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# Waves

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## JUDGE RULES IN FAVOR OF AMATEUR IN PALMDALE ANTENNA SUPPORT STRUCTURE CASE

On Friday, February 6, Los Angeles Superior Court Judge David Yaffe issued a ruling in favor of Alec Zubarau, WB6X, of Palmdale, California, in Zubarau's case against the City of Palmdale <<http://www.arrrl.org/news/stories/2008/12/19/10512/?nc=1>>. Last year, after Zubarau received a valid building permit from the City to erect an antenna support structure, the City of Palmdale revoked Zubarau's building permit after he had erected the tower. According to Zubarau's attorney, Len Shaffer, WA6QHD, the Court's ruling invalidates the actions of the City in revoking Zubarau's permit and requires the City to allow him to replace the tower.

"Zubarau's case has drawn nationwide attention and financial support from the ARRL, Amateur Radio clubs and individual Amateur Radio operators from around the country," said ARRL Southwestern Division Vice Director Marty Woll, N6VI. "Although this ruling does not directly address the City's proposed zoning ordinance amendment, based on the Court's language, it should provide considerable support for those hams attempting to negotiate a more reasonable provision allowing antenna support structures in the Palmdale City Code."

According to Woll, the Court also found that "unsubstantiated complaints by neighbors and anecdotal reports of transmissions interfering with other electrical equipment or posing health and safety concerns" did not constitute substantial evidence. Yaffe's ruling stated that Palmdale's ordinance requiring that amateur antennas be compatible with the surrounding neighborhood with respect to visual and other impacts is void, since it may not constitute the minimum practicable regulation as required under the California state statute [http://www.leginfo.ca.gov/pub/03-04/bill/asm/ab\\_1201-1250/ab\\_1228\\_bill\\_20030714\\_chaptered.html](http://www.leginfo.ca.gov/pub/03-04/bill/asm/ab_1201-1250/ab_1228_bill_20030714_chaptered.html). The judge further found that the City's decision to eliminate the tower violates the express requirements of California's PRB-1 equivalent statute that was enacted in 2003, but had yet to be used in a court case.

"While falling just short of invalidating Palmdale's current antenna ordinance," Woll said, "this language ought to put a damper on the City's Draconian proposed zoning ordinance amendment and its extreme limitations on Amateur Radio antennas. One hopes that the City of Palmdale will think twice in the future about using tactics -- such as the threat of large fines -- to force compliance with an order based on unsubstantiated findings."

Shaffer told ARRL that the text of the Yaffe's ruling will be released after the service of notice on the City and expiration of the appeal period. He, Zubarau and Woll thanked the ARRL and the Amateur Radio community for what he called "the tremendous showing of support during this lengthy battle."



# Grounding in RF Environments

By William D. Chesney, N8SA

Director of Communication

Michigan Wing, CAP

Dec. 2003

Proper grounding of radio stations is probably one of the least understood aspects of ham radio. It almost has a certain aura of mystique or magic about it instead of being the pure science it should be. This is a very important aspect of any radio installation. There are two major criteria we need to consider when doing the planning for this installation. The primary reason has to be safety, both for ourselves as the operator who will be seated at the controls, but also for our equipment and possibly the structure....probably our home. The second of course has to do with the performance of our antenna system and it's ability to radiate an efficient signal. Let's treat these separately for now and they will combine into a total plan at the end.

## **Surge (or Safety) grounding.**

**We need to protect our installation and ourselves from lightning.**

**There is no protection against a direct lightning hit!**

It has way more power than we can shunt to ground safely or our budget can handle. That is what insurance is for. We CAN however make our installation an unattractive target to lightning. We can also take care of any secondary surges and static build up that can destroy equipment and give healthy zaps enough to more than get your attention. There is nothing more frustrating than trying to talk on a radio and you keep getting zapped on the chin while doing so! I speak of personal experience here. Let's let it go at that. The Safety ground has to consist of enough ground contact surface area to safely dissipate the surges into the soil safely. Multiple ground rods connected with solid 1/0 ground wire is best. You should have one rod where your antenna support structure is whether it be a tower or mast or roof tripod, etc. It must have at least 4 gauge bare or insulated, NOT stranded wire. These surges can easily be hundreds of amps. DO NOT scrimp on the wire. This is your life you are dealing with. If stranded wire is used it should be no more than 8 conductors. Heavy bolt type connectors should be used for all connections. You should also employ a non corrosive type coating. All of these connectors and grease are available at your good home supplies or electrical supply houses. All grounds for the installation should be bonded together at the ground. NEVER daisy chain grounds. ALL connections from devices should go DIRECTLY to closest ground point. Use eight foot copper ground rods for all. Bond the rods with single 1/0 solid bare copper wire. Drive a ground rod for electrical supply to house if you do not already have one. Bond it to others with aforementioned wire. If you have overhead service to house, run wire direct to neutral wire at feed point and use split bolt connections with grease for corrosion. If you have

