

Arlington County RACES

Basic Operator Course Unit 4

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ARLINGTON
VIRGINIA



Personal and Family Preparedness, Equipment Recommendations



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OBJECTIVES

- **Family preparedness steps**
- **RACES member preparedness**
- **Frequency plans and coordination**
- **When to use simplex vs repeaters**
- **Recommended RACES Equipment**
 - 3 “Levels” -- “24-Hr Pack” for deployments
 - Rigs and antennas for portable, mobile, remote
 - Auxiliary power - battery, generator, solar
- **Share Lessons Learned**

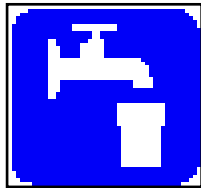
Prevent “A Disaster” from Becoming “YOUR” Disaster” through Planning and Preparedness!

- Every community is affected by disasters!
- Remember that Family Comes First!
- Your family must be self-reliant
- After you have planned, so they are prepared / self-reliant, you will know they'll be OK.
- Then, you can concentrate on doing your job!

First Step:



Learn About Hazards in Your Community



- Natural - Floods, hurricanes, tornadoes and winter storms
- Technological
 - HAZMAT releases, rail, truck, aircraft, power failures
- Resource shortages
 - Drought, potable water, fuel
- Other consequences
 - Of criminal acts, civil unrest or terrorism.



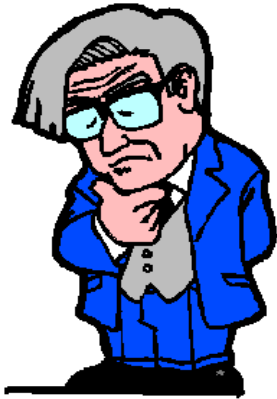
Next step

*Obtain basic knowledge to
enable you to cope with known hazards*

- Where are community emergency shelters located?
- What are the recommended evacuation routes?



- Who would you call? For help or to let family members know where you are and that you are OK.
- Where would family members meet if anyone should become separated?
- How would you and /or family members get there?



Third Step

Develop your family disaster plan

Two Safe meeting places:



- “Nearby Neighborhood Refuge”
 - Neighbor *within walking distance*
 - Safe for children to go when you aren’t home
 - To meet and account for everyone after a fire
- “Farther Away Friend” *within driving distance*
 - As an *alternative to a public shelter*
 - “Out of Area Contact,” If family members become separated, this party agrees to accept collect calls to let others know that they are safe.

Family Disaster Plan

(continued)

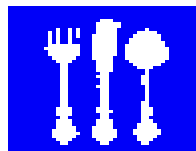
In case of evacuation, ensure that family members know how:

- To shut off electricity at the main circuit breaker or fuse box.
- To shut off water at the main valve.
- To shut off gas at the meter or pipe into the house, or at LP tanks.
- (By showing them, and labeling the valves and circuit breakers.)



Evacuation Supplies

Take to a shelter...for each family member...



- General purpose utility knife, with can opener
- Flashlight, with extra batteries
- Portable radio, extra batteries
- First Aid Kit, *(containing a first aid manual)*
- Personal medications and sanitation supplies
- 3 days supply of nonperishable food
- 1 gallon of water per person, per day
- Cooking and eating utensils
- Items for special needs, care of infants
- Wool blanket or sleeping bag
- Sturdy shoes and extra socks
- Rain gear, change of warm clothing and underwear

NOW THAT OUR FAMILY IS SAFE, WE CAN FUNCTION AS RACES OPERATORS

- **Rigs are functional, (with instructions if needed)**
- **Batteries, generators, (with cables) are ready.**
- **Notebook of ICS forms, Comm Plan, etc.**
- **We are ready to activate.**



Communications Plans

- **SIMPLEX** in “most cases” is **ROUTINE**
 - Repeater use as **BACKUP**, *not primary*
 - Only if *wide area coverage is needed*
- **ESTABLISH LOCAL FREQUENCY PLANS**
 - Contingency plans for operations
 - Anticipates storm-related repeater loss
 - Test regularly in exercises
- **Use ICS FORM 205 CommPlan Template**
 - Pre-program rigs to a standard list

WHY DO WE NEED SIMPLEX?

