

Newscaster

The Official Publication of the Winnipeg Amateur Radio Club
The Manitoba Repeater Society
The Winnipeg Seniors Club

mailing address

W.A.R.C.
Attn: Membership
598 St. Mary's Road
Winnipeg, MB
R2M 3L5

May 1993

Home Brew Night

Date: April 12, 1993

Time: 7:30 p.m.

Place: Sturgeon Creek Regional Secondary School

Other Important Dates:

WARC: June 20 Marathon
June 26-27 Field Day
July 9 -11 Ham Fest
MRS: June - July New Equipment Installed
WSC: May 13 Breakfast
May 18 Executive Meeting

Warc: Executive for 1992/93

President: Dave Panting - VE4EF
Vice-Pres: Alex McIlraith - VE4AIM
Secretary: Kay Quinn - VE4YF
Ross Hutchins - VE4LDS
Treasurer: Bill Panting - VE4KX
Past Pres: Judy Norton - VE4JBN
Members
@ Large: Scott Marshall - VE4WSM
Pat Giesbrecht - VE4PLG
Jim Ross - VE4AJR
Albert Sousa - VE4LS

Notes from your Editor: by Derek, VE4HAY

Well a lot has happened since the last Newscaster was put together, The Flea market has come and gone and a new group was formed in Winnipeg. The Winnipeg Amateur Radio Packet (WARP) group. The primary purpose behind this group is to educate you the HAM operator what packet is and how to use it. They have put together an impressive manual for packeteers, written in plain layman terms. I have read this book and have found quite a few things about packet that I did not know before. Maybe now I can enjoy this little corner of the hobby a little better. Also the VE4WGW is operational again (had a couple of set backs due to equipment problems), I hope to get an article from Dan VE4DRK on this gateway, in the mean time please check it out on 145.010 mhz.

Please mark your calendar for the Manitoba Marathon which is coming up in June (Father's Day), We hams provide the a major part of the communications for this great event. So even if you are out of shape and can't make to much past the start line, never mind the finish line, you can still participate. Please call Dave VE4EF and let him know that you would like to help out. My apologies to Witt VE4WK and to all of you for not including the diagrams for the J-pole antenna. Due to space limitations they were left out. I thought it best to include the article first and then the diagrams. Sorry !

Words from the President of WARC: by Dave, VE4EF

Hello there once again. Do you remember when I told you that according to real hams, the only time to put up an antenna is in January? Well, I've figured out two reasons why this is true. The first reason is that to get anything to stay together in Winnipeg, in January, requires huge amounts of tie-wraps, baling wire and electrical tape (which promptly falls off again). The second reason is that all the aforementioned junk blows all over the yard when dropped from sixty feet and you don't find it all again until you rake your lawn in the spring.

Home Brew night was a lot of fun with some very interesting entries. It was amazing to see the number of

things that can still be made at home from scratch and that actually work (not like MY last project)..

Another great event that happened in April was the Spring Flea Market. Attendance was up (as anybody who was caught in the crush around 10 a.m. will testify to), profits were up and as far as I could tell everybody had a good time. A tremendous vote of thanks to Pat VE4PLG and all her helpers for doing a marvellous job.

There will be two motions for our club to discuss at the upcoming May 10 meeting. The first motion was introduced by Wayne VE4WR at the March meeting and is currently tabled. Wayne's motion was published in the April Newscaster. The second motion will be introduced at the May 10 meeting by Rene VE4TV and we have included it in this Newscaster. Both of these motions are concerned with the issue of using amateur radio frequencies to transmit educational material between schools in Manitoba.

While these motions may seem to be of only local interest, the idea of supporting the use of amateur radio frequencies by outside interests should be considered very carefully. If WARC were to pass these motions it might not have any direct impact outside of Manitoba but it is possible that a nationwide precedent would be set. As a result of the executive's concerns regarding this issue, copies of the motions have been sent to Radio Amateurs of Canada (formerly CRRL and CARF). This issue was to be discussed at their first board of directors meeting on Sunday, May 2. Their response will be presented at the May WARC meeting.

I hope to see you at the next meeting.

