September 27, 2014
Status of the County Mutual Aid Radio System

In an effort to explain the process we (Emergency Manager Nehemia Volquardsen and I) have undertaken to try to improve the County Mutual Aid radio system in response to the following problems:

1. Chronic, persistent interference on the Ree Heights / Mutual Aid West UHF repeater.
2. Lose of effective repeater range due to narrow banding of the system in late 2012.
3. Lose of effective portable range due to narrow banding of the field units (portables and mobiles) in late 2012.
4. User error and behavior.

Problem 1: Chronic, persistent interference on the Ree Heights / Mutual Aid West UHF repeater.

The first issue, the interference, was originally an occasional event. Over the past four years we have hired several radio vendors from various shops and also state radio communications technicians to try and discover the source of radio frequency interference (RFI) which is present on the frequency used to access or control the repeater. The interference is not present on the broadcast frequency, just the frequency the repeater hears. Thus, when the repeater is trying to receive a signal and the interference is present, the repeater repeats that noise along with the voice traffic. Unless you are listening to the control channel, you will not hear the interference on your own equipment, only after it is repeated through the repeater.

In some situations the interference is so strong that the signals being sent to the repeater are distorted by the noise and result is the repeater rebroadcast this noisy signal back out. If the RFI is stronger than the intended signal from the portable or mobile user, the voice of the user may be wiped out completely by the noise.

The easiest analogy I can offer is that of sound. The repeater is much like us. It has a receiver (our ears) and it has a transmitter (our mouths). If we and it are expected to repeat what we hear, then the cleaner, the louder, the closer the source of what we want to hear, the more effectively we can repeat what we heard. Unlike us, the repeater cannot comprehend or piece together what we hear, it simply, like a machine is intend, repeats everything it hears, good or bad, clean or static filled, sharp or distorted.

In my analogy, the battle against the RFI or noise is similar to us, as a human, standing alongside a roadway with traffic, like US HWY 14. As the number of vehicle passing, as the sound of the vehicles passing, as the frequency of the vehicles passing increases, so too does the ambient noise you detect in your ears increase. This “threshold” of noise must be overcome for you to hear effectively and then repeat what you hear.

We, as humans, can insulate ourselves from some of this ambient noise and seek methods to improve our poor position and lower the noise threshold. We can turn away from the noisy traffic, go inside a structure, move further way from the traffic, talk louder, while listening harder or with more intent, or use ear phones to lessen the distance between the speaker and the ear. A repeater cannot do these human things.

The repeater is at a fixed location. It is licensed for service in one spot and it cannot be moved without considerable planning. Our Mutual Aid West repeater is on a 180 foot tower located in a prime spot for broadcast communications, it cannot be moved without FCC approval (licensing) and it cannot turn away, use an ear bud or headphones, it cannot build or hide in a structure. In fact, it has the opposite effect. Our repeater on this hill, attached to the top of a 180' tower has "big ears". It hears a lot!

The goal of any repeater is to bridge the distance between two field units who can reach each other on a simplex (unit to unit, using the same frequency in both directions) channel. A repeater receives a weak signal, boost it up and send it out with more power, nearly instantaneously. This same concept applies to all frequencies it detects; it hears them all, but through a process of signal rejection, it accepts the desired frequency from among the undesired frequencies. Even with filters (duplexers and pre-selectors), there is some RFI that is going to be present; there is a noise threshold to overcome.

In an effort to mitigate the interference we did the following:

1. In 2009 we installed a receiver "pre-amp" to try and increase reception on the desired signals.
2. The repeater was tested and checked to ensure it was tuned properly.
3. The duplexer was checked to ensure it was passing the desired frequency and ignoring the undesired.
4. The antenna was replaced (as the result of an ice storm).
5. The tower was rebuilt by the previous owner (NorthWestern) and we installed new coaxial cable as a result.
6. The new coaxial was replaced again after wind tore it loose from the tower and damaged it.
7. We exchanged the original 100 watt repeater with our "back up" repeater but it was only at 25 watts. We tested this repeater while in place, no improvement.
8. We installed a second, borrowed repeater.
9. We installed a third, borrowed repeater.
10. We purchased a new (narrow band compliant) repeater and installed it, no improvement.
11. We installed a pre-selector to further isolate the receive frequency and hopefully reject the unwanted noise penetrating our system. Some improvement.
12. We replaced the duplexer to also isolate our frequency and reject the others.
13. We contacted others with transmitters in the area to test their equipment for "spurious" noise emissions which may have gotten into our system.
14. We spent countless hours in the repeater building listening for the noise, identifying near-field and distant radio signals and trying to find harmonic sources of RFI.
15. We checked and rechecked the grounds, the buildings, the electrical sources, and the other equipment in the building.
16. In 2013 we purchased and installed a UHF relay station at the Vayland (East) sight to receive the radio traffic from the 911 provider in Huron. This relay received a signal and then shot it across the county to the West tower. In effect, it created a "virtual" remote for the Huron 911 center so they could broadcast the west repeater at 25+ watts.
17. We even moved the repeater six miles east of the Ree Heights tower and temporarily placed it on the old A&M radio tower from June through October of 2013. The noise was still present and the signal was still degraded.