Essential for local RACES / CERT Communications

- Reduce congestion on OPERATIONS net,
- Repeater loss due to storm damage
- AC power failure, depleted battery backup
- Don't tie up a repeater for local activities
- Use scheduled nets as drill opportunities
- Simplex is ideal for localized events

Teach Simplex Awareness

- **TEACH** what the 'reverse' button is for
- **DON'T** hog a "machine" for rag chews
- **DO USE** the repeater for initial contact
- **THEN... LISTEN** to the input
- **IF** both stations have good copy...
- **THEN** change to simplex, but ..
- **PLEASE...**respect the band plan!

Become Familiar with Appropriate **SIMPLEX VOICE FREQUENCIES**

- Regional simplex frequency plans are not “coordinated,” but “gentleman’s agreement”
- Reduce interference during local operations
- Please relinquish them for RACES ops
- *Normal amateur use is actively ENCOURAGED at all other times*
- Establish listening watch for preparedness

Observe band plans

- Use standard channelization
- Reduce adjacent channel interference
- Routine use, drills, non-emergency ops
- *Pre-assigned frequencies for local ops*
- *Assignments in exception to approved band plans should be made during declared emergencies only.*

2m Band Plans

T-MARC / SERA

- **No FM below 144.500 MHz!**
 - *No digital in simplex voice sub-bands!*
- **Standard channelization:**
 - Thirteen 15 kHz Channels 146.415-146.595
 - Twelve 15 kHz. Channels 147.42-147.585

VHF-UHF Simplex frequencies

- **146.415 - Statewide ARES / RACES**
- **146.52 – National Simplex**
- **146.55 and .58 – Secondary Calling**
- **RO assigns others as needed**
 - **146.43 Primary + 146.58 Alternate VHF**
 - **445.950 UHF for Logistics / Admin Talk-Around**
 - **144.250 USB for regional EMAC coverage**
 - **Working frequencies listed on ICS 205 >>**



Radio Communications Plan – ICS 205	1. Incident Name	2. Date / Time Prepared	3. Operational Period Date / Time
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4. Amateur (ARS) and General Mobile Radio Service (GMRS) Channel Utilization

Radio Type/Cache	Channel ID	Function	Frequency / Tone	FYI Info.	Tactical Calls of NCS, Agencies and Liaisons
HF-2m	Alpha 1	OPNET PRIMARY SIMP	146.430		
HF-2m	Alpha 2	OPNET ALT. SIMPLEX	146.580		
HF-2m	Alpha 3	OPNET BACKUP RPTR	145.150-		
HF-2m	Bravo 1	LOGNET PRIMARY RPTR	146.625-(107.2)		
HF-2m	Bravo 2	LOGNET ALT SIMPLEX	146.415		Mutual Aid, Training
HF-70cm	Bravo 3	LOGNET ALT SIMPLEX	445.950		
HF-GMRS	Charlie 1	ADMIIN PRIMARY RPT	GMRS Pair TBD		
HF-GMRS	Charlie 2	ADMIN BACKUP RPTR	462.675+(141.3)	REACT	Requires GMRS Lic.
HF-SSB	Charlie 3	RACES REG. COORD	144.250USB		
HF-2m	Delta 1	DIGITAL OPS	145.73		1200 baud / TCP/IP
HF-75m	Echo 1	HF EVENING PRIMARY	3947 LSB		
HF-60m	Echo 2	HF EVENING ALT	5330.5 USB		
HF-40m	Foxtrot 1	HF DAY PRIMARY	7243 LSB		
HF-40m	Foxtrot 2	HF DAY ALTERNATE	7255 LSB		
HF-10m	Foxtrot 3	Base-to-mobile-Ops	29.600 FM		
HF-GMRS	Golf 1	Neigh. Watch Guard Freq	462.5625	FRS1	Max 5w w/GMRS Lic.
HF-GMRS	Golf 2	CERT Ops	462.5875	FRS2	Max 5w w/GMRS Lic.
HF-GMRS	Golf 3	CERT Ops	462.6125	FRS3	Max 5w w/GMRS Lic.
HF-GMRS	Golf 4	CERT Ops	462.6375	FRS4	Max 5w w/GMRS Lic.
HF-GMRS	Golf 5	CERT Ops	462.6625	FRS5	Max 5w w/GMRS Lic.
HF-GMRS	Golf 6	CERT Ops	462.6825	FRS6	Max 5w w/GMRS Lic.
HF-GMRS	Golf 7	CERT Ops	462.7125	FRS7	Max 5w w/GMRS Lic.
HF- FRS	Golf 8	CERT Ops	467.5625	No GMRS	FRS only 500mw
HF - FRS	Golf 9	CERT Ops	467.5875	No GMRS	FRS only 500mw
HF - FRS	Golf 10	CERT Ops	467.6125	No GMRS	FRS only 500mw
HF - FRS	Golf 11	CERT Ops	467.6375	No GMRS	FRS only 500mw
HF - FRS	Golf 12	CERT Ops	467.6625	No GMRS	FRS only 500mw
HF- FRS	Golf 13	CERT Safety-EMERGENCY	467.6875	R I T	FRS only 500mw
HF - FRS	Golf 14	CERT Admin.	467.7125	No GMRS	FRS only 500mw

