Mercury Northwest Newsletter

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Serving the Mercury Emergency Radio Operators of the Pacific Northwest and those they strive to help

The Collapse of the Teton Dam, caused by an earthquake, in southeastern Idaho released 234,259 acre feet of water resulted in an estimated 2 Billion Dollars worth of damage. Most of those affected were members of the LDS Church. Was this THE BIG ONE? Probably not. (See Pg 12)

THE STATE OF MERCURY NORTHWEST

By Mel Martin, N7BCY
MNW President

A year and a half ago a group including most of the former MARA Northwest leaders got together and organized the existing Executive Board with the intent of revitalizing the organization. One result of the discussion was changing the name from MARA Northwest to Mercury Northwest (see the September 2007 newsletter on the website for the rationale for this decision). The primary intent of the Board was to develop bylaws which would establish a framework that would allow younger LDS hams to step in and begin to assume leadership roles in the organization.

The key to success with the new structure was the formation of local Chapters and Clubs under the MNW umbrella. Unfortunately, this has not happened and for a number of months the Executive Board has been discussing the seeming lack of interest by many LDS hams in MNW. We see two options: Disband entirely or restructure the bylaws to simplify the organization.

With few new hams stepping forward the Board has seriously considered disbanding MNW given that, for various reasons, most of the existing leadership group needs to reduce their commitment to the organization. The Board has decided to try one more time. But disbanding will be a reality if there is not an influx of new blood in the near future.

The Board is currently in the process of rewriting the bylaws to eliminate the need for Chapters in the club structure and providing for direct election of the Executive Board. Watch the website and the HF net for an announcement that the new proposed bylaws are ready for review by members. They will be posted about three weeks before a ballot is sent out for ratification and election of board members. Comments will be taken for a period of two weeks after the bylaws are posted.

We would appreciate input from anyone (voting member or not) on what direction you feel MNW should take. We would especially like to hear from individuals who would be willing to help, or would like to suggest someone else you think would do a good job filling a leadership role.

You can send comments and suggestions to mmartin@majesticwa.com and I will forward them to the entire Board. Please send your emails ASAP as we would like your input before completing the initial draft of the revisions.

FALL MEETING

Unfortunately no group stepped forward offering to host a fall Mercury Northwest regional meeting so the meeting is canceled. Maybe someone would consider hosting a meeting next spring and in the fall of '09. If you have any interest in helping with such a meeting please contact the MNW President.

SILENT KEY

It is with a great deal of sadness that we must report that Evan Johnson, KI7JW, passed away from a heart attack in his home on Monday, September 1, 2008.

Evan has been an active supporter of Church emergency communications through the years. Most recently he has functioned as one of the Net Control Stations for the Multi-Region ERC nets on Sunday evenings and Saturday mornings. He was also a key player in the Hermiston, Oregon LDS Bishop's Storehouse emergency

communications program. Evan participated in the Mercury Northwest HF nets and has supported the aims of the organization through the years. He will be missed!

The preamble to the Mercury Northwest Net states in part "...to provide those with a common interest the opportunity to meet." "Till we meet again, Brother Jenson."

Responses received before publication:

"In behalf of the Salt Lake City MARA contingent, please express our sorrow to the family regarding Evan's passing. Perhaps he and Dick Potts (N7JID) are having an eyeball QSO now."
~Dave KD7UM~

"It is very sad news about Evan Jensen, he will really be missed. Our prayers and best wishes go out to his family and all who knew him."
~Ron AC7CJ~

"It is a long while before we will see his like again."
~Bob AD7IL~

REGIONAL COMMUNICATIONS WORKING GROUP

By Mel Martin, N7BCY

I have decided to put together an independent working group of hams interested in developing an effective regional communications system. There were a couple hams who responded to my June article who will participate in this group; but we are looking for more participation.

You might review my June newsletter article (available on the website) which outlines the rationale for the need for an effective regional communications system. I would be interested in hearing of additional frequencies and / or modes that might provide 24/7 regional communications. Let me know if you are aware of a system currently implemented by another organization which you feel would fills this role.

Please consider dropping me an email at mmartin@majesticwa.com if you have interest in developing an effective regional communications network. We would especially be interested in hearing from you if: You have worked 6 meters or have an interest in 6 meters. Have worked digital modes (particularly HF) or have an interest in digital modes. Enjoy building home brew antennas, especially 6 meter directional antennas. Have expertise in computer hardware and software that could be utilized in a digital communications network. Have access to surplus gear that could be converted to 6 meters.

THE AVD CONCEPT

Dave Zehrung, AA7L

Around the Puget Sound area the Church emergency radio system (which, at that time was MARA) once had an experimental network of 2-meter packet radio stations. It was intended to find out whether it was feasible to use such a network as a primary emergency communications resource for the Welfare program. It was an interesting experiment but it wasn't entirely successful. There were some anomalies: the link from the Kent store house to most of the stations west of Puget Sound was dependent on having an airplane on approach to Sea-Tac to serve as an aluminum reflector. Most of the desirable links did not have LOS (line-of-sight) (which is ESSENTIAL for a VHF

Packet network). Etc. But mainly, the collapse was from what I call the divide between too much and not enough. Knowledge and experience, that is. The tekkies involved wanted to jump to TCP/IP and much higher levels of computer technology (not supportable by knowledge or budget of the others), and the non-tekkies never could get enough experience in realistic situations to understand what was going on that caused many connection attempts to fail. I made the following observations regarding that whole experience with packet:

1. The basic idea of AX.25 packet using direct LOS links or even several relays is a sound and simple concept.
2. Basic AX.25 is amazingly inexpensive. Perhaps the LEAST POSSIBLE cost for establishing an effective local network, if it's kept simple.
3. Each station in a successful packet emergency network really needs:
    a. An efficient antenna, up in the clear, with good path visibility in the direction of any desired links. (There is simply no way to obtain reliable VHF packet communications if the paths between stations depend on reflection or refraction.)
    b. Approximately 5 watts output. (Any more is useless and will only drain the battery faster.)
    c. An arrangement whereby the transceiver, TNC, and antenna are always on and dedicated to the network purpose, (at least at key stations in the network.)
    d. A computer and software that can store message files, and an operator that uses message files instead of "keyboarding" transmissions. (You know the adage that the most important part of a car is the nut that holds the steering wheel)? Well, a keyboarded packet network is sort of like a loose nut holding a steering wheel. The car sort of wobbles down the road.)
    e. A printer. (What good does it do to get 100% accurate messages in well-composed files if they are only present in a computer that the operator is going to take with him when he leaves?)
    f. A battery that will keep the station running for at least 6-8 hours, and another power source for recharging the battery. (An emergency network station that doesn't run on a battery is just. . . sorry, folks, PLAIN STUPID.)
    g. A control protocol that keeps the channel from getting saturated with collisions and re-tries. (A packet network using random transmission timing is only capable of carrying about 15% of the theoretical channel capacity, and as more is attempted, the channel becomes even less productive. If there's a means to assure that only one message is transiting the network at a time, channel efficiency can approach 80%.)
    h. An operator group emphasis on RELIABILITY as opposed to DISTANCE ("DX" is the BAIN of most emergency communications plans. Whenever I see hams trying to go distance for emergency communications, whether it be cross-country on HF or out of local range on VHF/UHF, I see failure looming.)
    i. A means of doing test communication and coordination without resorting to keyboarding messages back and forth. (Message traffic is best done over digital

means; coordination is best done by voice.)

That last realization led me to the development of the AVD Concept - Alternate Voice / Data. Meaning that you conduct a net using vocal procedures on a simplex channel or a repeater, and you plan to move traffic using packet ON THE SAME CHANNEL when cleared to do so by the Net Control Station. This way voice coordination pretty much assures that the only packet traffic will be that authorized by the NCS, there will not be efficiency-degrading collisions, and the delivered traffic will be fast and accurate.

Let's say I have a 25-word NTS formatted emergency message, and I'm checked in to a local area 2-meter net. All available channels are occupied, but our net has managed to squeak out and hold a frequency in our area, and it's inconceivable that we could go to another frequency to move the traffic, so NCS tells us to do it on the net frequency. How long will that take? If both operators are proficient (REALLY PROFICIENT) and the sender speaks at a rate the receiver can write legibly and all the phonetics are clear and understood, it takes maybe 90 seconds to transmit. And it's received with maybe 95% probable accuracy? And it's legible for someone other than the receiving operator to read? OK. What if the same message had been typed into a computer file before listing the traffic with NCS, and, when authorized, the process of connect / send file / disconnect is accomplished at 1200 baud packet? 3 seconds. Maybe 12 seconds if I have to use two relay stations to get LOS links. Figure 1