**Winnipeg Senior Citizen's Radio Club.
by Bill, VE4WU President.**

A reminder to all members that the club breakfast will be Thursday May 13, 1993 at the Norlander Inn, on Pembina Highway from 9:00 to 11:00 am. This will probably be the last spring breakfast with hopes of resuming this enjoyable get-together again in the fall.

Membership donations are being accepted and appreciated.

Next monthly executive meeting will be May 18, 1993 at 10:00 am in the club rooms.

**Manitoba Repeater Society
by Derek, VE4HAY**

Well the Annual General Meeting has come and gone, and all in all it has been a very busy year. There were elections at the meeting and the new executive and their positions will be posted as soon as offices are decided. Although it does not look like much has happened on the surface, you can be assured that your executive have been very busy. You can expect to see some changes in the very near future. We now have all of the controllers in Winnipeg, and are in the process of programming and testing them. The various repeaters will

be coming down as we prepare to install the new controller and repeaters. In order to accommodate the Dauphin Amateur Radio Club and it's link into our system, we will most likely have VE4WPG, VE4VJ, and VE4GIM hot-linked to the VE4MAN hub controller (not to the VE4MAN repeater) as a temporary measure until we have the funds to install a proper link. In a future issue I will include a map of Southern Manitoba, which will show all the repeaters and their approx coverage. This will certainly be something that everyone will want to keep handy.

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A Little Common Courtesy

by Jim KD1FW, Extracted with permission from the North Shore Repeater Association Newsletter 'Electronic Edition'. Spring 1993

This is a VERY difficult topic to discuss with people. The main problem being that everyone thinks you are pointing the proverbial finger at them. I would now like to make it clear that this essay was not intended for that reason. If you are a one-hundred percent, bona fide, A-1 operator my kudos to you! However not everyone fits into that category, so here goes!

There has been quite a bit of pent up anger directed at certain individuals in and outside the club because of their methods of operation on the air. Whether the problem is due to the lapse of memory about radio etiquette, the person's nature, or just plain being uninformed there is a simple solution to the problems at hand we all can use called COMMON COURTESY. I'm sure we are all bothered at times by rude behaviour on the air, for instance: A person jumps into your conversation and proceeds to take over OR: Two people talking on a repeater quick keying so not even an emergency situation could get a word in edgewise. These are all too common situations and I'm sure anyone on the radio could come up with other scenarios to match them. I find myself quick keying at times so I'm not perfect either by ANY means! This is precisely the point, NO ONE is PERFECT! So before we point fingers remember that the use of common courtesy is absolutely necessary to keep us ALL in line.

If you see or hear anyone slipping DON'T embarrass them by pointing out their mistakes on the AIR! Take them aside and constructively show them where they are in error. Do not do it in anger, think first then act accordingly with COMMON COURTESY.

**Joint CARF CRRL News Bulletin
CRRL LONDON, CARF KINGSTON
APRIL 09, 1993**

To: ALL RADIO AMATEURS

FCC and DOC talk about 220-222 mhz in Canada

Canadians do not need unwise and unnecessary " band takeovers " to add to our " free trade " problems! However that could easily happen if DOC allows FCC to influence the re-allocation of the 220-222 Mhz band in Canada. CRRL and CARF want this crucial Amateur " exclusive " band protected for the use of our fast growing amateur population and for digital networking, linking. A powerful service industry lobby was behind this same band segment loss in the US. We encourage every Canadian amateur to write to the minister of communications demanding the Canadian " exclusive " amateur allocation of this band be maintained.

FCC talks with DOC

The U.S. Federal Communications Commission (FCC) is making overtures to the DOC to possibly re-allocate the use of the 220-222 mhz portion of the 220-225 mhz amateur band. While in Canada the band is allocated only to the amateur service on a primary basis, in Region 2 the band is allocated to the amateur, fixed and mobile services on a co-primary basis. special interest groups, such as the United Parcel Service (UPS), played a major role in the loss of this segment to American amateurs. CARF and CRRL are talking to the DOC to emphasize the vital importance of this segment for amateur radio linking and networking activities. The tremendous interest and growth of amateur radio makes it absolutely crucial to retain VHF " amateur primary " spectrum in Canada.