5. Prepared by (Radio Officer or Field Team Leader)

Name _____

FCC Call sign _____

UHF Capability

Virtually essential in urban areas!

- **More effective building-to-building, floor-to-floor**
- **Less intermod, lower noise floor, quieter signals**
- **Hospital / shelter ops, cross-band repeat links**
- **Use amateur 70 cm 25 kHz channels for mobile / base**
- **GMRS “Interstitial” simplex channels 1-7 common with FRS used for CERT incident area talk-around @ 5w EIRP max --- IF you have a GMRS license and type accepted equipment (not an opened up ham rig!)**

"Good operating practice"

- **LISTEN! Before keying up!**
- **Avoid unnecessary output power**
- **Appropriate use of cross-band repeat**
 - Use of CTCSS to reduce interference
- **Portable / Temporary repeaters**
 - Shared-Non-protected Pair w /CTCSS
- **Regional CTCSS tone plans**
 - Multi- jurisdictional sharing of limited UHF frequencies for local area 'talk-around'
- **GMRS licensing and user coordination w/CERT**

Don't expect repeaters to “always be there”

- An HT is **INADEQUATE** for use as a primary rig for emergencies because it:
 - Limits you mostly to nearby repeaters
 - Severely limits your useable simplex range!

Average HT simplex range is 1-2 miles

- Typical stock “rubber duckie” is -5 dB!
- **But EVERYONE still needs one:**
 - For “walk & talk” solo assignments
 - As a spare or backup in case your mobile quits!



Using GMRS: General Mobile Radio Service

- **GMRS base, mobile and repeater units in the 462-468 MHz UHF range.**
- **Frequencies are shared with FRS.**
- **GMRS requires an FCC license, but can be used by family members.**
- **GMRS units may have 2 to 50 w RF output.**
- **Most GMRS repeaters are not “open.”**



For more info on GMRS:

- National Capital **REACT Incorporated** (NCRI) is composed of two area **REACT** teams -- Fairfax, Virginia and Montgomery County, Maryland -- as well as members of its own (designated "300" units). NCRI and its member teams have an open membership policy.
- Two repeaters are maintained by NCRI. Members, and non-**REACT** users, pay a yearly fee to use them. Non-**REACT** repeater users are designated as either "800" or "900" unit numbers.



FAMILY RADIO SERVICE

- FRS is an unlicensed service.
- Only hand-held units are FCC type accepted, with $\frac{1}{2}$ watt RF.
- Range is limited to < one mile.
- FRS can communicate with GMRS.
- Some radios have all 14 channels.
- All radios have channel 1.

Local nets are training opportunities!

Do more than just collect names on a roster!