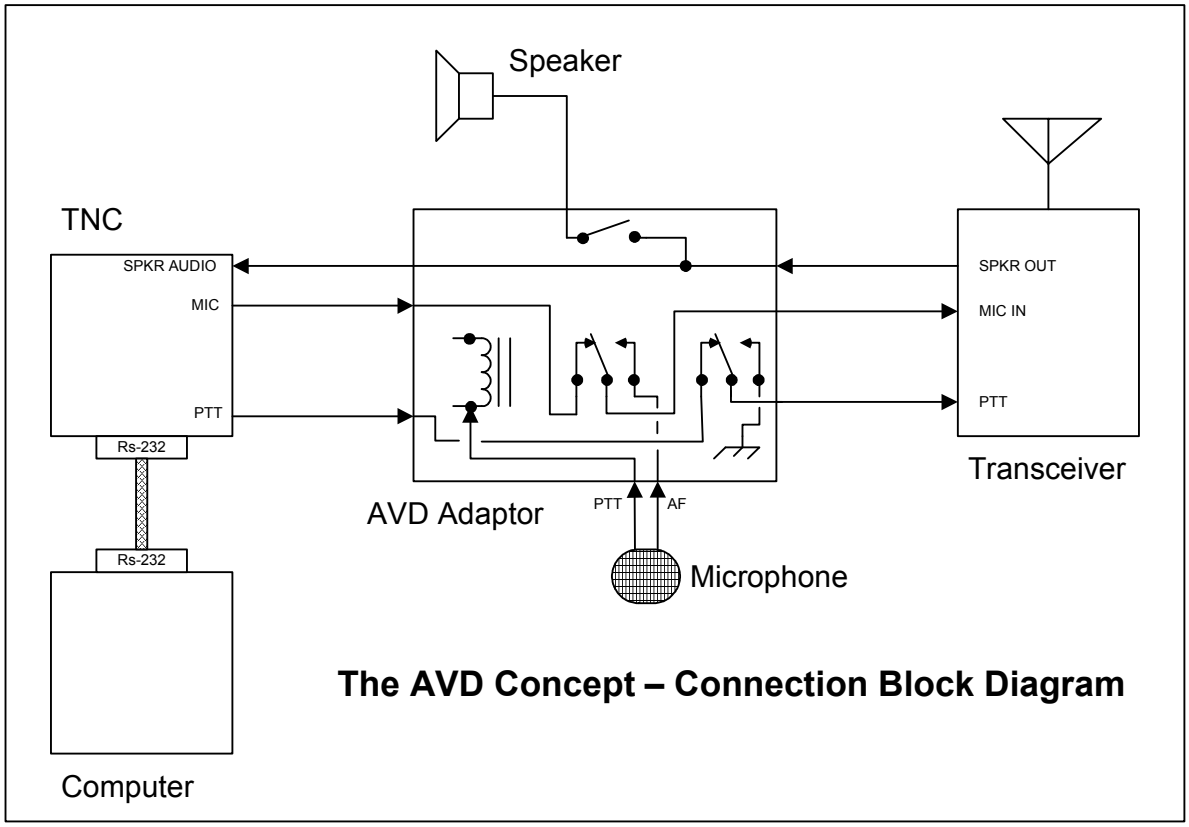


Figure 1

shows the block diagram of a small adaptor that is needed to interface the components of an AVD station. It leaves the TNC normally connected to the radio but disconnects the microphone input from the TNC and connects it to the microphone when the operator presses his/her PTT button. It's also handy to provide a speaker switch so the speaker can be turned off when the station is left in automatic packet relay mode of operation. The specifics of the wiring of such an adaptor will depend on what kind of radio and TNC one is using. On those I've built, I also run the 12VDC for the radio and TNC through the adaptor so I have only one power source plug for the whole station. If you follow the connection paths from the radio input on the right, back through the relay contacts, you can see the simple nature of the switching from "data" to "voice," hence the AVD moniker.

It's also handy to have a computer program that will initiate the packet connection, send a file, and disconnect in rapid fashion. I wrote such a program ten years ago in GWBASIC and it will run on old computers like early Tandy portables, and they're nice because they'll run all day on a 12volt car battery. Later computer options have the advantage of graphical interfaces, and better message handling, but also need a pure-sine-wave inverter to keep them alive on a battery, and they use a lot more current from the battery. (Don't ever connect a modern computer to a cheap inverter if you want to use the internal computer battery very long. The modified sine wave will drastically shorten the life of a computer battery.)

I intend to conduct a digital communications hands-on seminar over about four Saturdays in October through February if there's sufficient interest. The plan is to look at simple, basic AX.25 packet operations, experiment with some net concepts, build some AVD adaptors, and maybe also look as some other modes like AMTOR and PSK-31. My goal in doing this is to get a few operators well trained and equipped to use packet effectively, and hope that they will pass on the information and further develop the resource so that it can be proven to be the valuable tool it truly is. If you are interested, please send me an e-mail message at aa7l@cde-goldbar.com, and watch for further announcements on nets and the MNW website.

THE BEST NVIS ANTENNA

by Mel Martin, N7BCY

The discussion resulting from my June article on Effective Regional Communications focused in an area I had not anticipated. I was hoping to stimulate a discussion on non-mainstream modes and frequencies but instead most of the conversation has centered on NVIS antennas. (See the *Regional Communications Working Group* article in this newsletter for more on the June topic).

NVIS stands for Near-Vertical Incidence Skywave which translates in non-ham language to a design which causes the antenna to radiate nearly straight up and thus back down to stations in relative close proximity. This is bad if you hope to work DX but great if you want to talk with other hams on the HF bands within a range of 200 to 300 miles from your station location. This does not mean that an NVIS antenna is limited to a maximum range of 200 to 300 miles. Band conditions can cause propagation to be well beyond the local area.

Through the years I have talked with friends, listened to on-air discussions, and read several articles on NVIS antennas. A Google search of "NVIS" returns 100's of

articles, many of them giving empirical support for this or that antenna configuration. It's a hot topic with hams who are interested in regional emergency communications.

What has become obvious to me is that there is a wide range of opinions on the effectiveness of these antennas. I have listened to many on-air testimonials extolling the virtues of this or that configuration from those using ANVIS antennas. Others reported disappointing results when performing controlled tests using an "NVIS antenna" in comparison to "normal" antenna designs. Given the amount of interest and discussion on the HF net I decided to do some additional research on the subject. What follows is the result of that research. This article focuses on antenna design and does not address the need for careful schedules of time and frequency to increase the likelihood of successful regional communications. I have tried to make this as non-technical as possible but, unfortunately, to clarify some points it has become necessary to be somewhat technical at times. My apologies!

There are a number of operators on the HF net who successfully use ANVIS antennas. In writing this article I do not intend to be critical of antennas used by anyone! I hope to clarify what causes an antenna to exhibit good NVIS characteristics, to expand the definition of what an NVIS antenna is, and to suggest steps that can be taken to enhance the performance of an antenna intended for NVIS use.

When it comes to antenna theory and design, I highly respect the work of L. B. Cebik, W4RNL. L. B. went silent key in April of this year but I believe his research and writings will be invaluable to the serious antenna builder for years to come. While technical in nature, I recommend the 100's of articles written by L. B. as a good starting point if you have any questions regarding antenna theory or design. Much of his work can be accessed at: http://www.cebik.com/. It is necessary to create a no-charge login account to use this website; but once completed you have a priceless archive at your fingertips!

If you are interested in NVIS antennas I recommend you log on to the above-mentioned website, click the "Search The Site" button, and then enter NVIS in the search window. The top result in the list is "*Notes on NVIS Antennas*." Clicking on this title brings up a brief introduction to NVIS antennas along with six PDF files you can download. I strongly suggest you read and study at least the first two downloadable articles!

