

Primer on Redundant Communications

**Recommendations of the
State Expert Panel
on Communications**

February 2007

**Wisconsin Division of Public Health
Hospital Emergency Preparedness**

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Primer on Redundant Communications

The Office of the Assistant Secretary of Preparedness and Response (ASPR), formerly Health Resources and Services Administration (HRSA) and Centers for Disease Control (CDC) Preparedness Cooperative Agreements have required that hospitals and public health departments have communications redundancy so that should one communications system fail to function, there are other technologies that can be implemented to maintain communications among emergency responders.

To provide recommendations for hospitals and public health departments regarding telecommunications technology, the Wisconsin Division of Public Health, Hospital Emergency Preparedness Program, established the State Expert Panel on Communications. The Panel was composed of representatives from hospitals, public health departments, EMS, Emergency Management, State Patrol, law enforcement, National Guard, telecommunications companies, amateur (HAM) radio, fire departments, and 911 Dispatch.

The work of this Expert Panel resulted in the recommendation that each hospital and public health department in the State of Wisconsin have four tiers of communications redundancy:

- Landline/Cellular Telephones
- Two-Way Radio (UHF/VHF/800mhz)
- Satellite Telephone
- Amateur (HAM) Radio

To support these four tiers of communications redundancy and to assist hospitals and public health departments in the implementation of these four tiers of communications, the Expert Panel offered 46 recommendations for consideration.

Note: These recommendations represent the consensus of the Expert Panel. They were developed for the State of Wisconsin. All recommendations may not apply to all states and even regions within various states.

In late 2006 the state Hospital Emergency Preparedness Program identified certain recommendations that were required of all hospitals if they received federal preparedness funds for the purchase and/or implementation of telecommunications technology. These “required recommendations” are in **BOLD** print.

Baseline Recommendations

The recommendations, offered by the Expert Panel, are “baseline” recommendations. Baseline refers to the fact that these recommendations will help hospitals and public health departments establish a foundation of telecommunications technologies. Baseline also refers to the fact that these recommendations are intended to evolve over time as these organizations learn more about these four levels of redundancy and how they can be further enhanced.

The Expert Panel also recognized that the availability of communications technology and staff with communications expertise varies at hospitals and public health departments. Some of these recommendations can easily be implemented because of IT staff availability and expertise; other organizations will find it difficult to implement even some of the most basic recommendations.

Each hospital and public health department should adapt these recommendations to their unique environment. Not all recommendations are meant to be implemented equally across all organizations. There is also more than one way to implement each recommendation. Each organization will also need to consider the operational and financial impact of these various recommendations as they develop their plans.

Tier 1: Landline and Cellular Telephones

Landline-dependent telecommunications technologies include (not inclusive):

- Analog and Digital Telephones (corded and cordless)
- FAX Machines
- Landline Telephone Calls to Cellular Telephones
- Cellular Telephone Calls to Landline Telephones
- Dial-Up and DSL¹ Internet
- Dial-Up and DSL Email
- Voice Over IP² via Dial-Up or DSL
- T1³ (or higher) Lines

Why do landline circuits get overloaded? The landline system is typically built for 18% capacity. The assumption is that, at any given moment, 18 or less of every 100 users are on the telephone. Circuits were well over capacity in New York City on 9/11. Events such as Mother's Day (busiest calling day of the year) and snow storms (everyone is calling home before leaving work) can overload circuits.

T1 (or higher) Lines: These are dedicated landline circuits and are used, especially by hospitals and public health departments, for dedicated data access. These lines are more likely to get overloaded at the "server" or beyond, when many users are trying to access certain web sites such as the state Health Alert Network. Since these lines are dedicated circuits, they are not shared outside the organization. They can become inoperable due to damage, but overload can be prevented by an internal usage policy. T1 lines allow for 24 talk paths (48 users); some of these

¹ A digital subscriber line (DSL) connection is a very high-speed connection that uses the same wires as a regular telephone line.

² Voice over Internet Protocol, also called VoIP, IP Telephony, Internet telephony, Broadband telephony, Broadband Phone and Voice over Broadband is the routing of voice conversations over the Internet or through any other Internet Protocol (IP) based network.

³ If you have a T1 line, it means that the telephone company has brought in a fiber optic line (a T1 line might also come in on copper). A T1 line can carry 24 digitized voice channels or 48 paths (your call going out and the other call coming in) or it can carry data at a rate of 1.544 megabits per second. If the T1 line is being used for telephone conversations, it plugs into the telephone system. If it is carrying data, it plugs into the network's router.

paths can be used for access to the Internet, while other paths can be used for voice communication.

Cellular Telephones to Landline Telephones: If landlines circuits are open and operational, a cellular telephone call to a landline telephone (or vice versa) is connected. If landline circuits are busy or down, then cellular telephone calls to landline telephones or vice versa may not go through because the cellular telephone is using part of the 18% landline capacity.

Cellular Telephone to Cellular Telephone: If landlines are down, cellular telephones may still call cellular telephones, assuming communication towers are functional. Cellular telephones are also typically built for 18% capacity. When capacity is reached, the cellular circuits are overloaded. Extended power outages can exhaust back-up power supply at cellular towers and cause cellular telephones to fail.