underground service, ground at meter box. If your power company objects, run it to your service panel. You need a minimum of one eight foot ground rod for every protected structure, ie, every mast, tripod, vertical antenna, etc. These must all be connected together **AT THE GROUND**. Run bare copper between the separate ground rods to form a ground system. The bare copper provides additional surface contact area for the ground system. It should be underground, but does not need to be deep for any engineering reasons. Make sure you make yourself a map of the runs for future projects to avoid hitting and digging up the system in the future. Use heavy duty bolted connectors designed for this service. If you have access to a ground megger or ground tester the system should be less than 15 ohms. In sandy soil this can take several rods to achieve. I have had to put down 3, 32 foot rods (consisting of four 8 foot rods with couplers and driven in with a power driver) in sand to get the measurement needed. This should take care of our safety grounds.

### **RF Grounding.**

Rf grounding is considerably different than surge grounding. First thing is you are working with RF. Since it is an AC signal it has impedance. The length of the ground runs has much more to do with the fraction of a wavelength at the frequency involved than the DC resistance of the wire. While the DC resistance of a ground wire may be only a fraction of an ohm, the impedance (or the AC resistance at RF frequency) can easily be hundreds or thousands of ohms on the same wire. This can make it pretty difficult to get an effective RF ground. Remember an RF ground wire is just a short antenna! We want to make it as **LOUSY** an antenna as possible! We really don't need it radiating extra RF inside our shack. It is supposed to remove this stuff not cause it. An effective RF ground needs to be less than a quarter wave length at the highest frequency used. As you can see there is no such thing as an effective ground for VHF or UHF. We will concentrate our efforts to 10 meters and above. This means our ground wire from radio to ground must be about 9 feet or less! This is still pretty difficult. All radios, tuners, meters, etc in radio system should be grounded in a star ground configuration. The common point should be at the tuner if one is used, otherwise a ground bus bar can be purchased at an electrical house. All Connections to radios should be with either insulated or bare wire with as few strands as possible. RF likes smooth surfaces best. **DO NOT USE** braid for RF connections. This is an old wives tale! Your ground run should go directly to the ground where you should have a ground rod for the connection point, (which will be connected to all your other ground rods in the system as discussed above). This run must be less than nine feet to be effective. If you are on the second floor this will make this length impossible. Use of a shielded ground\* wire can stop radiation of the ground wire but you will still have a lousy ground. Nothing can change this. Ground wire tuners only turn your ground wire into a counterpoise for your antenna, meaning it **WILL** radiate. This will only ensure that the low voltage point of your antenna will be at your radio. Next we need to form our RF counterpoise outside at our ground system. You will next need to add some bare copper wire at the RF feedpoint where your shack ground wire connects to. I prefer to use bare 8 gauge copper ground wire here. It is single conductor, bare copper and easily bent and run around house. Single strand is best but it should definitely be bare even if you have to strip insulation off wire. Run it around the house or anywhere it will stay out of the way fo lawn equipment but not buried deeper than 1/2 inches. This is **CRITICAL**. RF will not penetrate soil deeper than this at these frequencies. Those bonding wires you have between ground rods and ground rods do not exist to the RF! Burying this wire under wood chips or similar non conductive landscaping, etc is the way to go. This counterpoise should be as long as the wire

