



# FEEDBACK

April 2013

### Your Story:

Do you have a story, humorous or otherwise about amateur radio? If so, please contact the newsletter editor (wr8g@omega-link.com) and get it published in FEEDBACK.

You don't have to be a professional writer, or even a writer at all. If you're comfortable with writing, great! If not, relate the story in the fashion that you are comfortable with and let the editor do the rest.

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## Hamfest and Field Day

Well, the crossroads hamfest has come and gone. Many thanks to all that helped with making this event a success. The weather held attendance down a bit over last year, but there were still over 600 through the door. Comments from the vendors would indicate that they felt this was a good hamfest.

Next up on the agenda is Field Day. Field Day will be June 22nd and 23rd this year. There have been a few changes to the rules this year. You can read them at: <http://www.arrl.org/files/file/Field-Day/2013/2013%20Rules.pdf>. As always, we need more operators. Tech and General class operators can operate in the extra class portions of the bands when there is an extra class operator present (and that is most of the time).

This year the club will be operating QRP (5 watts or less) and in the battery power class (A slight misnomer, this includes solar and wind power). I personally expect CW and digital to be the majority of our contacts, but phone contacts can be made.

I'm scattering a few pictures of the hamfest that were taken by Lyn and Gary Bleyer throughout the issue. I hope that you enjoy them. You'll note that there are no captions, I prefer to let the pictures speak for themselves.



### In the News

- New legislation in Idaho clarifies exemption for guyed amateur radio towers. Read the details at: <http://www.arrl.org/news/guyed-tower-legislation-in-idaho-to-exclude-amateur-radio-towers>.
- ARRL's annual SSB Rookie Roundup will be held Sunday, April 21st from 1800 to 2359 UTC. All amateurs first licensed in 2011 or later qualify to enter this 6 hour contest. All other licensed operators are encouraged to help the rookies out with contacts and getting on the air. More details can be found at: <http://www.arrl.org/news/the-2013-ssb-rookie-roundup-is-here>.



### Board of Directors

#### President

Gary Williams, N8QC  
n8qc@arrl.net

#### Vice President

Dave "Doc" Ashbolt, K8OLY

#### Secretary

Jay Jarrett, KD8OXR  
kd8oxr@hughes.net

#### Treasurer

Don Larkin, W8RVT  
w8rvt@arrl.net

#### Member At Large

Tom Goodson, WR8G  
wr8g@arrl.net

### Club Meeting

3rd Thursday of every month  
Maple United Methodist Church  
342 Capital Avenue NE  
Battle Creek, MI 49017

### Next Meeting

April 18th, 2013 @ 7 PM

### BLB Luncheon

2nd Thursday of every month  
Mancino's  
1791 W. Columbia Avenue  
Battle Creek, MI 49015

### Next meeting

May 9th @ 11:30 AM

### SMARS Breakfast

1st Saturday of every month  
Homespun, 210 E. Columbia Av  
Battle Creek, MI

### Next Meeting

May 4th @ 8:30 AM

### SKYWARN Coffee

1st Saturday of every month  
Immediately after Siren Test  
Coney Island, N.E. Capital  
Battle Creek, MI

### Next Meeting

May 4th

## Meeting Minutes 03/21/2013

Meeting called to order at 7:00 p.m.

Pledge of Allegiance

Introductions

Officers present – Gary N8QC, Doc K8OLY, Don W8RVT, Jay KD8OXR.

Secretary's report accepted. Treasurer's report accepted.

### Committee reports:

- RACES – Several more siren locations have been added to the test list. Extra volunteers will be needed to cover them all. Report that 7 candidates tested at the Hamfest VE session. All passed. Another VE session will be held at the Maple Methodist Church on April 25th. Over the last few weeks the Skywarn check-ins have averaged 37 to the VHF repeater, 22 on the simplex frequency and 37 on the UHF repeater. This is out of 56 names on the list.
- Ham In A Day – May 4th 10:00 a.m. until 3:00 p.m. at the BC Dept of Public Works, 150 S. Kendall. This being a Saturday, parking should not be a problem. Note that this is also a siren test Saturday.
- Hamfest – Financials almost complete. 693 tickets were sold, down from 900 last year. Discussion was that the weather forecast and icy road conditions may have kept down attendance. Also remember that last year the temp was nearly 80 degrees! Doc expressed thanks to all who helped, especially Tom who stepped up to handle the table sales while Doc was indisposed. Thanks also went to Jordan who pulled the stuck vehicle from the only muddy spot in the parking lot! All comments heard from attendees were positive and many vendors expressed their satisfaction for a job well done.
- For next year, Tom is going to work on a database to be used to keep track of tables, vendors and ticket holders so we can send out postcards early next year. We will also continue with the table tagging scheme that helped this year, and Tom is trying out a floor plan program to help with table assignments.
- Well done, all.