Makes no sense to limit amateur spectrum the DOC has been forward looking and progressive and played a key role in fostering pioneer amateur digital communications, it makes no sense for the government to promote the growth of amateur digital experimentation; then take away opportunities and limit future potential by deminishing the available VHF spectrum. Canada must not follow harmful FCC policy. Canadian amateurs can share the segment with the U.S. land mobile service along a 150 mile International border corridor possible interference between the services along the border can be effectively managed by the adoption of co-ordination procedure similar to which is currently used for U.S./Canadian VHF FM Repeater assignments.

Ask for protection

Canadian Amateurs expect their Government to protect this crucial " amateur primary " band segment for the use and enjoyment of Canada's fast growing population (now over 36,000). There is no reasonable justification to follow the devastating short-sighted policy of the FCC which in this case , squandered American Amateur band " exclusive " VHF opportunities.

CARF and CRRL encourage amateurs from coast to coast to write to Perrin Beatty, Minister of Communications asking for his assurance that Canada's valuable 220-222 mhz " amateur primary " band segment not be allocated to commercial use under any circumstances Send a copy to your MP and to CRRL/CARF. remind the minister that amateur radio

bands are a " natural resource " which must be nurtured and protected for future generations of Canadians.

W.A.R.C. Spring Flea Market by Pat, VE4PLG

April 18 1993 The flea market for this year again proved to be a success. w.a.r.c. realized a profit of \$358.55. I would like to thank everyone who helped clean up and set up at the flea market this past weekend. Some of the people I would like to thank are: David Rosner VE4DAR, Pat Plett VE4PGP & Dan Michaels VE4SYG for helping out in the kitchen, they did a great job. Kay Quinn VE4YF & Bill Crooks VE4JR for doing a terrific job at the door. Gordon Snarr VE4GLS, Jim Griffiths VE4GZ and Vic Moss VE4ML for setting up and at the door. Brad Ruptash VE4BAR for providing the sound system, and to Michael Markmann VE4MJM for doing the draw for us. I'd like to give a couple of very special thank you's, first to my friend & co-worker Betty Blanchard, who is not at all involved with ham radio, but who did a fantastic job organizing the kitchen and helping to make a success of our flea market. second, and most important, thank you to Blake Dunn VE4AFF for putting up with all my phone calls and for guiding me in the right direction. Without his help I never could have done the job. Thank you also goes out to the following people for donating door prizes: Dave Snidal VE4XN for giving us hats from M.A.R.M and the International Ham Fest, W.A.R.C. for donating a mouse pad and a storage box for computer discs, VE4SSS for donating a blue book, Comtelco Electronics for donating a dual band antenna, Prairie Communications for donating a mag mount and Ed Henderson VE4YU on behalf of C.A.R.F. for donating a call book, 3 repeater directories and a 1 year membership to the new R.A.C. I hope the fall flea market will prove to be just as successful.

T.T.U. station by Vern VE4VQ & Pat VE4PLG

We are still looking for help at T.T.U. for the end of May, the month of June and especially for the summer months. Please give T.T.U. a try you'll find it quite rewarding. If you could volunteer a couple of hours on a weekend contact Vern Dutton VE4VQ at 256 5346 or Pat Giesbrecht VE4PLG at 338 0511. We will have a new radio installed soon which will make VHF operation easier. The station is open Saturday and Sunday between 1-4 pm. parking behind the museum is free to those working the station. We'd like to thank Dick Maguire VE4HK for donating a head set to be used at T.T.U. this will certainly help, due to the high noise levels at times. Thanks also goes out to Brad Ruptash VE4BAR for donating radio amateur maps to the station.

Martti Laine DX Ambassador Award

by Mike, VE4AMC

Rob Kaufman, VE4GV is the recipient of the "Martti Laine DX Ambassador Award" for 1993. The plaque, presented by VE4HAM and VE4AMC at the WARC Flea Market on April 18, 1993 states: This award is presented to the Amateur who most emulates the Martti Laine approach to Amateur Radio and Life. This award is presented yearly. This award is sponsored by VE4AMC and VE4HAM. Rob deserves this award due to his contesting, DXing and frequent Dayton trips. This award is a local , Winnipeg award and is presented on behalf of Martti Laine OH2BH.