Misconceptions

One misconception regarding NVIS is that there is something special in the antenna design. Many articles have been written on how to build them. While it is true that one design may be superior to another, that superiority is not limited to NVIS performance. An effective NVIS antenna could also be an acceptable DX antenna if it were placed at the proper height. **Almost all single element horizontal antennas can be configured to work as an NVIS antenna.**

What is wanted for effective regional communication is a near vertical angle of radiation. Most hams realize that the closer a horizontal antenna is to the ground the steeper the takeoff angle will be, which is bad for DX but good for local communications. **There are actually two keys to increasing the takeoff angle: the height of the antenna and the ground quality beneath it.**

It makes sense then that the closer to ground an antenna is placed the more

vertical the angle of radiation. Which brings us to the second and most significant misconception regarding NVIS antenna, that they should be placed **very** close to the ground to work properly. **In fact placing almost any antenna close to ground limits its performance even vertically!**

Early (and some current) versions of antenna modeling software used a simplified ground calculating system which gave inaccurate results in modeling antennas placed less than 1/4 wavelength from the ground. Quoting W4RNL: "One of the shortcomings of MIN [MININEC abbreviated MIN by W4RNL at this point in his article] the system, made publicly available in the 1990s in QST by Roy Lewallen, W7EL, the developer of ELNEC and EZNEC, is the radical overestimation of gain by the MIN ground calculation system for antenna at or below 0.2 above ground. The system provides wholly unreliable gain values for horizontal antennas close to ground. It is responsible for many misestimates of gain for 1990s 160-meter and 80-meter antennas. As well, the MIN system, when only it was available to PC users, created misimpressions about very low-height NVIS antennas." *(NVIS Propagation and Antennas: Some Background Basics, L. B. Cebik, W4RNL)*

Several software packages in use today allow the user to select either the MININEC or Sommerfeld-Norton (SN) ground calculation system. The MININEC system is often used, especially on older computers, because it calculates much faster. However, only Sommerfeld-Norton provides sufficient accuracy for antennas under a 1/4 λ above ground. If your software package provides both systems be sure S-N is selected when modeling NVIS antennas!

Articles that recommend placing NVIS antennas very close to the ground rely on inaccurate assumptions that originated in the '90's, limited empirical evidence, and/or faulty antenna modeling. **While it is true that antennas placed near the ground radiate vertically, close earth proximity antennas are not the best option for most applications including NVIS!** [BTW if you're looking for a good free antenna modeling software package try 4NEC2 which can be downloaded at: http://home.ict.nl/~arivoors/]

If NVIS antennas should not be placed close to the ground then what is the optimal height? The truth is **most antennas used on the MNW HF net are NVIS antennas!** Any horizontal single element antenna less than a 1/4 wavelength above ground, or even slightly higher, will display NVIS characteristics. That's approximately 52' at the 75 meter net frequency! There are not many wire antennas higher than 52' so most are in effect NVIS antennas on 75 meters.

Single element horizontal antennas placed close to the earth radiate vertically but there is no gain. Vertical gain increases as the elevation of the antenna raises to a point around a 1/4 λ. As the height increases above a 1/4λ the takeoff angle lowers, the lobes extend and the gain moves from vertical to horizontal. So placing the antenna close to a 1/4 λ above ground will provide the most vertical gain.

The wild card in this whole equation is the effective ground level. The effective ground is a point below the surface of the earth at which radio waves are reflected back toward the antenna. One valuable way to visualize an NVIS antenna is to consider the antenna to be the driven element of a two-element yagi. The effective ground serves as the reflector redirecting the RF energy straight up thus creating vertical gain in the antenna. Basic antenna theory says that the optimal distance between the driven element and the reflector in a yagi is a ½ λ. At 75 meters that's somewhere in the area of

120 to 140 feet (depending on frequency and other factors)! The closer to the surface the effective ground is at your location, the higher your antenna needs to be placed (and vice versa). The problem is knowing the effective ground level. Antenna modeling software uses terms like “poor,” “moderate,” “average,” and “good” to approximate ground conditions. But is your QTH average, moderate, poor, or good? Unfortunately, (or fortunately) determining ground quality is beyond the scope of this article!

One final point before moving on. If your soil is dry and sandy and the water table is deep the effective ground could be at, or even below, 120 feet. This would seem to suggest that, under these conditions, the NVIS antenna should be placed very close to the earth. However, radio waves travel at a different speed through earth than they do through air so the phase angle between the direct and reflected waves can be out of phase and vertical gain can be reduced or virtually eliminated!

The Best NVIS Antenna

Unless you have unlimited funds and lots of space, antenna selection is always a compromise between optimal performance and the limitations of circumstance. Should you ask what is the best NVIS antenna I would respond with a question: “Given cost and site limitations, what do you think is the best horizontal wire antenna for your location?” Whatever that antenna is will be the best NVIS antenna for you to use! The exception would be long wire and rhombic antennas which inherently have lower angles of radiation.

Allow me to illustrate using my personal circumstances. We live on five acres beside the Spokane River (Google Earth Long Lake WA and look West two houses from the highway to see our place). We have lots of tall pine trees from which to hang antennas. The downside is that our home is located on the Northwest corner of our property. For some time now I have given thought to placing an antenna over the river. Power lines cross the river near our home at about 120 feet so as long as I stay below the power lines I don’t have to worry about airplanes hitting my antenna. There have been a couple of times airplanes flying along the river have appeared to come close to the power lines!

Now to a problem I think most of you would love to have. I have always followed the adage “the higher the antenna the better.” It would be no problem for me to put an antenna over the river at or even above 100 feet! But I want this to be an NVIS antenna so I need to take extra effort to keep it LOW enough!

A second problem: The best antenna design I’ve identified for my situation is an Extended Double Zepp. The modeling of this antenna looks great! To erect the EDZ would require that the west end hang from trees on my neighbor’s property. They said no, so I can’t use the EDZ. Given that I am locked into the corner of our property I need to choose an end-fed or corner-feed antenna or have only half of it over the river.

The very first antenna I built was a full wave horizontal loop on 75 meters. I loved the performance of that antenna! I ran the HF net during the first years of its existence using a QRP rig and the loop. This was in the early 80's and we were at the top of the sunspot cycle; but the antenna also played an important role in the success of the net.

I have reviewed the available literature on horizontal loops and am convinced this design is my best option given my circumstances. Horizontal loops are known for low noise and the performance characteristics model close to the EDZ. There are several hams participating on the

HF net who are running horizontal loops with very good results. So that's what I intend to put up later this summer.