### Old Business:

- The BLB luncheon will be moved to the Coney Island Grill for the next month to see if we can get a larger crowd. The Coney Island staff has always made us feel real welcome and they do a great job of accommodating our crowd, no matter how large. They also have a much more extensive menu from which to select. Hope to see more of you there. It is the 2nd Thursday of the month, starting at 11:30.
- We are still in need of a coffee provider, if anyone is willing to volunteer.
- Code class is still continuing, we have added one week to make up for the week that was lost to bad weather. (Some attendees question whether it will really help them, though!!)

### New Business:

- First Saturday Breakfast – We are also going to move the 1st Sat. breakfast to the Coney Island Grill. Our crowd has become so large that the Homespun is hard pressed to accommodate us and they don't take reservations. Once again, the Coney Island staff is eager to help us out.
- Field Day – Set up will be on the 21st of June. A committee was formed with Doc as chairman and John, Tom and Jay volunteered as his minions. Louie will be asked to contact the airport for location. The trailers need to be washed, wrapped and waxed before hand and Don and Terry will be working on this project. Help will be needed to get this done.

Meeting adjourned at 8:32

Respectfully submitted,  
Jay Jarrett KD8OXR, Secretary

# Board Meeting 04/01/2013

Attendees: **Gary N8QC, Don W8RVT, Jay KD8OXR, Stephanie W8AEZ, John W8JRD.**

Due to Doc's ongoing appointments, the board voted to move the monthly board meeting to the second Tuesday of each month which should allow Doc to attend. The change will be considered temporary until the other board members can be queried.

Don presented a copy of the financial report as well as an updated financial report on the Hamfest. We took in just about twice what was needed to cover expenses.

A discussion was held to provide new briefcases for the officers since most existing cases have been around for many years. A search will be made for the best cost/quality before purchasing.

Don is looking for some reasonably priced newer computers for the Field Day trailers. He has purchased one from Craigslist but others are needed. The board voted to reimburse Don for the first one purchased. Jay mentioned he knew where there were many waiting to be recycled and would pursue. (Contact has been initiated and we await word from New York City!)

Logging software on hand should be acceptable for this year. The only problem might be the split of Ontario, which could be handled OK, Don believes.

Don was tasked with finding/designing a way to mount the wind generator. His thought is to use some 2" or 2.5" PVC piping with guy wires. The board authorized him to proceed with purchase of materials.

A coffee volunteer is still needed, unless meeting attendees don't care that there isn't coffee. To date we haven't heard any complaints. It may develop that attendees will just bring cookies as a goodwill gesture such as happened at this meeting.

The trailers still need to be "wrapped" before Field Day. As the weather is beginning to warm up, this becomes higher on the priority list. Each trailer must be washed prior to wrapping and should be waxed afterward. It is hoped that we can get some volunteers who will help with this. One problem is that there are very few vehicles available among the board members that can tow these trailers. Announcements will be made at the meetings to find a way.

The March of Dimes walk is on Sunday April 28<sup>th</sup>. The RACES group has been asked to provide radio com-

munication. We will ask Dave or Ken if they need more help.

There will be a Michigan QSO party on April 20<sup>th</sup>. We would like to get one of the trailers out and set up to participate. A location needs to be found, volunteers to man the trailer will be needed also. This would be a good pre-run for Field Day, if we can get enough interest.

Meeting adjourned at 6:00 p.m.