Note: Technologically, “Blackberries” and other similar devices are the same as cellular telephones.

With this introduction to landline and cellular phone technology, the Expert Panel made the following recommendations.

Note: Required recommendations are in **BOLD** print.

1. **All hospitals and public health departments must to identify personnel that fulfill critical functions and determine what communications technology these critical functions must have available.**

Note: Appendix C “Worksheet A – Critical Functions and Telecommunications Capability”, on page 20 can be used to identify critical functions and what telecommunications technology should be available for each critical function. Appendix D is an example of a completed worksheet and can be found on page 21.

2. All hospitals and public health departments must have landline telephone capability for critical functions.
3. All hospitals and public health departments must have FAX machine capability for critical functions.
4. All hospitals and public health departments must have cellular telephone capability for critical functions.
5. **All hospitals and public health departments must have a T1 (or greater) lines for high speed access to the Internet.**
6. All hospitals and public health departments must have partial use of a T1 Line for voice communication.

7. **All hospitals and public health departments must have an internal policy to manage use of T1 lines, when there is the potential for staff to overload these circuits.**
8. All hospitals and public health departments must have email capability for critical functions.
9. All hospitals and public health departments must have Internet access for critical functions.
10. **All hospitals and public health departments must have dedicated telephone lines (POTS⁴) for critical function areas.**

Note: Dedicated telephone lines are defined here as a unique line that goes from a specific telephone within the organization to the outside by-passing the organization's telephone system.

11. **Each dedicated line must include the telephone number clearly marked on the instrument along with instructions on how to dial.**

Note: Since the dedicated line bypasses the organization's telephone system, a person unfamiliar with the dedicated line may attempt to dial "8" or "9" in an attempt to make the call and be unable to complete the call.

12. **If using a cordless telephone for critical functions, all hospitals and public health departments should have emergency power/battery backup. If unable to have emergency power/battery backup, a corded phone may work best in this situation.**

Power Outage: Most landline and cellular telephone companies have emergency power backup. Remember any cordless telephone will need a battery backup in order to be used in a power outage (the base station needs electrical power to operate).

13. **All hospitals and public health departments that use cable for Internet must have discussions with their cable provider about what back-up systems are available.**

Cable Internet: Cable Internet is dependent upon electrical power and can be damaged physically. However, Cable Internet can continue to be accessed even if landlines are down or overloaded, provided there is electrical power.

Email and Internet: Dial-Up and DSL Email and Internet depend upon landlines and are subject to overload and physical damage.

⁴ POTS stands for "Plain Old Telephone System". Non-POTS lines are based on high-speed, digital communications lines, such as ISDN (*integrated services digital network*) and FDDI (*fiber distribute data interface*). The main distinctions between POTS and non-POTS services are speed and bandwidth. POTS is generally restricted to about 52 kbps (52,000) bits per second or "dial-up speed").

Satellite Internet: Satellite Internet is also dependent upon electrical power. The satellite dish can be physically damaged, interfered with by sun/weather or be susceptible to landline problems. However, Satellite Internet can continue to be accessed even if landlines are down or circuits are overloaded, provided there is electrical power.

14. The Expert Panel does not recommend Satellite Internet Service as a redundancy for Internet access.

Physical Damage: Besides being overloaded, cellular telephones, landlines and T1 lines can be damaged physically, e.g. “digging in your garden”, “blowing up the switching station” intentionally, such as by a terrorist attack, “blowing up the switching station” unintentionally, such as by a tornado or a backhoe accident.

15. **All hospitals and public health departments are to have GETS access for critical functions.**

GETS: “Government Emergency Telecommunications Service” provides emergency access and priority processing. A dial-tone is needed to access GETS. GETS is not just for long distance, but is also extremely useful for local congestion and damage. On September 11th, 18,000 GETS calls worldwide were made with a 95% completion rate.

How GETS Works: 1) You call the GETS toll free number and enter your PIN 2) GETS (transparent to you) connects you to a nationwide carrier like Sprint or AT&T (alternate numbers are also available if these are not your long distance carriers)

Cost for GETS: There is no activation or monthly fee; however, there is usage fee. The usage fee is \$0.075 or \$0.10 per minute (dependent upon your carrier). A GETS account must be established.

16. All hospitals and public health departments should have WPS access for critical functions.

WPS: “Wireless Priority Service” is the wireless complement to GETS. Currently, WPS is available in Wisconsin through AT&T Mobile, Nextel and T-Mobile. Sprint and Verizon are also scheduled for WPS. This service must be added to the cell phone.

How WPS Works: Calls are queued for the next available radio channel by dialing *272 plus the destination number. If landline networks are congested, dialing *272 + GETS toll free number will give the caller priority on both the wireless and landline networks.

Cost for WPS: There is a \$10 activation fee, a \$4.50 monthly fee (This is a cap only; the actual fee may be less dependent upon the carrier) and a \$0.75/minute airtime charge. The use of WPS does not count against cellular plan minutes.