Consideration was given to moving to the A&M tower because the signal into Miller was better but the signal to the west and southwest had decreased. The change in natural elevation and the lesser height of the tower negated the move. The A&M sight improved communications in Miller but at the expense of lesser service to considerable territory to the West, South West and North West. We had weigh the

benefit for Miller responders against all of the real estate we would be losing in the Ree Heights and Polo response areas. The benefit did not offset the cost.

We moved the repeater back to Ree Heights to its original, licensed locations. We continued to work with other vendors and providers to check and recheck their equipment and still the source of the RFI was not found. It is interesting to note that a receiver on our antenna system can hear radio traffic from over most of central North Dakota and easily most of "East River" South Dakota. That is why we say this sight has "big ears".

If we return to the analogy of us standing alongside the road and dealing with the ambient noise and we recognize that we tried to quite or filter our receiver / ears with no success and we tried to identify the worst offending noise makers (passing vehicles on the highway), and we tried to move away from the noise the only solution we have left is to switch frequencies. That is to move or shift the receiver to a place where the ambient noise has less of an impact. In effect, this would be the same as having someone who cannot hear the lower frequencies of the traffic (partial deafness) but who can hear the higher frequencies, replace us alongside the roadway to act as our human repeater.

We started the process by hiring a radio vendor in Sioux Falls to apply for licensure on a new pair of frequencies. We wanted to move away from whatever was causing the RFI on 453 megahertz so we asked to be moved to 460 megahertz. **This is our last resort**. This move means that every signal radio on the system will have to be reprogrammed and or reconfigured. This will be no easy chore, as there are several hundred pieces of equipment on the system.

The vendor located four possible frequency pairs for us. I programmed my equipment to monitor the four pairs of frequencies for traffic and noise. We settled on one pair and started the process to get FCC approval.

This past week, we received "concurrence" from the user on the 460 megahertz frequency we want to apply for. This concurrence means that we and they (the only other, but statewide user of the frequency) will co-exist in using the frequency. The flip-side is that if we cause them interference, we will have to remedy the problem, even if that means moving off that frequency.

So, the application process to the FCC continues now that we have the concurrence letter from the current occupant / user of that frequency. I cannot tell you how long it will take for us to get final approval to begin using the frequency. We just do not know.

What should you expect?

- In the near future we will announce whether we were successful in acquiring the new frequency pair.
- We will develop a plan to migrate from one frequency pair to the other.
- We will develop a plan to reprogram radios, most likely on an agency by agency basis.
- We will set up a firm date on when to switch the systems and go live.

What can you do to prepare?

- Educate yourself.
- Educate your agency staff.
- Prepare an inventory of equipment that will need to be switched.

- You may have to prioritize the equipment from most important to least important.
- Be supportive. Negative feedback does not promote change. We know the problem exists and despite the "haters" we have been working to find a solution.

PROBLEM 2: Lose of effective repeater range due to narrow banding of the system in late 2012.

Narrow banding is an FCC requirement for users on our license class (Part 90). We did not have a choice in whether we could, should or would switch from the pre-2013 wide band emission to the post-2013 narrow band requirement. We, as the holders of the license, and me in particular as the person named as system administrator had to comply with the requirement or face penalties, some of which are thousands of dollars.

What is narrow banding?