- Teach and routinely use directed net procedures!
- Rotate NCS operators so that all learn how!
- Generate and handle some formal written traffic!
- Encourage operators to use emergency power
- Practice setting up in field / mobile locations
- Leave breaks, so that others can make contact
- Encourage “weak signal” capability and LISTEN!
- Test limits of coverage, teach operators to call for and relay outlying stations as a matter of routine

Realistic training

- **Anticipates repeater loss**
 - Storm damage from wind or icing
 - Battery backup must be conserved
- **If a repeater is "down"**
 - Revert to the **output frequency on simplex**
 - *To meet for scheduled nets.*
 - (Idea!) - Have control "op" turn off repeater during a scheduled net! This is a great drill!

Equipment Recommendations

Safety and Reliability

- 24 hours minimum battery power
- 2m, or dual-band recommended
- 440 or 220 portable / mobile
- Mobile / Portable / Base Capable
- 25 watts minimum RF output
- For Reliable simplex
- Less dependent on repeaters



Equipment Recommendations

Your basic rig should be capable of:

- Operation on 12-15V DC power (battery capable)
- "Low" -- 5w RF to conserve battery and,
- "High" -- 25w min. RF output for reliable simplex
- Frequency agile, field programmable, w/ PL
- Minimum ten field-programmable memories

Arlington RACES May Add:

- **Packet capability extremely valuable and highly desired.**
- **2m SSB capability is useful if enough people have it.**
- **Portable / mobile HF, if General license or above.**
- **Cross-band repeat *not essential, but “nice to have”***

When a Portable Unit is Best

An HT may make more sense than a mobile if you ...

- Use public transportation
 - To and from work or school
- Are a minor who doesn't yet drive
- Have impaired mobility or depend upon others to assist you in conducting basic life activities.

**Soif all you have is an HT,
Make the most of it!**



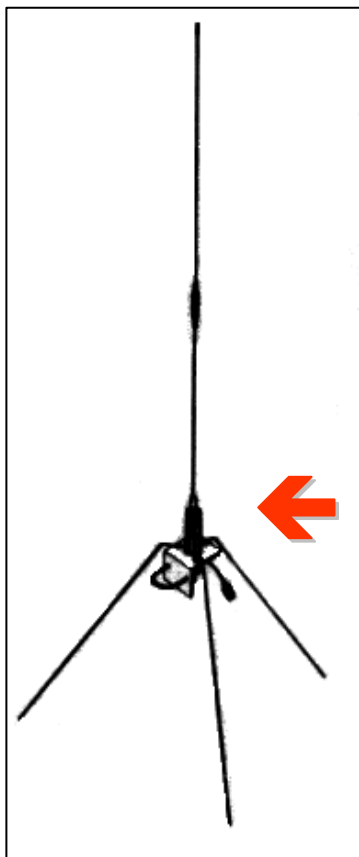
HANDHELD USERS

Supplement your equipment!

- 1/2-wave 'no ground plane' antenna, unity gain
 - Equal to a 1/4 wave with a ground plane
 - 2.15db gain if used with a ground plane
 - Single or dual-band mobile antenna + mag mount
 - Telescoping 1/2 wave whip, or ...
 - Roll-up 300-Ohm twin-lead, or copper J-pole
 - Works well when pulled up high into a tree !
 - Or when attached to a bicycle or wheel chair!

HANDHELD USERS

(continued)



Or 5/8 wave mobile whip

+ mag-mount, (3db gain)

If no ground plane improvise!

Use a metal vehicle, file cabinet, trash can, railing etc.

Get radial kit + mast clamp

for your mobile antenna

TV tripod and 15 ft. of mast,

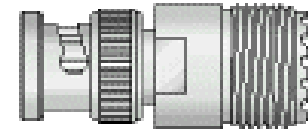
+ mallet, stakes, guys to anchor.