**Resolution Proposed
by Rene, VE4TV**

Be it resolved that the Winnipeg Amateur Radio Club support the use of amateur radio/video technology by the White Horse Plain School Division for purposes of operating a tele-teaching system between St. Paul's Collegiate in Elie and St. Laurent High School (including a repeater unit at Warren), to transmit courses in Senior High School Physics, Communications and Computer Science; weekdays between the hours of 9:00 AM and 4:00 PM.

Presented by Rene Raimbault (VE4TV) on behalf of the White Horse Plain School Division.

**HOME BREW NIGHT THANK YOU'S
by Dick VE4HK**

Thank you to the following companies, who graciously donated prizes for the Winnipeg Amateur Radio Club Homebrew Night.

First prize: a Fluke 12 Digital Multimeter, worth over \$100.00 donated by Mr. Mike Manzoni of Fluke Electronics, won by Barrett VE4ABA for a UHF corner reflector antenna.

Second prize: an Xcelite miniature screwdriver set, worth \$30.00, donated by Cooper Tools, won by Wayne VE4WTS for a fox hunt transmitter, placed inside a beer can.

Third prize: a gel cell charging kit, worth \$20.00, donated by Radically Applied Designs (VE4AIM), won by Ralph VE4RY for his adjustable DC load for testing power supplies.

I know that each of the winners truly appreciates their prize.

**WORKED ALL WINNIPEG AWARD
by Dick VE4HK**

The third annual Worked All Winnipeg Award QSO Party assaulted the airwaves on Saturday, April 3, 1993, commencing at 9 am. About 20 Winnipeg amateurs participated. All the activity was on 20 meters, 14.165 MHz plus or minus QRM. We ended early, at 3.30pm, when the band died.

Conditions overall were poor. Propagation was spotty, with VOI's and a few West Coast stations worked. I was located at VE4WSC for the day, with VE4PLG, VE4VID, and VE4DAR. We worked only about 20 stations.

We were supposed to operate on 10 and 15 meters in addition to 20. Ten was totally flat, and there were virtually no stations from outside Winnipeg on 15.

I am somewhat disappointed with the QSO Party this year, mainly because of the poor band conditions. Next year, we must arrange with the person in charge of propagation, for excellent conditions.

Thank you to the following participants: VE4's ANC, MJM, AMN, DAG, YF, KU, PLG, VID, DAR, AD, ANG, ASK, GO, QEW, AHW, YU, AX, AMS, GTR, GZ, SG, CS, BI, AJD, JS, ACE, DRN, and of course little old me VE4HK. A special thanks to Bill VE4WU, the president, and all the other members of the Winnipeg Senior Citizens Amateur Radio Club, for allowing us to use their station for the QSO Party.

The following amateurs have achieved the Worked All Winnipeg Award, since January 1, 1993. I am certain each of them is proud to have this lovely certificate decorating their hamshack wall.

| # | Name and Call | Date Issued |
|-----|-------------------------|------------------------|
| 294 | Jim McGill VE7IED | January 15 |
| 295 | Harry Burhans W3FM | February 2 |
| 296 | Milos Oblak S53EO | February 19 (Slovenia) |
| 297 | Fred Tieken VE7IDV | February 19 |
| 298 | Jan Schippers VE4YS | March 12 |
| 299 | Doug Newberry VE4DRN | April 17 |
| 300 | Dan Mooring VE7PHA | April 20 |
| 301 | Steve Kaposzta VE7KSI | April 20 |
| 302 | Frank Nash VO1FK | April 20 |
| 303 | John Gambin VO1ANJ | April 20 |
| 304 | Bob McCaig VE3TMM | April 20 |
| 305 | Kenneth Cote VE7KRC | April 20 |
| 306 | George Gates VE4GO | April 20 |
| 307 | Joyce Sutherland VE6JOY | April 20 |

As you can see, there is a lot of interest in the Worked All Winnipeg Award Certificate. Ours is acknowledged to be one of the most beautiful available, anywhere.