Respectfully submitted,  
Jay Jarrett, KD8OXR, Secretary

## Income and Expense Statement 3/1/13 Through 3/31/13

Category Description	3/1/13-3/31/13
<b>INCOME</b>	
50 50	11.00
Dues:	
2013	51.00
2014	10.00
Dues-Other	10.00
<b>TOTAL Dues</b>	<b>71.00</b>
Hamfest Inc:	
Snacks	504.00
Tables	660.00
Tickets	3,195.00
Hamfest Inc-Other	85.00
<b>TOTAL Hamfest Inc</b>	<b>4,444.00</b>
Interest Inc	0.24
<b>TOTAL INCOME</b>	<b>4,526.24</b>
<b>EXPENSES</b>	
Hamfest:	
Drawer Change	0.00
Facility	219.00
Snacks	182.46
Tables	937.50
<b>TOTAL Hamfest</b>	<b>1,338.96</b>
Utilities:	
Telephone	79.11
<b>TOTAL Utilities</b>	<b>79.11</b>
Uncategorized Expenses	0.00
<b>TOTAL EXPENSES</b>	<b>1,418.07</b>
<b>TOTAL INCOME - EXPENSES</b>	<b>3,108.17</b>

**Hamfests**

04/20/2013: Jackson County ARC Hamfest  
 Jackson, OH  
 Jackson County ARC

04/20/2013: Milford Swap-N-Shop  
 Highland, MI  
 Milford ARC

04/20/2013: North Central Indiana Hamfest  
 Peru, IN  
 Cass County ARC, Miami County ARC, Grant County ARC,  
 & Kokomo ARC  
<http://nci-hamfest.net>

04/21/2013: Arthur Hamfest  
 Arthur, IL  
 Moultrie Amateur Radio Klub  
<http://www.qsl.net/mark/>

04/28/2013: Athens Hamfest  
 Athens, OH  
 Athens County Amateur Radio Association  
<http://ac-ara.org/>

05/04/2013: Cadillac Hamfest  
 Cadillac, MI  
 Wexaukee Amateur Radio Club  
<http://www.wexaukeearc.org>

05/04/2013: Ozaukee Radio Club's May Hamfest  
 Cedarburg, WI  
 Ozaukee Radio Club  
<http://www.ozaukeeradioclub.org>

05/05/2013: Jackson County WV Hamfest  
 Ripley, WV  
 Jackson County Amateur Radio Club

05/05/2013: THE DEKALB HAMFEST  
 Sandwich, IL  
 Kishwaukee Amateur Radio Club  
<http://www.karc-club.org>

05/17/2013: Dayton Hamvention  
 Trotwood, OH  
 Dayton Amateur Radio Association (DARA)  
<http://hamvention.org>

Do you know of a amateur radio related event that isn't listed in this news letter? If so, please contact the news-

letter editor (WR8G, Thomas Goodson, wr8g@omega-link.com, 269-962-8007) with details and I'll try to get it into the next edition of Feedback.



**S.M.A.R.S. W8DF Club Repeaters**

Southern Michigan Amateur Radio Society

2 Meter Repeater 146.660 MHz  
 -600KHz offset, PL 94.8

70cm Repeater 443.950 MHz  
 +5MHz offset, PL 94.8

1.25 Meter Repeater 224.240 MHz  
 -1.6MHz offset

70cm and 1.25 meter repeaters are linked.  
 Also available via echolink.

W8DF-5 144.39Mhz Digipeater/Igate  
 Find it on [www.aprs.fi](http://www.aprs.fi)

**Other Area Repeaters:  
 Skywarn/ARES/RACES**

2 Meter: 147.12, +600KHz offset, PL 186.2  
 70cm: 442.350, +5MHz offset, PL 94.8



## Batteries for Amateur Radio Emergency Service

by Lou Rucker, AD7UT

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This paper is intended as a first overview for understanding and choosing a lead-acid battery as a power source for emergency amateur radio operation. It is not a technical discussion of chemistry or electrical properties, but, hopefully, a collection of generally useful facts organized in an order to give an understanding for the reasons each type of lead-acid battery was developed and their strong and weak points. The chemical and electrical topics will have to pop up here and there, but there will be no depth in coverage.