There is one more consideration regarding this antenna. The 75 meter loop will load nicely on 40 meters with a tuner. However, the height I intend to place the antenna will be well above the optimal height for 40 meter NVIS propagation (good for DX though). Lowering the antenna would allow it to display NVIS properties on both bands but performance would suffer. A better option would be to hang a 40 meter loop in the trees to the South and East of our home, which I will do once the 75 meter antenna is up.

Because of limitations, you may be forced to use a single antenna on 40 and 75. Will it work? Yes, but performance will not be optimum. The better option is to use two antennas optimized to the best NVIS height for each band. I think this is an important consideration given that 40 meters is the best HF band for regional communications during a good part of the day.

Now I wish you all had acreage, trees, and a body of water! Then you could copy my antenna layout, or better yet come up with a superior design that I could use. But you don't, so you need to look at your situation and choose the best design given your circumstances. If you are on a small lot with no trees, maybe it's a folded dipole hanging from a TV mast above the roof of your home. It will not perform as well as an Extended Double Zepp but nothing I have looked at will. Maybe you have space for a G5RV, dipole, inverted V, or a loop. Determine your best option and use it! Better yet put up two antennas, one cut for 75 and the other for 40. **Decide what is the best wire antenna your circumstances allow and, if you're going to use it on 75 meters, put it as high as you can** (under 65').

One point yet to be covered is the impact the ionosphere has on this discussion. Just because you have an NVIS optimized antenna does not insure you can work close-in stations. **Effective NVIS communication requires a very thin ionized layer.** "If a wave strikes a thin, very highly ionized layer, the wave may be bent back so rapidly that it will appear to have been reflected instead of refracted back to Earth. To reflect a radio wave, the highly ionized layer must be approximately no thicker than one wavelength of the radio wave. Since the ionized layers are often several miles thick, ionospheric reflection is more likely to occur at long wavelengths (low frequencies)." *(Refraction in the Ionosphere, http://www.tpub.com/neets/book10/40e.htm)*

Four important points can be gleaned from this quote: 1. This is why we seldom see near vertical reflection at frequencies much higher than 40 meters. 2. Changes in layer thickness and level of ionization, coupled with ground properties, explain why at times a ham using an NVIS antenna cannot communicate with a station relatively close while stations in the 200 to 300 mile range are booming in. 3. This also explains why an optimized height NVIS antenna can, at times, be an effective DX antenna. When the ionized layer is greater than one wavelength the wave is refracted instead of being reflected creating skip even with high angle radiating antennas. 4. This phenomenon also accounts for both 40 and 75 meters being completely "dead" during periods of the day or night when propagation tables suggest one or the other should be wide open. This is caused when the ionized layer is of such density that the radio waves are refracted away from instead of back to earth.

You might be interested in reading the total web page quoted. It's relatively short and provides an understandable explanation

of the variations that affect reflection and refraction of radio waves by the ionosphere: http://www.tpub.com/neets/book10/40e.htm

Which brings me back to the original premise of my article in June's newsletter. Even if the best possible antenna configuration were used by all participants, and precise time and frequency tables were followed, there will be periods (often extended periods) during the day and night when effective regional communication is not possible on the HF bands. **We need to seriously explore alternate modes and frequencies if we intend to provide reliable 24/7 regional communications!**

Given all the limitations I have outlined it's a wonder we communicate at all! The reality is we should be thankful we do not have perfect antenna conditions. While following the suggestions outlined in this article will improve the performance of your antenna for NVIS usage, what is predicted by antenna models is never what actually occurs in the real world. No antenna (except one in free space) will create the perfect radiation pattern predicted in the models. Abnormalities in ground condition, buried pipes and wires, metallic objects in close proximity to the antenna, the placement and type of feed line used, etc. etc. all cause abnormal lobes and radiation angles in your real-world antenna. This helps to explain how a real-world antenna works, and often works well, even though "the book" says it shouldn't. It also explains why the same antenna will not work at another location. This is what makes ham radio interesting to me! It's the uncertainly that keeps me looking for more. **Isn't this a great hobby?**

(Thanks to AA7L, N7YAF, and K3SHD for reviewing this article and providing suggestions for clarification!)

MNW High Frequency Net

The Mercury Northwest Net meets Mondays at 21:00 Pacific time on 3.965. A secondary net meets Saturday mornings at around 08:15 following the conclusion of the multi-region ERC net on 3.935.

Under the capable direction of John, K7CXJ the preamble has been streamlined and the focus has changed to truly be a place for LDS hams to get to know each other better and share ideas that can make us more effective emergency communicators. Come and share your ideas with the rest of us!

FEMA Independent Study Courses

Barry Ellis Coleman, PhD - N7BEC

I recommend the use of the FEMA Independent Study Program Courses to assist in training for the upcoming emergencies and disasters. Everyone old enough to understand would benefit from taking IS 022 "Are You Ready?" which is an in-depth guide to citizen preparedness. It gives good advise on preparing for emergencies before the fact as well as what to do during and after. This course could even be taught in a classroom setting quite effectively.

Church leadership might consider taking, at a minimum, IS 0700, IS 0800, IS 0100, IS 200, and IS 0288. These courses will give all our leadership a good foundation should an emergency come up. We need to be prepared to either stand alone and be self sufficient or effectively integrate into the local governmental emergency system as needed. These courses will lay the foundation that will allow us to accomplish this integration with relative

ease. The IS 0700 and IS 0800 outline the National Incident Management System and the IS 0100 and IS 0200 get into the basics of the Incident Command System. All four of these courses are required of all Emergency Response persons under the Homeland Security program. The IS 0288 is on the role of voluntary agencies in emergencies. (We in the church fit in this category). This gives us the tools necessary to integrate into the local governmental system more effectively.