HANDHELD USERS

(continued)

- 25 ft. of RG8-X + adapters

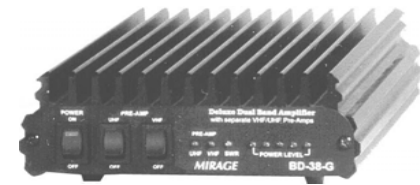


- Auxiliary power cord



- Gel cell or AGM battery

- “Brick amp” (25w to 50w)



"Go Kit" Three Levels Which Build Upon Each Other

Level I – Carried or accessible all of the time:

- Eyeglasses (*if you need them for close work*)
- Cellular telephone or pager (*if used for alerting*)
- Driver's License and RACES ID
- Cash for phones, vending
- HT and FCC license copy
- 1 qt. water and snacks for a day
- Personal medications for a day
- Small AA flashlight
- Utility pocketknife
- Lighter or matches

Level II - Equipment, Comfort and Safety Items

In vehicle, "lumbar pack," shoulder bag or rucksack

- HT, (if not carried at Level I)
- RACES plan, forms pack, operating references
- AA battery case for HT
- Spare AA batteries
- Earphone / speaker mic
- HT "gain" antenna
- 10 ft. RG8-X jumper
- Antenna counterpoise
- Personal first aid kit
- Notebook and pencil
- City / County road map**
- USGS 7.5 min. topo**
- Orienteering compass**
- Matches, lighter**
- Knife / multi-tool, (if not at Level I)**
- "Stuff-able" rain gear + hat**
- 2-7ah gel cell battery for HT**
- AC charger for HT & gel cell**
- Power cord for HT and gel cell**
- Water, 2 qts. min. + 1 "meal"**
- Extra "warmth" layer**
- Sunglasses, sunscreen**

Level III - Backpack with PPE + “Ten Essentials”

“Personal Protective Equipment: (PPE):

- **Hardhat** (ANSI Z89.1-1986 Type I or II, Class A or B *required for CERT*)
- **Reflective Vest** (ANSI Type II recommended)
- **Safety glasses** (ANSI Z87.1-1989 w/side shields *required for CERT*)
- **Dust mask** (N-95 level protection recommended for CERT)
- **Work boots w/ ankle support, and traction sole**
(ANSI Z41-1991 safety toe is HIGHLY recommended)
- **Leather work gloves** (for rope work, use of hand tools)
- **Medical Exam Gloves** – *needed for CERT triage, first aid*
- **Rain suit or poncho** (if not carried at Level II)
- **“Larger” 4AA primary flashlight and extra batteries**

Level III - “Ten Essentials”

(Less the items already carried with you in Levels I or II)

- ❑ **First Aid Kit**
- ❑ **Map (s) - VDOT road map, USGS 7.5 min. topo of sector**
- ❑ **Compass – orienteering type on “dummy” cord**
- ❑ **Knife – or multi-tool**
- ❑ **Food – two meals, plus snacks already in Levels I and II**
- ❑ **Fire starting materials – lighter, matches, tinder**
- ❑ **Signaling materials – whistle, signal mirror, highway flare**
- ❑ **Emergency shelter – poncho + liner or plastic tarp**
- ❑ **Extra clothing, rain / wind / cold resistant clothing, layered**
- ❑ **Water – *additional to total minimum of 1 gallon***

See the article “Your 24-Hour Pack,” for a full description of minimum contents and recommended additional shared items for RACES Disaster Response Teams.

Radio Equipment Annex

- **2 meter or dual-band mobile rig (25w capable)**
- **3db gain 2 meter or dual-band antenna**
- **Mast to elevate the antenna 15 ft minimum**
- **50 ft. RG8-X (*or better*) coax with connectors**
- **Repair kit, tape, fuses, tools, test equipment**
- **Portable packet and / or HF equipment**
- **Manuals + quick reference cards for all rigs**
- **Battery powered broadcast + NOAA radio**
- **Battery power to run equipment for 24 hours**

72-Hour Annex

- **Re-supply point for your 24-hour pack**
- **Box stored in your vehicle**
- **Recommended for “away” deployments**
- **3 days food, 5 gals water, camping gear**
- **Extra clothing items, socks, underwear**
- **Extra blankets, sleeping bag**
- **Cold weather, wet weather gear, boots**
- **Extra batteries, first aid supplies, personal medication, comfort and expendable items**

Auxiliary Power Requirements

- **24 hrs battery power *for EVERYONE***
- **48+ hours highly recommended for:**
 - Local Radio Officers / Assistants
 - Team leaders / Assistants
 - RACES Emergency Stations
 - Designated net liaisons
 - Fixed stations in critical facilities
 - Repeater backup