You can do your part to help more hams earn the Worked All Winnipeg Award. All you have to do, is talk up the certificate, when you are on HF. Hams are experts at talking, hi, hi, so that simply gives you one more topic of conversation.

MINUTES FOR W.A.R.C. MEETING held April 12, 1993.

The meeting was called to order at 7:35 pm by Dave VE4EF.

1. MINUTES - the minutes for the March 8, 1993 meeting were read by Kay VE4YF. Correction - by Dick VE4HK - the seconder for the motion in 5.7 should have been VE4RBF. MOTION - moved by Don VE4GD that the minutes be accepted as read. Seconded by Dick VE4HK. Carried.

2. NEW BUSINESS FROM THE MINUTES 2.1 BROCHURES - Mike VE4MP advised that Radio Shack Stores were refusing to put up information posters. Kay VE4YF said that

Ed VE4YU had written a covering letter stating that we have permission from their district manager to distribute the information brochures to their stores. These brochures and letters are now being delivered to the various branches.

3. CORRESPONDENCE The following pieces of correspondence were received and made available to members: a. several newsletters from other clubs b. a letter from CRRL stating nominations for section manager CRRL will be held over until the formation of RAC c. information on and an agenda for the International Hamfest 1993 d. a letter from Triple S Communication Group, Selkirk and a letter from the Interlake Amateur Radio Club, both urging WARC not to support the motion in 5.7 of the March minutes.

4. TREASURER REPORT - Bill VE4KX reported a balance of \$1384.90 with \$90.00 cash and a cheque for \$15.00 to be deposited. All debts are paid off.

5. STANDING COMMITTEE REPORTS 5.1 EDUCATION - Rick VE4OV stated that night school classes start April 22. The amateur radio course was advertised in the booklet LIFETIME AFFAIR that was distributed to 81,000 people. Signs describing the course were placed in various stores and other locations.

5.2 CUMBERLAND HOUSE CANOE BRIGADE -Vern VE4VQ says the DX-pedition up north is still on. Contact him for details.

5.3 VE4TTU - Pat VE4PLG and Vern VE4VQ are still hoping to recruit more volunteers to operate TTU on Saturdays and Sundays.

5.4 FLEA MARKET - Pat VE4PLG advised that there are still tables available for the Flea Market being held April 18. She also asked for volunteers to work at the door and in the kitchen.

5.5 NEWSCASTER - Derrick VE4HAY, the new editor, says all articles are welcome. The diagram for the J-pole antenna will be in the next issue. It had been intentionally omitted last time due to space problems.

5.6 MARATHON - Dave VE4EF said that the Marathon will be held June 20,1993. Operators are needed at aid stations, in medical vans etc. A sheet for people to sign up was left at the front.

6. NEW BUSINESS 6.1 MOTION by Wayne VERWR - Wayne said that, after consulting with members and with the approval of the seconder of the motion he presented at the March 8th meeting, he would like to leave his motion (5.7) tabled at this time.

6.2 NEW MOTION - moved by Dick VE4HK as presented in the Newscaster: "I move that the Winnipeg Amateur Radio Club Inc. purchase a new simple-to-use 2 meter transceiver, as soon as possible. " Seconded by Tom VE4SE. Discussion followed with Dick presenting information booklets on several suitable radios. Yori VE4ACX said parts for the KDK radios currently in use are no longer easily available. In further discussion it was suggested that the club speak with Rick VE4RA, who was instrumental in obtaining the 2 KDK radios at a reduced price many years ago, to ensure that we are entitled to sell them now. Dick stated that Burghardt's had recommended the Icom IC28H. Ralph VE4RY owns one and is very satisfied with it. Call for questions. The motion was carried.

7. GOOD AND WELFARE OF THE CLUB 7.1 BLUE BOOK- goes to press shortly. Pass on any changes to Bill VE4UB. All proceeds from the sale of this book goes back to amateur radio. No profit is made.