Before starting, please note that the terms cell and battery sometimes seem to be used interchangeably. They are not. A cell has two electrodes and electrolyte in some kind of insulating "bucket". The battery is two or more cells connected in series to increase the available voltage. Common flashlight cells are often called batteries and that's okay for the drug store crowd, but the 1.5 Volt variety of "batteries" are not batteries - technically. The 9 volt packages are true batteries, since they contain a stack of six 1.5 Volt cells.

Now to business.... First, all the batteries to be discussed fall in the lead-acid category which uses aqueous sulfuric acid (water-acid solution) as an electrolyte. In a charged battery the positive electrode or anode is lead-dioxide and the negative electrode or cathode is lead. As the battery discharges lead and lead-dioxide both become lead-sulfate and the acid becomes water. This is reversed during the charging period. Also during charging some of the water is separated into hydrogen and oxygen gasses at the electrodes. These gasses can be dangerously explosive. Excessive gasses will be produced during overcharges. Because of the gas release these batteries must be used in a well ventilated area - such as under the hood of a car (exceptions in sealed batteries are discussed below). This battery is sometimes called flooded as opposed to the sealed battery. The term wet is also used because of the liquid electrolyte. The sealed battery can also be a wet cell, but the term is generally reserved for the older unsealed battery that discharges a significant amount of gas making it necessary to replace water in the electrolyte.

Having mentioned the battery in cars, the automotive version of the lead-acid battery has relatively thin and "spongy" electrodes (spongy in the sense having a sponge-like structure - not soft like sponge). This optimizes the design for very high current by increasing the electrode area. The highest current occurs when starting the car. However, it has the disadvantage that deep discharge (or deep cycling) can cause the thin-spongy electrodes to crumble or develop holes. The automotive battery, usually called a Starting-Ignition-Lighting (SIL) battery should not generally be discharged below 50% of the Amp-hour (Ahr) rating in normal use. Some manufacturers emphatically recommend not going below 20% discharge. While these batteries can recover from deep discharge 30 to 150 times they will not usually survive the thousands of deep cycles like other lead-acid battery types, or like they should in normal SIL use. This with the evolution of dangerous gas makes the usually inexpensive and common car battery not a good candidate for powering an amateur radio station except in a car while the engine is running most of the time - or in an emergency when nothing else is available.

In the 1970s the sealed lead-acid (SLA) battery became available. This design might be more properly called a "valve-regulated cell" or "Valve-Regulated-Lead-Acid" (VRLA) because a valve must be used to prevent dangerous high gas pressure from developing. Even with the valve, manufacturers state that the loss of water in the sealed battery is limited so that in most cases it can be neglected over the life of the battery. It has been found that if the battery seems to be failing prematurely the water level should be checked by prying off the top seal or seals (this is usually easy to do). The electrolyte should be at the bottom of the 1/2 inch diameter cylinder into each cell that is left opened when the seals are removed. Distilled water can be added to bring the level up if needed. Then the caps must be replaced. It is often found that after a year or more in a hot engine compartment the level in one or more cells is low enough that the electrode plate tops can be seen. The seal also limits acid fumes so corrosion near the battery is reduced. A catalytic element is usually built into each cell to convert the hydrogen and oxygen gasses back into water. The conversion is not 100%, but is close enough and in addition to recovering water it keeps gas pressures down. However, this is still an automotive battery with thin-spongy electrodes unable to survive deep discharges or deep cycling.

The next step is to make heavier electrodes that can withstand the repeated deep discharges. These batteries are marketed for use in golf carts, fork-lifts, powered wheel chairs and other deep discharge applications. They are often called "deep-cycle batteries" or "Traction" batteries. At this point, we have a relatively safe battery capable of running a radio for extended periods and into a deep-discharge. But the story is not finished.

The term "Stationary" battery describes a sealed lead-acid (SLA) or VRLA battery that has long shelf life and generally moderate load current. They are usually variations of the other batteries being described below for use for emergency lighting, phone system backups, uninterruptible-power-supplies (UPS) for computers and other applications. They are suitable for emergency radio supplies if they have a high enough rating. Many are fairly small, intended to supply relatively low power for only minutes to hours, until an emergency can be dealt with. The long shelf life usually means that they do not deteriorate much over months to years when hooked up to commercial power to maintain full charge until needed.