ESTIMATING LOADS:

Determine battery capacity needed

- **Sum (current loads) x (duty cycle) x 150% safety factor***

Example: 50-watt VHF mobile @ 25% FM duty cycle, for one 8- hour duty shift:

Tx @ 10A (2 hrs)	= 20 ah
+ Rx @ 2A (6 hrs.)	= <u>12</u> ah (<i>loud volume and squelch open</i>)
• Total (8 hrs.*)	= 32 ah x 150%* = <u>48 ah</u>

BCI Group 27 (96 ah) battery provides 16 hours “air + monitor” time, and requires 8 hours “idle time” for recharge each 24 hours

**Based upon 12-hour “operational periods”*

Use 200% for critical systems with no other backup

ESTIMATING LOADS

(continued)

- **Repeat process for each piece of equipment:**
 - HF, external DSP speaker and antenna coupler / tuner
 - VHF / UHF voice radio(s)
 - Dedicated packet data radio
 - Laptop PC and TNC
 - GPS / APRS / ATV equipment
 - Emergency lighting
- **Sum to obtain total station requirement**
- **“Quick & dirty” use the “Ah / Watt Rule”**
 - 1 amp-hour battery capacity for each watt of transmitter output
 - Recommended minimum for each 12-hour operational period
(assumes typical 25% operating duty cycle)

LEAD-ACID BATTERY TYPES

- WET or FLOODED cell batteries are the common lead plate – sulfuric acid type.
- SLA – Sealed Lead Acid types, include VRLA (Valve Regulated Lead Acid) and AGM (Absorbed Glass Mat) The cells are sealed, but can release gas pressure from overcharging.
- Gel Cell – thickener added to prevent spillage. Requires slower charging rate.

“Walking and Talking”

HT Battery Recommendations

- **Minimum: - NiCd + AA auxiliary power**
 - Large capacity (1000mah) NiCd pack
 - + AA case
 - TWO spare sets of AA alkaline batteries
- **Highly recommended : also carry**
 - Pair of Yuasa NP2-12 (total 4 ah) SLA batteries
 - AND external adapter cord to run the HT from a gel cell battery or from an auto cigarette lighter plug!

“Roving Operations”

Portable / Mobile in support of ground SAR

Fire Camp, CERT or Damage Assessment Teams

- Minimum - BCI Group U1, AGM type, 33ah (23 lbs.)
 - One powers 12 hrs FM @ 25w, or 24 hrs. @ 10w
 - 12hrs packet or cross-band repeater @ 10w.
 - 12 hours SSB on HF or 2 meters @ $\leq 40w$
- Recommended: Two to four U1's - used in parallel
 - Or rotate to fresh battery on each watch rotation
 - Recharge at 13.6-13.8V at rate not to exceed C/10

“Fixed Bases”

Portable Repeater / Mobile CP / Shelter Ops

- **Minimum:** for field team leaders and AEROS
 - **BCI Group 27 AGM (96ah, 65 pounds)**
 - Powers 50w FM, or 100w SSB for 12-16 hours at 20-25% duty cycle, then needs 8 -10 hrs for recharge
- **Recommended:** for Command Post, RO, or for portable repeater, 150w FM amp, HF and digital ops
 - **Two Group 27 (96ah) or Group 30 (105ah)**
Or more!, parallel or alternate 8-hr. charging rotations

Served Agency Fixed Locations

Repeater Backup / EOC

Hospital / Red Cross Chapter Station

- **Qty. 4 - Group 27 or 30 AGM in parallel bank**
 - (380-420ah) w/solenoid combiner or isolator diodes
 - 40 to 60w photovoltaic charging system + controller
- **BEST for severe service:** *Concorde Lifeline AGM series*, high vibration, low temperature performance, non-spillable, aircraft-type cell construction, widely used by the U.S. Navy and Coast Guard, *UPS shippable*, (available from West Marine call 1-800-BOATING, Group 27 size \$199 ea)
- **Low-cost expedient:** *AC-Delco Voyager, Deep-Cycle- RV*, Sealed-flooded, maintenance free; recombinant caps, floating hydrometer indicator. Require boxed, upright storage, good ventilation will lose 50% of its capacity below 32 degs, F (Group 27 size at K-Mart or Wal-Mart \$89 with trade-in)

HOW DO WE KEEP GOING?