antennas you have in the air. For most hams this will be about 130 feet. Longer is better. I run all the way around my house. I have found the eight gauge will push into the spacing used between driveway and foundation when persuaded with the proper tool, (READ HAMMER). You can connect the loop back on itself at the feed point. This can add several S units to the receive signal and dramatically reduce noise on the signal, though nothing will help all the noise on 80 or 160 meters. Years ago I installed a long wire antenna that was about 250 feet long and about 50 feet in the air. This should work fantastic you say. I had three ground rods outside window of shack with single ott solid copper ground wire direct to tuner. Ground wire length was only six feet. All three rods were spaced about eight feet apart with connecting bare wire interconnecting them....in other words, a really good surge ground. What I did not realize at that time was how lousy my RF ground was. We could not tune the antenna on most frequencies and we kept getting zapped from the radio or microphone when we transmitted. Also, our signal reports were lousy. SO, after consulting some experts, I added 250 feet of counterpoise around the building consisting of some bare 6 gauge copper wire I had. The radio was on while I rolled it out and a friend was listening to the broadcast on 40 meters, (OK it was night time---best time to do antenna work right!) Anyway he reported the broadcast was only about S 4-5 on meter. As I rolled out the counterpoise it rose to 40 over S9 and came in much clearer. We were able to tune everything easily now and SWR was rock stable. **When we did a signal test, the station we had talked to before accused us of running a contest amplifier. We could not convince them it was only 100 watts, same as before and the same antenna!**

#### **SUMMARY.**

**Don't underestimate the importance of a good ground system. Include it into the planning of that ultimate shack you are working on. Don't scrimp on good copper wire and connectors. Aluminum can be used above ground but never in ground. Add one size to aluminum to achieve same current capability. Ground everything to the system. A ground run to ductwork in house can alleviate a lot of noise. A run to water pipes should go direct to ground....NEVER to radios, NEVER connect radios to ANYTHING inside the house for ground purposes. Always run all grounds from everything to ground directly. In other words, your furnace ducts will get one run, your water pipes will get one, etc. Don't daisy chain to save wire. If you have a chain link fence in back yard, run a bonding wire underground from ground system to it and bond well. A solid aluminum or copper wire run along bottom of fence as a bonding device will make it a great addition to the system. Weave it through the bottom fence fabric and bond every few feet with a split bolt connector. The power company does this with all their fences around their power stations.**

**\* A shielded ground can be made using RG 8 or similar coax to replace the ground wire. Connect both inner and outer shields to the Ground rod and connect the center only to the radio. Add a .1uf 1000 volt cap between ground and shield at this end.**

## CQ to Accept eQSL Confirmations for Award Credit

(Hicksville, NY and Bedford, TX, January 13, 2009) - CQ magazine will accept contact confirmations made on the [eQSL.cc](http://www.eQSL.cc) electronic confirmation system for its operating awards effective immediately, CQ Editor Rich Moseson, W2VU, and eQSL Founder and Webmaster Dave Morris, N5UP, announced today.

There will be certain limitations and procedural differences for different awards, at least to start. Only confirmations from "Authenticity Guaranteed" members of eQSL will be accepted, and in accordance with existing eQSL policy, a membership level of bronze or higher is required in order to participate in award programs via eQSL.

"This is the first time that CQ has formally accepted anything other than traditional paper QSL cards for its awards," said Moseson. "We have been working with Dave Morris and his team for several months to assure that the integrity of our awards programs will be protected and to create mechanisms to make it easy for both award applicants and award managers to use eQSL credits toward our awards. All of our award managers have been involved in this process and support this action."

"We want to express our great appreciation to Dave and his team for their willingness to do whatever was necessary to make this agreement possible," Moseson added. "It has been a pleasure working with them and we look forward to a long-lasting relationship."

"We are pleased to be adding CQ to the top of our list of amateur organizations that accept electronic QSLs," said Morris. "CQ has some of the most highly sought-after awards, and we have been working behind the scenes for years to create credit submission mechanisms that would ensure the integrity of their programs without introducing any additional labor for the award managers. We believe the electronic QSL can drastically reduce costs, and the award application mechanisms we have developed will provide for more efficient processing at reduced cost for both the applicant and the award manager."

Applicants for the CQ DX and CQ DX Field Awards must print out their eQSLs and submit them along with their traditional QSLs to a CQ checkpoint or to CQ DX Awards Manager Billy Williams, N4UF. eQSL has an automated process in place for applicants for CQ's Worked All Zones, WPX and USA-Counties awards. N5UP explains how that will work for the applicant:

"The applicant goes to the My Awards screen. He clicks on the particular award he wants to apply for. This brings up a list of the credits our system 'thinks' he is entitled to. There are checkboxes that allow him to check which ones he wants to use, and we automatically pre-fill one credit per category so he doesn't have to do anything if he wants to take the defaults. At the bottom of the screen are two buttons: 'Submit to CQ' and 'Print Paper Application'." The "submit" button will place all the selected QSOs into a file for the award manager to access, while the "print" button will generate a printed list to be submitted along with the traditional application. PLEASE NOTE that ALL applicants must send the award fee payment to the CQ Award Manager, regardless of how the application is submitted. Some CQ award managers are now accepting PayPal; see individual award web pages for details. All awards will continue to accept traditional QSLs as well as eQSLs. For the USA-Counties Award (USA-CA), applicants must note on their record books (or printouts) whether each county has been confirmed traditionally (with an "X" to the right of the entry) or electronically (with an "E" next to the entry).