Narrow banding is a concept where you take a given allotment of frequency space or channel spacing and split it in half or quarters to allow for more channels. In our case, the UHF radio frequency spectrum between 453.000 and 453.100 had five 25 kilohertz channel assignments. They were:

- 453.000
- 453.025
- 453.050
- 453.075
- 453.100

There are nine 12.5 kilohertz channel spaces / frequencies in that same segment. The narrow the channel spacing, the more likely adjacent users could cause RFI on their neighbors, unless you narrow the emission. Narrowing the emission of the radio signal reduces the likelihood of RFI into the adjacent channel.

- 453.000
- 453.0125
- 453.025
- 453.0325
- 453.050
- 453.0625
- 453.075
- 453.0825
- 453.100

The next probable move will be to move to 6.25 kilohertz channel spacing which will look like this: This degree of narrow banding will most likely be for digital communications. Analog communications cannot be controlled as precisely as digital modes.

- 453.000
- 453.00625
- 453.0125
- 453.01875
- 453.025
- 453.03125
- 453.0375
- 453.04375
- 453.050
- 453.0565
- 453.0625

- 453.06875
- 453.075
- 453.08125
- 453.0875
- 453.09375
- 453.100

The splitting of five frequencies into halves and then halves again requires the technology of sending that signal to be “narrowed” to reduce the chance that a signal on one channel segment will bleed or interfere with the next. Thus narrow banding was required to increase channel availability and maintain a RFI buffer between the channels available.

To achieve narrow banding of an emission from a transmitter the signal itself must be changed so that it occupies less space in the frequency spectrum. In short, there is half as much signal. Hopefully the signal contains more voice then noise.

Please visualize the following….

A flashlight held in your hand is a transmitter of energy, just like a radio. It takes power from a source and converts it to signal (light). The bulb is your fed element, same as an antenna and the reflector behind the bulb focuses or directs the energy, same as a dish or directional antenna does.

Your flashlight has a lens opening (broadcast emission) of 1 inch. The light emission is in a cone shape away from the lens / bulb and reflector. If you lay the light on the floor you can see the pattern in two dimensions (length and width). Now let us narrow the emission of light. Let us reduce the emission of energy by use of a filter so the lens spacing is reduced to ½ inch, one half of what you previously enjoyed. Your pattern is going to change. The length may be similar but the width will be greatly changed in that it will be much narrower and the focal point may even change.

Now image you had four identical flashlights, each with a 1 inch lens all laying on the floor and you spaced them apart so that the beam s(emission) just barely touch each other at a distance of 5 feet out from the source. This is channel spacing. Within the first five feet where the light energy is greater, the separation of beams is better but past five feet they overlap, they interfere with each other.

Now…place eight flashlights with 1 inch lenses in the same space and you will see the blending, the interference at a shorter distances. The beams will penetrate or saturate each other and your original signal will lose its character. But if you narrow the emission (beam) you can restore the separation back out the specified distance. Same energy output but now occupying ½ of the space. In the main part of the beam, you should see good signal. On the edges, you will see it drop off. The “deviation” of a signal must be controlled in the radio and is regulated by the FCC manufacturer requirements. This deviation is like setting a tolerance on a machine part. You are only allowed so much room to work in or there will be consequences.

If want to experiment with this concept, take your flashlight and a solid (non-transparent) funnel and go into a dark room. Now, turn on the light, see the pattern, and then place the funnel opening over the lens of the light so now the energy is focus / filtered down out the smaller opening. You can easily see the difference. If your funnel is ½ the size of your lens, you will see it proportionally to what is happening with our radio signals.

In simple terms…we lost ½ of the previously allowed bandwidth to send the signal, our emission tolerances were reduced to ½ of what they previously were. If the transmitter is set up right the voice occupies the center of the signal and what are really missing is the fringes of the signal. Generally speaking, the signal is much quieter then it was previously. For us, we saw significant decreases in user volume which most of us equate to loss of signal.

What does this all mean? It means that we are transmitting ½ of the signal we used to. The repeater is hearing ½ of what it used to and rebroadcasting ½ of what it used to. If you are close to the repeater, this problem is almost non-existent which is why the portable users in Ree Heights always sound good! If you travel away from the repeater, the signal begins to degrade until you reach a point where there is not enough signal and distortion occurs. Several of us compensate for weak signal by using mobile radios at 25 or 40 watts to "boost" the signal and thus extend our usable coverage.

The equation is this…Signal equals power divided by distance. The lower the power, or greater the distance, the weaker the signal and the more distortion you hear. Consequently, to maintain a good signal at a longer distance, you will need more power. If you have had a cell phone in a rural area, you know what this means! You might have to move to a window, go outside or stand on something tall to keep that call…same concept appears here!

