a few months unless treated with a stabilizer. Store extra Jerry cans empty. When a severe weather "Watch" changes to a "Warning," fill your extra cans while there is still power to run the pumps, then store them under cover, but outside! Once the generator is started, use a wooden dip-stick to check the fuel level every 2 hours and "top off" generator tanks before they run out.

NFBM Membership/Renewal Form

New member:	\$25	New family member:	\$12.50
Member renewal:	\$20	Family member renewal:	\$10

Please submit to: NFBM, PO Box 486, McLean, Va 22101

Call Sign: _____

Name: _____

Address: _____

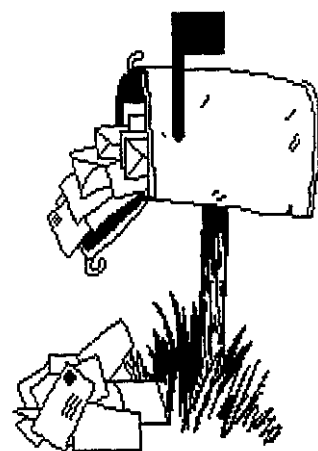
City-State-Zip: _____

Phone: _____

E-mail: _____

List telephone number in directory?
 Yes No

ARRL member?
 Yes No

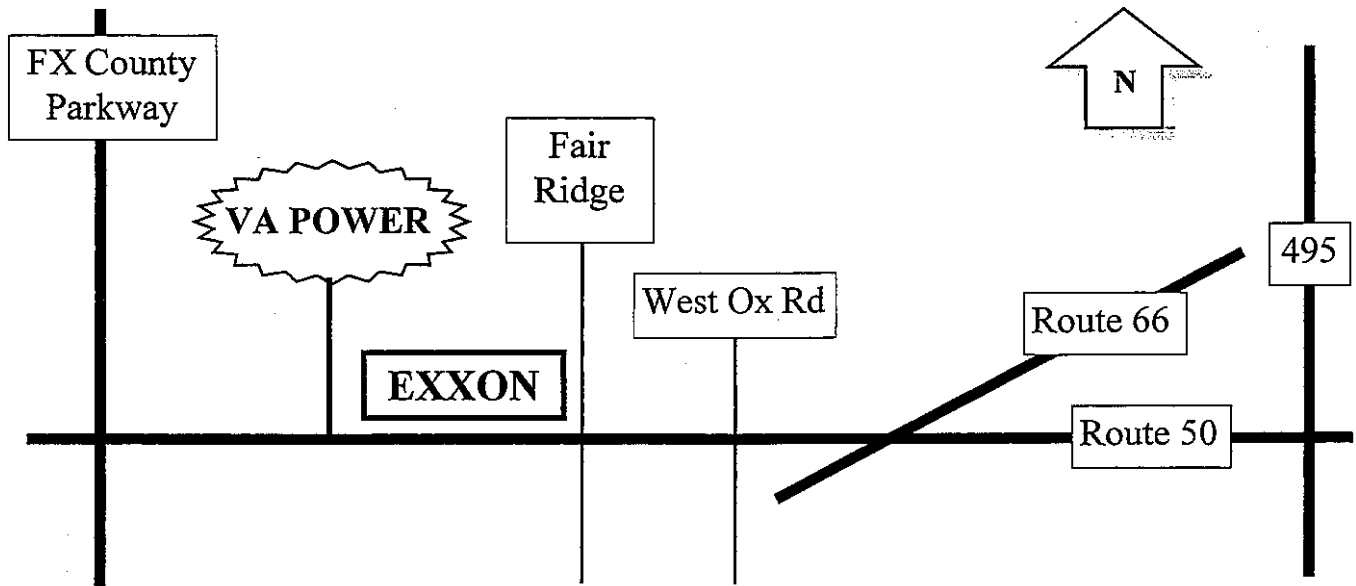


Check your address label opposite this page for membership expiration date.

General Membership & Election Meeting Notice

Thursday, October 15 at 7:30 pm

At the Virginia Power Operations Building
Route 50, 1/2 mile East of the Fairfax County Parkway



Northern Virginia FM Assn.
P.O. Box 486
McLean, VA 22101

FIRST CLASS MAIL
U.S. POSTAGE
PAID
MCLEAN, VA
PERMIT NO. 7259