- **CONSERVE your batteries by using:**
 - **MIMIMUM** reliable transmit power
 - **SHORTEST** run of **LOW LOSS** feed line
 - **Most EFFICIENT** practical antenna !
- **Run car engine 10 mins. / hr. to charge battery?**
NOT! - wasteful of gasoline in real emergency!
- **Equip vehicle with dual batteries**
 - Isolator diodes or solenoid and means of external charging (such as solar) , entirely "off the grid"

BATTERY CHARGING “Rule of Thumb”

for dry NiCd, sealed lead-acid, AGM or gel cell:

1/10 capacity(Amp-hours) X 10 hours

Up to 14 hours maximum at full charge

- **NEVER** charge gels >5a or NiCds >14 hrs
- **NEVER** exceed 14V to recharge a 12V gel cell!
- **INITIAL** charging current not to exceed 10% of the battery's capacity, e.g. 5a for 50ah battery

BATTERY CHARGING

(continued)

- **Flooded cells - recharge at 5% of capacity (C/20)**
 - 2.5 amps for 50ah, full recharge in 24 hours.
 - Low recharge rate avoids gassing
 - Reduces explosion risk, and loss of electrolyte
- **“Flooded May Float” at 1% to 1½% of capacity**
 - Compensate for self-discharge in periods of non-use
 - Periodic inspection and “top off” with distilled H₂O

BATTERY CHARGING

(continued)

- **Gel cells require a low amperage, automatic charger, to recharge at a slow, controlled rate**
 - Do not exceed 2.3 volts per cell
 - Maximum 13.8VDC for a 12V battery
 - Cannot float endlessly without shut-off
- **Recommend Schumacher Mod. SE-1-12S**
 - 1.5A, Auto-shut-off safe for small gel cells >2 ah
 - Available at Wal-Mart, Sears, at discount about \$30
 - Over 100ah, use Schumacher SE-600 charger \$75

www.batterychargers.com

BATTERY SAFETY HAZARDS

- Lead-acid batteries contain **sulfuric acid**. Wear gloves and face shield or goggles.
- Over-charging batteries generates **hydrogen gas – explosive!**
- Batteries are heavy. Lifting or carrying over 35 lbs. is **back and muscle injury** hazard. Use a handle for better grip. Plan to use a dolly to move batteries a distance.

"EMERGENCY POWER"

- Batteries are "auxiliary"- not "emergency" power
 - Finite capacity, Limited depth of discharge
 - Require regular load testing and recharging
- How long can you operate your station?
 - During a prolonged power failure. . .
- All RACES operators should be ready for 24 hours
 - MINIMUM - 48+ hrs. for net liaisons, team leaders!
- How would you operate for a week?

HOW DO WE KEEP GOING?

(continued)

- **If you** must operate a fixed station for more than a few days a **GENERATOR !**

Sure, but...

- **It requires an ample source of clean fuel**
- **5 gals per 8 hours typical fuel consumption for a continuous duty 5kw generator, about the minimum adequate for maintaining household appliances and or a mobile Command Post**



Generator Safety Tips

From the U.S. Consumer Product Safety Commission

- **Carbon monoxide hazard!**

- Never use indoors or in attached garages!
- Set up **OUTDOORS** in a well ventilated, dry area
- Away from HVAC air intakes
- Under a canopy, open shed or carport

- **Electrocution Hazard!**

- Adequate grounding of generator and equipment!
- **DO NOT** connect or plug into household AC!
- Plug only individual devices into generator
- UL-rated cords of wire gage adequate for load

Generator Safety

(continued)

- **Explosion / fire hazard!**
 - Fuel vapors can travel along the ground and be ignited by sparks, arcs from switching equipment, or pilot lights from appliances!
 - Store fuel outdoors in a ventilated shed
 - Use Fire Marshall approved containers