There are over 75 courses in all that cover just about any aspect of emergency management necessary. I have personally completed over 70 of these courses. There are even some on communications that would be very beneficial to our radio operators.

Keep in mind that in order to best serve the needs of our people and the community we need to know what the local governmental authorities are doing then plan how best to fill in any gaps most effectively. Depending upon the geographic area served Stakes, Wards, and/or Branches might consider calling a person as Liaison to act as the contact person with the local governmental authorities. This person should be regularly attending the LEPC (local Emergency Planning Committee) meetings. This allows us direct input into the overall community planning process as well as allows them to know we are ready, willing, and able to assist, and in what specific manner. When you take the IS 0100 and IS 0200 courses you will see that this person becomes a very important and critical link in the overall command structure. This person should be someone who has very good knowledge of church policies and is willing to take extra time to further their education on emergency management. Because of the extra training involved and the need for this person to gain the trust of the governmental authorities this should be a long term calling not a short term one. It takes time and effort to gain the needed knowledge to effectively fill this position. This person also needs to have the confidence of the Priesthood Leader sufficient to allow him/her to make on the spot decisions that will be in keeping with the policies of the church. As you can see this is not an easy position to fill and should be approached with careful consideration and prayer.

Well, I hope this will give you some ideas that will assist each of you in better preparing for the troubling times coming. Remember that no one can do it all alone, but, together we can accomplish great things, and maybe even survive what is coming.

COLLAPSE OF THE TETON DAM

By R.B. Sturtevant AD7IL

It was nothing really unusual, a simple earthen dam. It was 3,100 feet long and 350 feet deep. The base was 1,700 feet wide at the base. It was like the thousands of other Bureau of Reclamation Dams all over the western states.

They had been working on it since 1975 and it was about to be declared finished when the 234,259 acre feet of water from the Snake River finished backing up behind it. It would be a fine event to cap off for the Bicentennial Year bringing much needed water to southeastern Idaho for recreation and agriculture. It was 3.85 million dollars well spent.

The volcanic rock that the dam was built on was 1.9 million years old and sat on top of sedimentary rock. The area was highly permeable, highly fissured and unstable. Boreholes drilled in one side of the canyon

showed that it was doubtful that the dam site could be fixed using the Bureau of Reclamation's usual method of "grouting" or injecting concrete into the fissures. The risk was judged "acceptable" and the dam was built and started to be filled in March or the year. Absolutely nothing was wrong with the dam until July 3rd when two small springs were discovered on the dam. They were 40 and 60 gallons per hour and considered small. Spring runoff had filled the dam to it's maximum depth of 240 feet.

At about 7:30 on the morning of June 5th a muddy leak appeared but this was not a real problem. Part of the usual growing pains a dam will go through when it comes on line. By 9:30 a large wet patch appeared on the down stream side that threatened to washout. Crews with bulldozers were sent in to plug the leak. As the day progressed the work crews were pulled out for their own safety. Two bulldozer operators were retrieved with ropes from the eroding embankment. The Sheriff ordered down stream residents to be evacuated.

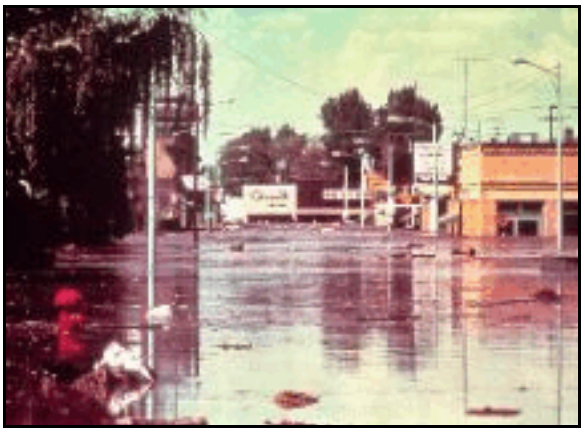
At 11:55 the top of the dam collapsed, two minutes later the rest disintegrated. A wall of water 5 to 6 miles wide roared down the valley. A 2.2 seismic event about 18 miles from the dam had contributed to it's collapse. 234 thousand were now rampaging down the valley.

Rexburg, Wilford, Sugar City, Salem and Hibbard were all dead center of the rushing waters. One estimate placed Rexburg's existing structures damaged or destroyed. Wilford was gone and Sugar City was nearly all but wiped off the riverbank. To the southwest the town of Roberts received significant damage. Idaho Falls, further down the flood plain was able to alert some of it's citizens. Downstream the old and unstable American Falls Dam was opened. The engineers were able to release a lot of water before the flood arrived. The American Falls dam held. This stopped the flood but at the cost of 300 thousand acres of valuable land being stripped of it's top soil. Miraculously only 11 people were killed.

Because of the area's 95% LDS population much of the damage and destruction had been visited upon members of the Church. There were 7,000 homeless Saints and many dealing with the tragedy in other ways. At this point about a hundred Amateur Radio Operators went on the air. From mobile or scratched together stations as well as those who had been missed by the tragedy all together they lit up their rigs and tried to make sense out of the chaos around them. They reported on the 3000 destroyed homes and the 13,000 head of drown cattle, the large areas of farmland stripped down four to six feet down to bare rock and other areas where two to three feet of rock and gravel where piled on top of arable land. They also reported the eleven damaged or destroyed meetinghouses and marveled at how few had died in the calamity. This information found it's way both to the public media and to the Church's leadership in the area. This was not an organized effort. Nobody was in charge. It was just Amateur Radio Operators doing what they do best, Pass Traffic.