7.2 INTERNATIONAL HAMFEST - Wayne VE4WTS announced the 30th annual Hamfest will be held July 9 - 11, 1993. a schedule of events and an information pamphlet were

made available. He also asked us to consider anyone we would like nominated for Ham of the Year.

7.3 IMPORTING EQUIPMENT - Mike VE4MP warned us that problems have been encountered with duty being charged when importing amateur radio equipment. Correct forms stating the tariff number must be included by the shipping company. There are different interpretations as to exactly what is exempt.

7.4 OPERATING PROCEDURES - Dave VE4EF asked the members if they would find sessions on operating procedures useful. A discussion followed with several suggestions on what topics should be covered, the best format for presenting them, and how often we should have this on the agenda.

7.5 ARES - Bill VE4JR presented the CRRL ARES EMERGENCY CO-ORDINATOR certificate to Rod VE4TM.

7.6 WORKED ALL WINNIPEG AWARD - Dick VE4HK said even though band conditions were poor, about 20 stations qualified for the award during the QSO party. Thanks to all the VE4's that participated including PLG, DAR, VID, and especially Lee VE4ANC and Mike VE4MJM. 7.7 ANNOUNCEMENTS a. VE4GRY has recently passed the morse code 12WPM. b. Witold VE4WK brought his J-pole for all to see. Seeing the real thing is better than looking at diagrams.

The meeting was adjourned at 8:35 pm and followed by the annual Home Brew Night.

New Call Signs

| | |
|---|-------------------------|
| VE4MJS Murray Schultz | VE4KTO |
| Douglas Eyres | VE4EPCEric Champagne |
| VE4NHL Narciso Leand | |
| VE4DRC Dale Chevalier | VE4BZ Daryll Hyslop |
| VE4MTX Elliot Filbert | VE4WNY Nick Yetchishin |
| VE4MAB Mark Blumm | VE4OH Barry Mudray |
| VE4OPC Paul Champagne | VE4PGT Peter Theisen |
| VE4BDB Brain Bater | VE4ALP Alipio Pagatigan |
| VE4GLH Gail Hay | |
| VE4BWG Philip Isaak (no longer VE4APJ) | |
| VE4WHP Wayne Warren (Woodlands Collegiate Repeater) | |
| VE4JTH Wayne Warren (John Taylor Collegiate Repeater) | |

Ham Radio and it's affects on Cancer - Extracted from Arrl

(Part 3)

Table 4 shows a sampling of measurements made at Amateur Radio stations by the Federal Communications Commission and the Environmental Protection Agency in 1990. As this table indicates, a good antenna well removed from inhabited areas poses no hazard under any of the various exposure guidelines. However, the FCC/EPA survey also indicates that amateurs must be careful about using indoor or attic-mounted antennas, mobile antennas, low directional arrays, or any other antenna that is close to inhabited areas, especially when moderate to high power is used.

Table 4

Typical RF Field Strengths near Amateur Radio Antennas
a sampling of values as measured by the Federal Communications Commission and Environmental Protection Agency, 1990
Freq, Power, E Field, Antenna Type MHz Watts V/m

| | | | | | | |
|-------|-----|-------|---------------------|-------|------|----------------|
| 14.15 | 100 | 7-100 | Discone in attic | 146.5 | 250 | 10-27 |
| | | | In home Half sloper | 21.15 | 1000 | 50 |
| | | | Dipole at 7-13 ft | 7.14 | 120 | 8-150 |
| | | | Vertical | 3.8 | 800 | 180 |
| | | | Yagi at 60' | 21.2 | 1000 | 10-20 |
| | | | In shack | 14 | | 12 m from base |
| | | | Yagi at 25' | 28.5 | 425 | 8-12 |
| | | | | | | 12 m from base |

| | | | | |
|---|--------|------|------------|-------------------|
| Inverted V at 22-46' | 7.23 | 1400 | 5- 27 | Below antenna |
| Vertical on roof | 14.11 | 140 | 6- 9 | In house |
| 35-100 At antenna tuner Whip on auto roof | 146.5 | 100 | | |
| 22- 75 2 m from antenna | 15- 30 | | In vehicle | 90 Rear seat |
| 5-element Yagi at 20' | 50.1 | 500 | 37- 50 | 10 m from antenna |

Ideally, before using any antenna that is in close proximity to an inhabited area, you should measure the RF power density. If that is not feasible, the next best option is make the installation as safe as possible by observing the safety suggestions listed in Table 5.