In an effort to mitigate the loss of volume and signal quality from narrow banding, we did the following:

1. We published the results of what was happening on our various media sources.
2. We spoke to agency department heads.
3. We spoke at training sessions.
4. We spoke to individual users of the system.
5. We adopted the "speak loud and proud" mantra to get users to realize they need to speak up.
6. We openly started to tell people…"Can you repeat that, only louder?"
7. We encouraged people to speak closer to their microphones.
8. We tried to lead by example.

What should you expect?

- This problem will not go away.
- Narrow banding is here to stay, speak louder to compensate for lower volume.
- To help others with complaints and be supportive and help teach good radio behavior.

What can you do to prepare?

- Educate yourself.
- Educate your agency staff.
- Be supportive. Negative feedback does not promote change. We know the problems exist and despite the "haters" we have been working to find a solution.

Problem 3: Lose of effective portable range due to narrow banding of the field units (portables and mobiles) in late 2012.

As stated above, the narrow banding of emissions from radio equipment has shown us a sharp reduction in audio volume. The problem appears to be compounded in portable radios which run lower power settings of 2 to 4 watts.

When you couple a narrower bandwidth emission (signal) with a reduced power, the problem seems to intensify. The ability for radios to communicate effectively is a formula of various variables. Improve or control the variables and you can mitigate some of the problem. Ultimately though, the problem is inherent and only controllable to a certain extent.

Ways to mitigate loss of signal and signal volume from a portable:

- Speak "loud and proud" into your portable's microphone.
- Not all portable radios have a microphone *in* the speaker face. Find the microphone hole and speak to it, not the speaker. There is a difference.
- Avoid obstacles like metal buildings which reflect your signal and which do not allow the signal to penetrate or reach the intended receiver (whether a repeater or another user).
- Avoid heavily wooded areas. Trees absorb signals and pine needles absorb them even more. Move to a clearing to minimize signal loss.
- Avoid dense building materials like concrete, block walls, interior rooms in structures. Just like your cellular phone, the signal needs to reach the tower or other user. You may have to move to a window or outside to get your signal out.
- Avoid low areas, the Earth will absorb your signal better then you think. If there is Earth between you and the repeater or other user, you may be wasting your time unless you are very close.
- Make sure your equipment is working. Is the antenna bent, broken or missing? Is your power level set to low or high?
- Inspect your equipment.
- Don't be afraid to tell someone that you can't hear them and to "speak up".

It is a sad reality of this migration to narrow band that we have to compensate by speaking up, but it is the easiest solution.

What should you expect?

- This problem will not go away.
- Narrow banding is here to stay, speak louder to compensate for lower volume.
- Seek the cleanest path between you and the intended receiver.
- Be supportive. Negative feedback does not promote change. We know the problems exist and despite the "haters" we have been working to find a solution.

What can you do to prepare?

- Educate yourself.
- Educate your agency staff.
- Be supportive. Negative feedback does not promote change. We know the problems exist and despite the "haters" we have been working to find a solution.

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1. **Problem 4:** User error and behavior.

In 1994 and into 1995 I stole the ideas for our radio system from McCook and Lincoln counties in Southeast South Dakota. Both of them were using UHF radio systems to connect their 911 provider with field units and while both of them are roughly one-half our size, our intended use was the same. Our goal was to reach all agencies located in the county. Those agencies located outside of the county but

response areas typically were attached to their "home" county for radio communications. Orient Fire was the exception. They purchased some UHF radio equipment so they could at least hear us.

The basic idea was to place a repeater which would cover as much of the county as possible and bring all agencies together on a common channel for emergency response, weather spotting and information sharing. We had met that objective until the RFI started and narrow banding compounded the problem with fewer signals reaching the repeater.

Wessington Fire and Wessington Ambulance shared a UHF repeater on the Vayland Hills so coverage to the east part of the county was not an issue, it was already covered. My focus was to cover the rest of the area and for many years we covered it.

Most users got used to the system being there when it was needed and we took for granted that it would always be that way. Well, I for one was wrong to believe this system would survive forever.

In 2009 we started to see a decrease in signal quality and it became more frequent and more invasive and ultimately started to ruin our trust in the system.

In 2013 narrow banding added insult to injury when what little signal was reaching the repeater(s) was cut in half.