The next day, Saturday, President Spencer W. Kimball arrived and two large

conferences were convened on the Campus of Ricks College in Rexburg. President Kimball and Elder Boyd K. Packer of the Council of the Twelve, advisor to the Idaho area, spoke at the Conference. Privately they also heard the reports from the various areas hit by the disaster. In those days most telephone calls where carried by telephone lines on poles. In those pre-microwave days the telephone poles and their lines were gone. When the President and Elder Packer had counseled with the areas Church Leadership the requests for action went out. Again most went by the only reliable means



of communications, first shortwave and then broadcast radio and TV. Relief efforts had begun immediately on a local level but now they had organization. Assets were moved to where the most serious need was, people were organized into various activities and direction flowed through the area in an organized way.

Newspapers, TV, magazines and radio around the world carried stories of the heroic efforts being exerted by the survivors of the dam's collapse and the resulting flood. Very little, however, was reported about the Amateur Radio Operators who were the glue that kept everything together and organized. One Brother spent four days on top a bank with his rig keeping traffic flowing and no relief. But after all, they were just passing traffic.

PRIED FROM THE STATIC

By Ignatius J. Riley

Our refugee from the third call area, Vic Bak, K3SHD wasn't quite up to doing an article for this edition of the newsletter; and prevailed upon me to submit something in his stead. Although he said he couldn't think of anything to write on, he unknowingly gave me plenty of material.

First Vic has a friend who recently opened a land mobile radio shop, primarily servicing radios for county and city governments, public safety and businesses. He is about to take the test for a ham radio license and is thinking of perhaps selling items hams may be interested in. Aware of the near impossibility of competing with large mail order outfits that cater to hams, he is trying to figure out what hams would want to be able to purchase at a local shop versus mail order. Some thoughts included coax and hard line, which are heavy and can cost a lot to ship. A shop can purchase a large roll and cut off lengths to suit. The other item was antenna towers and accessories. These items ship by commercial freight and the buyer has to hang around for the freight truck to arrive. If you have any thoughts what ham operators might like a local radio shop to sell or carry, email Vic at k3shd@arrl.net and he'll pass it on to his friend.

Next, Vic mentioned that he recently acquired a copy of the ARRL's VHF Digital Handbook. This is a new, first edition publication by the American Radio Relay League (ARRL), and according to Vic is simply a "must have" reference book if you have any digital intentions in ham radio above 50 MHz.

The handbook is in 8½ x 11 inch format and a little over a half-inch thick and containing just short of 200 information-packed pages. Almost half of the book consists of three appendices that contain in-depth information about AX.25 packet, D-STAR, and a Common Air Interface and protocol used APCO Project 25 radios.

Overall contents include Packet radio fundamentals, APRS; D-STAR; High Speed Multimedia; Digital Meteor Scatter and Moon bounce, along with WSJT and other related modes; and digital applications in public service and emergency communications such as Packet Radio, APRS, Winlink 2000, Outpost, and more.

It is the above 50 MHz complement publication to the ARRL's HF Digital Handbook and truly a "must have" for your amateur radio reference library if you have any thoughts of doing anything digital.

Lastly, Vic recently learned a lesson about differences between the real and virtual worlds. He and a group of other operators took to the boondocks to determine communication coverage over some 30 miles of bicycle trail by a couple repeaters and from a number of previously selected mountaintop sites. A lot of research went into this. The locations were carefully scrutinized with Google Earth and detailed directions were provided to all participants. One group ended up on a mountaintop behind the intended one, but it was higher and looked down the real site and resulted in adequate coverage for the testing. A stop at the right spot was made on the way back and some quick radio tests were conducted.

Vic drove into the National Forest armed with a GPS and several prints from Google Earth and Google Maps, but, unfortunately, no detailed national forest map. In reality, you simply cannot zoom out to get a better view of things. They finally saw a critical, but hidden turn-off after passing it several times. The GPS unit lost lock on satellites due to steep mountainsides and the forest canopy. Technically, they were not lost because they were able to stop in a clearing or mountaintop and the GPS would tell them exactly where they were and the straight-line distance and azimuth to their mountaintop destination. However, the roads all looked the same. Additional logging roads were not on the map but looked like the national forest roads. Few roads were marked and some of those that were had a different numbering system than that depicted in the Google Earth maps. And some road signs had been moved, further complicating the situation.

Fortunately, much of the time they were in radio communication with the others and not in any danger, per se, but some good lessons were safely learned. A quality compass and detailed paper map are still essential to augment a GPS and downloaded maps. Setting waypoints into the GPS unit ahead of time would also have helped considerably in this instance. This occurred on a clear sunny day. If one gets into an area like this with snow or a thick fog, it is even easier to get disorientated.

After-the-event analysis showed they had gotten within 1.5 miles of their destination. They crossed the road to the peak several times and actually turned on to it, but in the wrong direction.

There is a big difference between zooming in and out on a three-dimensional satellite image overlaid with roads and being down on the ground under a tree canopy. Take their experience to heart and be prepared when you go out to the boondocks.

MERCURY MEMOS

By John Swapp K7CXJ

Memo 1: Reliability, Accuracy, Speed. Is it a footprint or a shoeprint?

Memo 2: "Bits and Pieces". "This and That". Mobeel, Moble, or Mobyle

Memo 3: Memorable Call Sign Phonetics

Memo 1: What do you think is the most important characteristic of emergency communications? Is it reliability, accuracy or speed? Some of us may think, that since this is an emergency that speed is the most importance consideration. I believe that *reliability* is most important. *Accuracy* is second. *Speed* is third.

Reliability. Above every other consideration, if a message can't be delivered due to unreliable communications, the other two factors don't matter.

Accuracy. Is it a footprint or a shoeprint? How many times have you seen a shoeprint and called it a footprint? It is important to accurately describe a situation. Do you remember the West Virginia coalmine disaster in January 2006? When the rescuers made it to the scene, they sent this message to the officials above, "Found eleven. Checking vital signs." Those people above ground interpreted the message to mean, "We've found eleven of them alive. We're checking to see how they are."