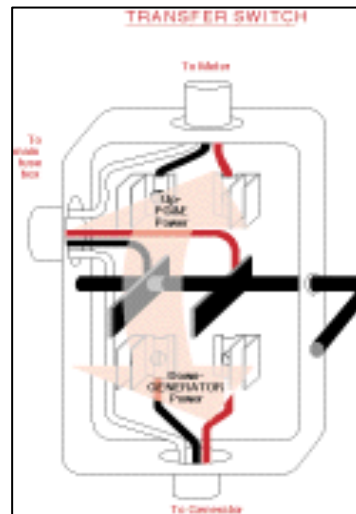
F-3201.2 of the Virginia Statewide Uniform Fire Code prohibits storage of more than 5 gallons of gasoline in residential areas

Generator Safety

(continued)

- If a backup generator is to be connected to a building electrical service, NEC requires that it be equipped with a double-pole, double throw transfer switch:

A “transfer switch” prevents “back-feed” into the building electrical service, which can endanger utility workers who are trying to restore your power!

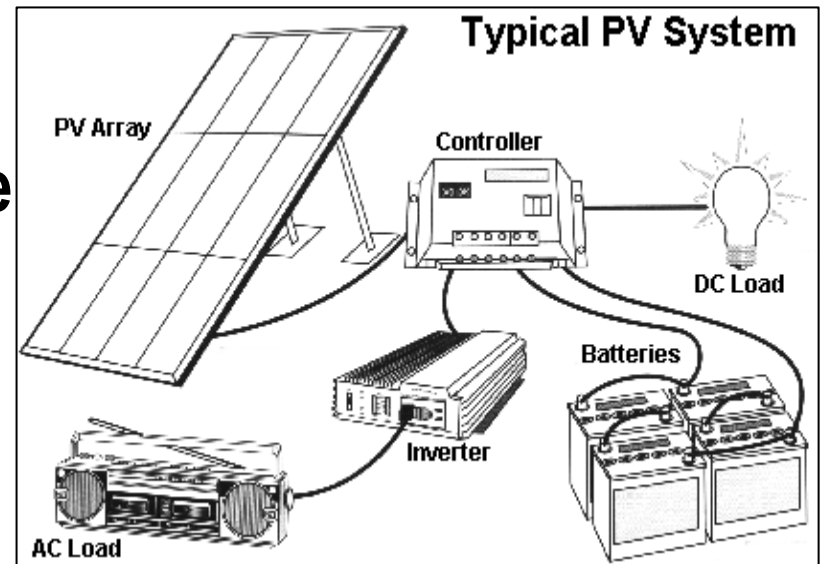


A “transfer switch” also prevents “backfeed” from damaging your generator or appliances once the AC “mains” come back up!

Courtesy Pacific Gas & Electric Co.

SOLAR POWER: A VIABLE OPTION

- **30-40w panel maintains 2-4 Group 27 (95 ah) deep-cycle lead-acid batteries**
- **Less expensive than 5Kw continuous duty generator for DES or command post**
- **Recommend routine use of a minimal solar system equal to 1½ % of battery capacity to provide self-regulation and maintain against self-discharge**



READINESS SUMMARY

- ✓ **Everyone maintains preparedness Level 1**
- ✓ **24 hours minimum battery power for all!**
- ✓ **At home VHF 25w, + 3dBd antenna desired**
- ✓ **Mobile 25w VHF, hardwired to battery**
- ✓ **Inspect / test batteries and equipment weekly**
- ✓ **Use simplex nets for equipment checks**
- ✓ **Those with standing assignments at Level 2**
- ✓ **DRTs able to reach Level 3 within 4 hours**

RACES Stations and Teamwork

- Stress highest ERP, (effective radiated power) station efficiency and reliability!**
- Get your message through the first time**
- RACES can provide EmCom independent of repeater infrastructure**
- More information: www.varaces.org**

Acknowledgements:

Arlington County RACES is extremely grateful to the following Individuals and organizations who have provided materials used in the production of this training



Virginia RACES, Incorporated
Wind River Search and Rescue Group
San Francisco, CA - Office of Emergency Management

www.72hours.org