The next advance in VLRAs is to gel the electrolyte to a semi-solid consistency so it cannot spill. This also prevents stratification in which the components of the electrolyte can separate (there are often small quantities of other chemicals not mentioned here for reasons we will also not mention). The electrolyte is gelled by adding a compound like fumed silica to the acid. This electrolyte cannot be replaced if there is a problem, but this is not usually necessary. These cells are more easily damaged during recharging requiring slightly lower charging voltage than the flooded cells. If overcharging does occur, voids can occur between the gel and the electrode reducing the battery's current delivery ability (electrode area). This cannot be fixed. The recommended charge rate is C/20, one of the lowest charge rates considering all secondary cells, not just lead-acid. C is the Amp-hour rating so the maximum recharge current on a 100 Ahr Gel battery would be 5 Amps - quite low.

*(Continued on page 6)*

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The Absorbed Glass Mat Battery (AGM) is another VRLA battery that uses a Boron Silicate fiberglass mat, or similar material, about 95% saturated with sulfuric acid. The mat immobilizes the acid but keeps it in liquid rather than a gel state. The liquid state keeps the acid available to the electrodes allowing higher discharge rates and deeper discharges. It also promotes the recombination of the hydrogen and oxygen gasses. The structure may be the parallel plate structure of earlier battery types, but it is common to use a spiral electrode in today's designs for improved performance. The AGM battery is almost always a VRLA type and is sometimes known as a dry or starved electrode since there is no excess acid. The case can crack with little or no acid spillage. Another advantage of the AGM battery is a low self-discharge rate. They will lose only 1 to 3% of their charge per month on the shelf; significantly less than other lead-acid batteries. Voids formed as a result of overcharging simply float to the surface and pose no problems. Most Gel cells under 100 AHr are really AGM cells. In spite of not forming voids the AGM batteries, like Gel cells, must be charged carefully and not over charged though they are a bit more forgiving of abuse.

Little has been said about the electrolyte so far and not much needs to be said. In the lead-acid battery it is an acid-water solution. But, as pointed out above when discussing stratification, it may have small amounts of other additives to enhance the battery's performance such as recharging properties or extension of the battery life. You will probably not know if these additives are present or what they are.

Another lead-acid battery that may be of interest is the marine battery. This is for use on boats, as you may have guessed, and the electrodes are a compromise between the SIL battery with high discharge ability and the deep cycle batteries. Generally, the high discharge motor starting current is not needed for emergency communications so an "ordinary" deep cycle battery might be preferred to the marine design. But the marine battery is an option.

Now that we've discussed lead-acid battery features in some detail, the time has come to make a decision. Which one do we use? There is no single answer to that. If you need to get on the air quickly in an emergency any battery will do with the proviso that those emitting gas must be well ventilated or you might not be on the air very long. Obviously the best battery for many would be the Gel or AGM batteries, but they cost more and are a little touchy to recharge - not a problem if you set up the charging properly ahead of time, but if you are in a hurry some of the older battery designs are much more forgiving on more crude charging - especially those designed to take a deep discharge. It would be bad to lose a good battery at a critical time because a charger damaged it and power output is reduced - especially if you have paid extra for a premium battery. So what is the best case? Plan ahead, put in something like the Gel and AGM battery - or whatever you can afford - with proper charging and ventilation and Be Prepared (any Scouts out there - they have a pretty good motto). If it is a tight situation and you are desperate, pull the battery from your car and do the best you can. Run lower power on transmit, etc., if possible, to minimize battery drain. Again, be prepared. Check your rig/antenna performance during better times with reduced power output so you know what can or has to be done in an emergency.

In the above paragraph I kept mentioning recharging a battery.

But during an emergency when you have to be on battery - and can't charge...what then? Well you will have to recharge the battery eventually when commercial power does come back on and then keep the battery for the next emergency. Also, remember that the automotive SLA cannot take a deep discharge without possible damage. So what do you do in an emergency with an automotive SLA? You use it - even to deep discharge. One time probably will not hurt so you can recharge it and stick it back in your car and keep going. In real life you do what you have to do. If you do deep discharge an automotive SLA and it seems not to want to take a charge, take it down to your favorite mechanic or battery shop and they can sometimes take care of it for you. Also remember the solar panel, wind or water driven generators. None are ideal, but they, with a battery, can keep you on the air. There is a very neat lawn-mower motor driven alternator design that can be built for just over \$100 in "Emergency Power for Radio Communications" by Michael Bryce, WB8VGE, published by ARRL along with a lot of other good ideas. Remember the Scouts - Be Prepared. But if you can't then do what you have to do.