Those waiting above shouted for joy. Bells rang in celebration. It was nearly two hours before the correct message, that there was only one survivor, was received by those in the town. You can imagine the emotions the loved-ones experienced!

This tragedy underscores the importance of accuracy in radio messages. It's not a good idea to paraphrase a report. If the person sending the message wants to ensure accuracy, they can ask the receiving station to read back the message. In addition, the receiving station can say, "I read back for confirmation." Accuracy is very important. Is it a footprint or a shoeprint?

Speed. Speed is a consideration in emergencies. That's why we use radio, but it is number three on the list.

Memo 2: "Bits and Pieces".

Have you noticed there are three ways to pronounce the word "mobile"? Here is the key to decode the pronunciations:

Mobeel. This means the operator is an Old Timer and has been a ham for 30, 40, 50 years…"to infinity and beyond"!

Moble (as in "noble"). The operator is licensed within the past ten or twenty years.

Mobyle. The operator is probably Canadian.

There is another pronunciation that is a custom. That is saying the letter "Z". It is customary to pronounce this as Zed. Eric's call letters are KD7WZedP.

I've never done any Instant Messaging on a cell phone, but I understand there are some dandy abbreviations. Well, there are some in ham radio also. Most of them stem from CW, but we see them sometimes in emails.

BCNU. I'll be seeing you.
CUL. I'll see you later.
TUSU. Thank you. See you.
Condx: Conditions.
WX. Weather
TX. Transmitter
RX. Receiver
XCVR. Most use transceivers now.
GE. Good evening.
TNX. Thanks. You will also see "TKS".

Memo 3: Memorable Call Sign Phonetics
I remember some call letters only because of the custom phonetics the operator used. Here are some that I remember:

W9MJ – W9 Mumbo Jumbo

W6TCZ – W6 Tall Cool Zombie

K6DDI - Dave in Los Angeles was obviously a young father at the time. He used K6 Dirty Diaper Inspector

W6YFT – W6 Yellowstone Firestone Tombstone

KL7CYB – KL7 Carefree Young Bachelor. Then he said, "None of the three apply any more."

AL7DK – AL7 Drop Kick. "My method of radio repair".

W7MWF – W7 Monday Wednesday Friday.

KN0K – Glenn in Bellevue. Some calls don't need phonetics to be remembered.

If you have some custom phonetics for your call sign, send them along and we'll include them in the next Mercury Memos. You could also give them to us on the air.

That's it for this issue.

ONE LAST WORD

By R. B. Sturtevant AD7IL
MARA Newsletter Editor

I am sure that most of you have noticed that our MARA Newsletter has gotten a little irregular in the past few months. I hope this has not caused any of you any inconvenience but the time has come for me to make a few changes in my schedule of things that I am working on.

For the past year I have been juggling two separate assignments for two organizations that I think a great deal of. The first you know about if you are a reader of the MARA NW Newsletter is the Church that our organization supports and our responsibility to serve as Emergency Communicators in time of trouble for the Church. As the editor of the Newsletter I have and will continue to give you, the readers, the best Newsletter I can to serve your needs in our callings and Church Service.

The other organization I am interested in is Army MARS. MARS stands for the Military Affiliated Radio Service and has an organization within the Army, the Air Force and another serving the Navy/Marine Corps. These three organizations are official unpaid auxiliary of their parent service. As MARS members we have missions in support of the various services signal operations and are very active in emergency response and the war on terrorism.

After running a Newsletter for Oregon I was ask to put out one for the Pacific Northwest Region. Three issues of the Regional edition got me a request from Army MARS Headquarters to put out a national Newsletter. The request was for a six issue a year publication in order to cover all of what Army Mars's 5000 members are doing. In order to comply with this request I need to reschedule my work for MARA.

I have discussed this schedule change with our President, Mel Martin, and the Board of Directors has been consulted. The MARA Newsletter will continue to come out four times a year and I will strive to make it as worthwhile as it has been, perhaps even more encompassing of our work for the Church that we all love and want to serve. My new responsibilities should not interfere. Perhaps some of you will even consider MARS membership

Registration
Mercury Northwest
Amateur Radio Club

Mail Registration To:
Mercury Northwest
PO Box 154
Startup, Washington 98293

There are two ways you can register with MNW: As a Participating Member or as a Voting Member. All who participate in MNW nets or activities are considered Participating Members. There is no cost to participate; but we would like to have your contact information. Voting Members support MNW by paying dues and are able to hold MNW office and vote on MNW matters. Dues are $12.00 per calendar year (January to January) for an individual or $18.00 per year for a family. If you register partway through the year you may choose to pay dues of $1.00 (individual) or $1.50 (family) for each month remaining in the year. A family is entitled to two votes on MNW matters. Registered Canadian members cannot pays dues to MNW and are thus registered as Affiliate Members (although voluntary contributions are appreciated).

	Name	Callsign	Primary Email Address
Member 1	_____	_____	_____
Member 2	_____	_____	_____
Member 3	_____	_____	_____
Member 4	_____	_____	_____

Member 1 & 2 will be Voting Members if dues are paid.

Family Info: Address 1 _____

Address 2 _____

City _____ State/Prov _____ Code _____

Phone Number(s) _____

Net Affiliation(s) _____

_____

_____

Registration

- ❑ Participating Member(s)
- ❑ Voting Member(s)
- ❑ Affiliate Member(s) (No dues required. Voting through affiliate organization – see Bylaws)
  - ❑ CARS (Portland area)
  - ❑ Canadian Net or Affiliated Club _____

Date Registered: _____ Dues Amount Enclosed: _____