We started a campaign to educate people on how to work around the problems but ultimately we failed. I failed. We have found countless emails, internet posts, photographs, messages and know of personal messages about how to work through and around some of these issues, only to learn they never reached the masses.

We sent information to agencies and not every agency shared it with their staff. Not every agency trained their staff on radio usage, not every agency changed their radio programming, not every agency kept up with the changes but every agency wanted the system to work 100%, 100% of the time.

Ultimately, I failed and those who asked or offered to help failed so now we are at this point where I am writing this document and I am making it available to the world and sending out a NIXLE message to give you access in hopes that you and your agencies will open a dialog about this system and what we must do to grow with it. The test of your agency's leadership (not the same as leaders) will be whether this letter and its content get brought up at future meetings and becomes part of your training plans. Not just for 2014 but each and every year thereafter. Let's consider this a game of "hot potato" and I have just tossed it…

So, I and we all have user issues to resolve. Here are some of the ways we as users cause our radio system (and other systems you are on) to fail or fall short of your expectations:

1. We assume that as soon as we press the push to talk (PTT) button that others will hear us.
    a. PTT depression starts the process, it does not guarantee the process will work.
2. We mumble without clarity.
3. We speak softly, like we are telling a secret to someone.
4. We don't make sure we are on the right channel.
5. We stand in ditches, behind lead walls, in grain bins, machine sheds, courthouse basements, and interior apartment building walls, in tree groves, 15 miles or more from a repeater and believe it should work like we were standing at the base of the tower.

6. We have our volume down or we are not scanning but we are mad when we miss something.
7. We don't check our scan lists or even the radio to ensure it is set properly.
8. We leave with almost dead batteries and then get made when our radio doesn't work.
9. We ignore information about problems that have been identified and accuse the authors of being full of crap or on power trips.
10. We think complaining or insulting people will lead to a solution.
11. We assume someone else will do it when the power rests with you and me, the end user of the system.

Indeed, every one of you who reads this (and I, its author) has had the power from day one to mitigate the problems through a simple change of behavior. The same change in behavior that taught you to move to the window or outside when your cell phone reception was bad, the same change that taught you that there is a limit to how far a signal will go and how far my signal will go.

We as users continued to try and use portable radios inside sheet metal vehicles believing the system was the problem, not the fact that radio signals from a 4 watt radio do not penetrate sheet metal or other dense materials.

We as users have to adjust to a changing system; there is no other solution to a bad signal from a hand-held device except a change from the person holding it.

We as users can, however, leverage ourselves by the following remedies:

- Reducing obstruction and sources of interference between the hand-held user and the intended receiver or repeater.
- Use of mobile radios with antennas on the exterior of vehicles.
- Use of base stations in structures where communications are frequently received or transmitted.
- Using good radio etiquette which is:
    - "PUSH PAUSE TALK" or depress the microphone, pause a good long second, then talk. The whole problem of clipping can be completely resolved by "PUSH PAUSE TALK".
    - Speak "LOUD & PROUD", speak with authority, and know what you are going to say before you say it.
    - Speak into the microphone, not at it. I have seen users yell at their microphones from foot or more away…THAT DOES NOT WORK! Speak an inch away at the most.
    - Recognize your limitations. There are places where you are not going to reach the repeater, consider an alternate plan.
    - Train for disaster, expect the worst, plan for adversity and rejoice when you don't have it. Planning to work under adverse conditions makes it easier to work under good conditions.
    - Check your equipment. If your battery is low…take along another or switch it.
    - Recognize that batteries which are not used to transmit develop a capacity to match that of a scanner. It takes less than one amp to listen so the battery drains at less than one amp. Now you transmit at two amps and your battery beeps right out of the charger. It's fried…get a replacement. Talk on the radio and keep your capacity. That is why users who use their radios do not see this problem.
    - Recognize that others may not hear you unless you do something to improve your signal. If you can barely hear them, they most likely will not hear you at all.
- Use tools provided to improve communications.

    - These are mobiles, base stations or external antennas for portables.
    - The EM-EXT /SRC-2 channel (Emergency Management Extender) which has been in the courthouse attic since November of 2012 to help link Mutual Aid West users in the area of Miller.
    - Training and information to improve your understanding of the system.
    - State Radio as an alternative. The Huron Police 911 center can be reached via the "HURON 911" talk group. They have this dedicated channel (talk-group) on 24/7.
        - It is really nice when you want to talk after 11pm or before 7am and not wake the entire county with radio traffic. Sometimes the rest of don't need to know what's up at the expense of some solid sleep time.
- Know the difference between "4-2", "33-1" "33-2" or State Radio. We are not the same!