### Appendix 1

•A few more facts that might be useful:

The unsealed wet battery should be equalization charged by occasionally applying an overvoltage for a time when fully charged. For details see manufacturer's recommendations.

•Any sealed battery (SLA) or VRLA MUST NEVER be equalization charged.

•Charging of the Gel and AGM batteries are both more delicate than the wet batteries. The charge rate must be lower and the Gel types must not be overcharged. Both Gel and AGM batteries can and should be maintained on a "float" or "trickle" charge.

•The deep cycle batteries are heavy because of the heavier lead and lead-oxide electrodes, but the weight alone does not guarantee that the battery is a deep cycle or deep discharge type.

•Battery acid is dangerous - it will eat holes in your clothes. Think what it will do to your skin or eyes. Wear goggles and keep fresh water at hand to rinse acid from the body. If you get acid in the eyes rinse immediately and continuously for 10 or 15 minutes and get medical help - even if you don't think you need it!!

•All lead-acid batteries can produce dangerous high currents that can heat and/or melt a screw driver. Use extreme caution with tools and things like rings and other jewelry around the top of these batteries. Fingers have been cooked off by a short through a wedding band. Gloves are a good idea and they can protect you from acid too.

•Deep discharge or deep cycle batteries can be taken down to about 20% of their full charge, but the automotive or SIL battery in normal use does not go below about 95% of its full charge before recharge. The level of discharge which it can take without damage varies according to manufacturer, but is variously given as 50%, 60% or even 80% (i.e., only 20% discharge).

•There are various charging methods. Check with your manufacturer for what is recommended for your particular battery. These include constant-V, constant-I, V-then-I and I-then-V and some fancy variations that depend on memory of discharge level and/or measure of charge voltage or current. The fancy variations obviously

*(Continued on page 7)*

(Continued from page 6)

require a "smart" circuit but can have benefit in terms of longer battery life.

•After discharge the battery voltage will be lower than normal. After charge it will be higher than normal. According to Lou, WA6DVK, his batteries recover in about 15 minutes, but some manufacturers recommend waiting up to twelve hours before making the "normal voltage" measurement. Probably one of these times is practical and the other more precise.

\* The good old method of measuring the electrolyte with a hydrometer also has its drawbacks in terms of delays in reaching a steady condition. Obviously it is not useful in sealed batteries - especially the Gel or AGM types.

•No lead-acid battery is really sealed. All have at least a valve and all can discharge gas although the amount of gas (and lost water) is much smaller in the sealed designs. Without a valve dangerous gas pressure can build up during the charge cycle - especially with over-charge.

•There is lots of information on the Internet about batteries from a variety of sources. Go to the manufacturers first for reliable info, but always remember that one manufacturer will not build electrodes or have electrolyte additives the same as others so be careful about applying info to all batteries in general.

•Remember to fuse battery lines NEAR THE BATTERY. It does no good to have the fuse near the rig and get a short in the line. And it can happen and create a panic and/or fire. There is lots of info in the literature about where you should fuse, but at least fuse the positive (non-grounded) line with a fast fuse.

•When hooking up multiple batteries for higher voltage or current use heavy insulated wire. How heavy? That depends, but GAGE 8 to 12 isn't good enough.

## Appendix 2

### Definitions

**AGM:** Absorbed Glass Mat - A battery with a fiberglass mat to hold the liquid electrolyte.

**battery:** Two or more cells connected in series to increase the potential, voltage, available.

**catalyst:** A chemical that promotes a reaction between other chemicals, but does not take part in the reaction itself.

**cell:** Two dissimilar metals in an electrolyte that develops an electrical potential and can deliver electric energy. The potential, voltage, developed is dependent on the chemistry of the cell. Lead-acid develops about 2 volts per cell.