For more information on eQSL, visit <http://www.eQSL.cc>. For more information on CQ awards, visit the awards page on the CQ website at <http://www.cq-amateur-radio.com>. Please note that the award rules posted on the website have not yet been updated to reflect the acceptance of eQSLs. This will be done as soon as possible, but the policy takes effect immediately.

## Minutes, CARC Meeting of February 6, 2009

Meeting was called to order at 7:00 pm by President Mark (KA0YDC).

Mark introduced Mr. Tim Troutman of the National Weather Service in Huntsville and turned the "Storm Spotter Training" program over to him.

A break was called at approximately 7:40 due to a glitch with the AV equipment.

The program resumed at 7:50 and concluded at 9:05 pm with approximately forty-two in attendance.

The Tour de Cure sign-up sheet was announced and circulated by Bill (K4TSF).

The March chili cook-off was announced and all attendees were invited by Bill (K4TSF).

Mark (KA0YDC) called a break for refreshments.

The meeting continued for interested members.

Jim (KD4EHN) gave the treasures report.

Charlie (AD4F) announced a local silent key, Ronald Farris (WB4LRD).

Jack (AD4LP) stated a concern that corrections were not being made to the minutes published in the WAVES.

Meeting adjourned at 9:30 pm.

Respectfully submitted by Bill (K4TSF).

### Program Notes

The program for Thursday, March 5th, will be our annual chili cook-off. If you would like to participate please bring a crock pot of your favorite chili to the 7:00 pm meeting. All attendees will have the opportunity to judge and determine the "Grand Champion" and "Almost Grand Champion" of the CARC chili makers. Bowls, spoons, crackers and drink will be supplied. Basically this meeting will be a social and we may even make a few QSO's with the W4AM station. Visitors are welcome.

The program for Thursday, April 2nd, will be about the National Traffic System. Tom Wolfe (K4CMY) will do the honors. Tom has been involved with passing traffic for many years and the program should be of much interest. 7:00 p.m. is the meeting time and visitors are always welcome to the meetings.

**Membership Application**  
**Chattanooga Amateur Radio Club**  
**P.O. Box 23121**  
**Chattanooga, TN 37422-3121**

Name: \_\_\_\_\_ Call Sign: \_\_\_\_\_ Class: \_\_\_\_\_

Street or PO Box: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip+4: \_\_\_\_\_

Phone No: \_\_\_\_\_ Email: \_\_\_\_\_

Are you and ARRL Member? Yes or No Circle choice.

Spouse: \_\_\_\_\_ Call Sign: \_\_\_\_\_ Class: \_\_\_\_\_

Circle All Applicable:

New member Renewal Associate\* Family\*\*

New or Renewal Member \$ 18:00 \_\_\_\_\_

Associate Member\* \$12:00 \_\_\_\_\_

Family Member\*\*\$9:00 \_\_\_\_\_

ARRL Membership (New or Renewal)\*\* \_\_\_\_\_

**TOTAL** \_\_\_\_\_

**NOTES:**

\* **Associate Membership** is available for unlicensed persons or licensed operators living 25 miles or more from meeting location.

\*\***Family Membership** is available for licensed operators living at the same address as Member.

\*\*\***ARRL** membership is available through the club as new member or membership renewal. Simply send your application or renewal notice along with this application and your check. Your check should be made payable to the **Chattanooga Amateur Radio Club**. We will send it to the ARRL. (The club gets a handling fee from the ARRL.)

I / we agree to abide by the club's Rules and Regulations.

Signature / s \_\_\_\_\_ Date: \_\_\_\_\_

\_\_\_\_\_ Date: \_\_\_\_\_

**March 5, Club Meeting Chili Cook-Off.**  
**March 21, Tullahoma Hamfest.**  
**April 4, Sequatchie County Hamfest.**  
**May 9, American Diabetes Association Tour de Cure bike ride.**  
Look on [WWW.W4AM.ORG](http://WWW.W4AM.ORG) for additional information.

**Time for 2009 dues**