It is also possible, of course, to calculate the probable power density near an antenna using simple equations. However, such calculations have many pitfalls. For one, most of the situations in which the power density would be high enough to be of concern are in the near field--an area roughly bounded by several wavelengths of the antenna. In the near field, ground interactions and other variables produce power densities that cannot be determined by simple arithmetic.

Computer antenna-modeling programs such as MININEC or other codes derived from NEC (Numerical Electromagnetics Code) are suitable for estimating RF magnetic and electric fields around amateur antenna systems. And yet, these too have limitations. Ground interactions must be considered in estimating near-field power densities. Also, computer modeling is not sophisticated enough to predict "hot spots" in the near field--places where the field intensity may be far higher than would be expected.

Intensely elevated but localized fields often can be detected by professional measuring instruments. These "hot spots" are often found near wiring in the shack and metal objects such as antenna masts or equipment cabinets. But even with the best instrumentation, these measurements may also be misleading in the near field.

One need not make precise measurements or model the exact antenna system, however, to develop some idea of the relative fields around an antenna. Computer modeling using close approximations of the geometry and power input of the antenna will generally suffice. Those who are familiar with MININEC can estimate their power densities by computer modeling, and those with access to professional power-density meters can make useful measurements.

While our primary concern is ordinarily the intensity of the signal radiated by an antenna, we should also remember that there are other potential energy sources to be considered. You can also be exposed to RF radiation directly from a power amplifier if it is operated without proper shielding. Transmission lines may also radiate a significant amount of energy under some conditions.

SOME FURTHER RF EXPOSURE SUGGESTIONS

Potential exposure situations should be taken seriously. Based on the FCC/EPA measurements and other data, the "RF awareness" guidelines of Table 5 were developed by the ARRL Bio Effects Committee. A longer version of these guidelines appeared in a QST article by Ivan Shulman, MD, WC2S (see bibliography).

QST carries information regarding the latest developments for RF safety precautions and regulations at the local and federal levels. You can find additional information about the biological effects of RF radiation in the publications listed in the bibliography.

Table 5

RF Awareness Guidelines

These guidelines were developed by the ARRL Bio Effects Committee, based on the FCC/EPA measurements of Table 4 and other data.

- o Although antennas on towers (well away from people) pose no exposure problem, make certain that the RF radiation is confined to the antenna radiating elements themselves. Provide a single, good station ground (earth), and eliminate radiation from transmission lines. Use good coaxial cable, not open wire lines or end-fed antennas that come directly into the transmitter area.

- o No person should ever be near any transmitting antenna while it is in use. This is especially true for mobile or ground-mounted vertical antennas. Avoid transmitting with more than 25 watts in a VHF mobile installation unless it is possible to first measure the RF fields inside the vehicle. At the 1-kilowatt level, both HF and VHF directional antennas should be at least 35 feet above inhabited areas. Avoid using indoor and attic-mounted antennas if at all possible.

- o Don't operate RF power amplifiers with the covers removed, especially at VHF/UHF.

- o In the UHF/SHF region, never look into the open end of an activated length of waveguide or point it toward anyone. Never point a high-gain, narrow-beamwidth antenna (a paraboloid, for instance) toward people. Use caution in aiming an EME (moonbounce) array toward the horizon; EME arrays may deliver an effective radiated power of 250,000 watts or more.

- o With handheld transceivers, keep the antenna away from your head and use the lowest power possible to maintain communications. Use a separate microphone and hold the rig as far away from you as possible.

- o Don't work on antennas that have RF power applied.

- o Don't stand or sit close to a power supply or linear amplifier when the ac power is turned on. Stay at least 24 inches away from power transformers, electrical fans and other sources of highlevel 60-Hz magnetic fields.