**Deep-discharge:** Discharging to some level of less than say 80% charge. Some batteries are designed to be deep discharged; some are not. In SIL cells this is most critical because the electrodes are thin and may discharge or charge unevenly, resulting in damage.

**Deep-cycle:** The same as deep-discharge. Deep-cycle is usually the preferred term although deep-discharge is used and may be more descriptive.

**Dry:** A cell in which the electrolyte is trapped so that it cannot spill. This applies to the AGM cells as well as the Gel cells.

**Gel:** A cell in which something has been added to the liquid electrolyte so that it becomes semi-solid or gelled.

**Electrode:** One of two dissimilar metals in a cell which react with the electrolyte to produce an electric potential.

**Electrolyte:** A liquid or gelled material between the electrodes that reacts with the electrodes to produce an electric potential. It generally also serves the purpose of ion transport (conduction) between the electrodes. The electrolyte in lead-acid cells is an aqueous sulfuric acid solution (water and acid).

### Emergency:

1. A period of unusual condition or inconvenience like when you lose power and your computer won't work. Nobody is getting hurt and no houses burning down. The worst risk is boredom or irritation which most of us can survive.
2. A condition where lives and/or property are at risk and communication is helpful or essential. This is the emergency for which we are trying to be prepared.

**Flooded:** A wet cell. Sometimes this term is limited to those cells that are not sealed.

**Lead-acid:** A cell or battery using lead or lead compound electrodes and a sulfuric acid solution as an electrolyte.

**Equalization Charge:** An over charge at higher voltage applied to wet unsealed batteries occasionally. It MUST NOT be applied to any sealed battery design.

**Marine battery:** A lead-acid battery that is a compromise between the high starting current design of the SIL and deep discharge characteristics.

**Over charge:** To charge for longer than necessary to fully charge a battery. This may lead to damage of the cells of a battery. Sometimes a low or trickle charge can be applied when a battery is not in use to maintain full charge without damaging over charge.

**Sealed:** A battery that is sealed to prevent loss of gasses which are then turned back into water (in the lead- acid case) and prevent electrolyte spillage. Sealed batteries are not really sealed as they would build up dangerous pressure, so there is a relief valve provided and the cell/battery is known as a Valve- Regulated-Lead-Acid or VRLA type. There will be some gassing and water loss in the VRLA battery, but not much.

**Self-discharge:** The loss of charge (stored energy) in a cell or battery when it is put "on-the-shelf" with no load or charging.

**Shelf life:** The length of time a cell/battery can last on the shelf with no load or charging without losing some significant amount of its charge.

**SIL:** A common automotive battery meant for Starting, Ignition and Lighting use. Not meant for deep discharge.

**SLA:** Same as SIL - stands for Starting, Lighting and Accessories. A little confusing - see "sla".

**sla:** A sealed-lead-acid cell/battery.

**VRLA:** A Valve-Regulated-Lead-Acid cell/battery intended to limit loss of water, gassing and spillage.

**Wet:** A lead-acid cell/battery with a wet sulfuric acid electrolyte. The term sometimes does not include the sla type that uses a liquid electrolyte although it is also a wet design.

# SOUTHERN MICHIGAN AMATEUR RADIO SOCIETY

## FEEDBACK



SMARS

P.O. Box 934

Battle Creek, MI 49016

## FIRST CLASS MAIL

«CALL»  
«NAME»  
«ST\_ADDRESS»  
«CITY», «STATE» «ZIP»

### SMARS NETS

Before Lunch Bunch  
Monday—Friday 11:30 AM, 146.66

Sunday Evening 8:00 PM, 146.66  
Monday 7:00 PM, 147.12 (Skywarn)  
Monday 8:00 PM, 224.24 / 443.95  
Wednesday 7:00 PM, 224.24 / 443.95  
Wednesday 8:00 PM, 28.365  
Saturday 8:00 PM, 224.24 / 443.95

### Upcoming events:

**Club meeting: April 18th @ 7:00 PM**  
**VE Testing: April 25th @ 7:00 PM**  
**SMARS Breakfast: May 4th @ 8:30 AM**  
**SKYWARN Coffee: May 4th after siren test**  
**BLB Lunch: May 9th @ 11:30 AM**  
**Club meeting: May 16th @ 7:00 PM**