What should you expect?

- This problem will not go away unless the user makes a change in behavior.
- Speak up, "loud and proud" after you "push pause and talk"
- Seek the cleanest path between you and the intended receiver.
- Be part of the solution, not part of the problem.

What can you do to prepare?

- Educate yourself.
- Educate your agency staff.
- Be supportive. Negative feedback does not promote change. We know the problems exist and despite the "haters" we have been working to find a solution.

CONCLUSION:

This document is intended to provide the user with an idea of what has happened to bring a once "trophy" radio system to ruin and how we as the administrators have tried to mitigate problems on the mechanical side. It also is intended to help you, as the users, understand that you can and need to do your part to help mitigate user error through simple behavior changes and good radio etiquette.

Working in concert, not discord, with each other, we can restore this system to the best it can be. Frankly, that may not be what it once was but as best as we can get it.

From the mechanical side, we have:

- Double checked our transceiver at the Huron 911 center (August 2014), no defects found.
- Double checked the relay between Huron 911 center and Mutual Aid West repeater. (August 2014), no defects in the relay equipment were found but the antenna separation were insufficient. We changed the antennas until separation of directional antenna can be made in spring of 2015.
- Daily monitoring of communications system through use of recorded radio traffic (100% evaluation, 100% of the time). (Continuous since 2010)
- Started negotiations on placement of or rental of repeater equipment in the northern most townships of the county where signal degradation is worst and is un-restorable. (July 2014)

- Testing of the EM-EXT (or SRC-2) relay present in the courthouse which links the EM-EXT or SRC-2 channels (which are in nearly every radio now) to the Mutual Aid West repeater. (Since 2012, daily)*
- Staff interaction and evaluation with Huron 911 center about issues with volume and clipping.
- Received permissions to add users to the South Hand Fire repeater for joint ventures in the southern part of the county were county owned repeaters do not reach. (Fall of 2013)
- Use of the Highway Department repeater on the MUTUAL AID EAST channel for county wide communications off of the Wessington Repeater.

From the mechanical side, the process is as follows:

- Acquire new UHF frequencies to use on the Mutual Aid West tower. (2014 / early 2015)
- Install a higher power repeater at Ree Heights (fall 2014)
- Either rent or build out a "working" repeater for the northern townships in the county (2015)
- Either construct a permanent "relay" for users in and around Miller or, (2015)
- Use / reconfigure the law enforcement repeater at the courthouse to broadcast the same traffic as is on Mutual Aid West (2015)
- Install a commercial grade "extender" to patch state radio talk groups to our system (fall 2014)
- Install back up power at repeater sites. (2015 and 2016)
- Regular monitoring of equipment and frequent inspections.
- Regular training of agency personnel (up to the agencies to implement and maintain)
- PROGRAMMING once all of this is ironed out. Spring 2015
- Educate and hand-off operations of this system to another administrator (late 2014 or 2015)
    - It's a volunteer position, just ask for an application.

* For users in the Miller and three mile surrounding radius: I installed a relay (non-standard repeater) in the attic of the courthouse in late 2012. I used the EM-EXT (Emergency Management Extender) or SRC-2 channel for this. I choose this channel because it was programmed into nearly every radio I offered programming to or advice as to programming. This relay has run nearly every day (a fuse blew once) since late 2012. It ties the EM-EXT or SRC-2 channel to the MUTUAL AID REPEATER at Ree Heights. This was advertised, information was provided to agencies and only a handful of people use it.

I personally have used it from the x-ray room, the armory, the Catholic Church, the Plaza, Manner, Arms, elementary school gym, basement of the courthouse and a host of other "tough structures" with no problems.

I would encourage anyone within three miles of Miller to add this channel to your scan list or turn your radio to it for pager tests and see for yourself. You may, just as it was intended, use this channel to bridge / link the gap between the Miller area and the Ree Heights repeater.

In closing: PUSH, PAUSE & TALK, speak LOUD AND PROUD.

Doug DeBoer
License Holder – Hand County
FRN: 0002404580 (http://wireless2.fcc.gov/UlsApp/ApplicationSearch/searchAppl.jsp)