17. **All hospitals and public health departments should consult with their local telephone company about repair priority. Depending upon the established priority, the hospital or health department may consider getting TSP.**

T S P: “Telecommunications Service Priority” mandates that telephone companies prioritize service requests for TSP subscribers. There is an annual cost associated with this service. Telephone companies usually work with local authorities to prioritize repairs.

What technologies does the telephone company use for redundancy? They use exactly what the Expert Panel is also recommending for hospitals and public health departments: cellular telephones, two-way VHF/UHF radio, satellite telephones, Amateur (HAM) radio.

Tier 2: Two-Way VHF/UHF/800MHz Radio

Understanding Radio Communications: “If you understand two tin cans and a string, then you understand radio communications”. There is one receiving and one transmitting unit. The signal is sent over the airwaves (the string). Only one person can talk at one time. The limitations of communicating using two tin cans and a string are also the same limitations of two-way radio.

What Is Radio Communication?: Radio provides the ability to talk over the airwaves: Simplex: one radio unit communicates with another radio unit on a single frequency; Duplex: multiple radio units can communicate with multiple radio units through a “repeater” system, using two frequencies (listen and transmit frequencies are simultaneous). A “repeater”: a tower that picks up a signal from a radio and transmits it to another radio.

What Bands Are Used?: VHF, UHF, 800 MHz, 900 MHz (cellular telephones), Microwave

Who Uses Two-Way Radio: Radio is mostly used by Public Safety: Law Enforcement, Fire Departments, Hospitals, Emergency Medical Services, Emergency Management, Public Health, Government, Businesses (such as utilities).

Who Can Use Which Frequencies?: In the State of Wisconsin, for example, each Public Safety discipline is pre-assigned a specific frequency. For example: 155.475 is assigned to Law Enforcement; 154.295 is assigned to Fire Services; 155.340 is assigned to EMS.

What Is a Trunking System?: A trunking system is a digital system (computer operated). Think of a line in a bank: all people stand in one line and then you go to the first teller available. A trunking system pools all frequencies and makes the line that first becomes open, available to the first user (system is transparent to the user).

Advantages of Radio: Radio allows for a large number of users, the ability to communicate with many other users at once (broadcast capability). Radio has inexpensive upfront costs and minimal recurring costs. It is easy to operate (push-to-talk), independent of other communication systems and fairly easy to learn.

Disadvantages of Radio: You cannot “ring” someone (some systems now have this capability). The range is limited by power, terrain and system design. Battery life is also limited for hand-held radios. There are a limited number of frequencies and talk groups (radio frequencies are

shared). There is the high potential for unauthorized use of and access to frequencies. Communication is not secure (encryption requires additional equipment).

Interoperability: The definition of interoperability is the ability of various groups to talk with one another by radio. It requires a plan to know on which frequencies they will communicate and what equipment will enable this communication on these frequencies. This plan needs to deal with obstacles to communication (terrain, power, etc.).

There are very few, if any, interoperability problems with a telephone. You simply pick up any telephone, anywhere, dial the number and you can communicate. Interoperability is not that easy with radios. Radio users choose one or more of the multiple bands with different frequencies available and with different equipment available. This creates many problems for users in communicating with one another.

Users have different radio systems. One system works well in one location but not in another. There are different protocols and frequency bands. Oftentimes, there is the lack of knowledge of who has what frequencies. There are also political and “turf” issues.

Project 25: Project 25 (P25) is the standard for interoperable digital two-way wireless communication products and systems, developed by state, local and federal governments and the Telecommunications Industry Association (TIA). P25 is accepted as the standard for public safety, security, public service and commercial applications. P25 standards are not required for EMS and hospital base stations (unless equipment is being purchased with Homeland Security funds). Other public safety agencies do not need to upgrade to P25 for the next 5 – 10 years. There will be no negative effect upon State EMS and hospital communications as others become P25 compliant. The cost for P25 equipment is 2 - 3X greater.

Internal Radios: Radios can be used within a hospital or health department so that staff can communicate with one another and also with others outside the facility such as law enforcement. If the hospital or public health department emergency communications plan includes communications with law enforcement, the radio must be capable of transmitting on law enforcement frequencies -- with permission!

“Narrow Band” Project: This is a project that is already underway. It is the ability to create more frequencies by “narrowing” the band. All radio equipment must be narrow band operational by CY 2013. For example:

- 155.340 (existing band)
- **“155.3475” (created by narrowing the band)**
- 155.355 (existing band)

Statutory Requirements: Hospitals and public health departments should know the statutory requirements for two-way radio in their state. For example, in the State of Wisconsin, EMS and hospitals are required to obtain an FCC⁵ license for operation of a two way radio base station.

⁵ FCC is the Federal Communications Commission

18. **All hospitals are required to have the ability to communicate on the State EMS channel so ambulances from any area can make contact with the hospital.**
19. **All hospitals must have UHF/VHF two-way radio communication with EMS.**
20. **All hospitals must have radio communications with local EMS, if different from VHF.**
21. **All radio licenses must be current and up-to-date.**
22. Any new radio equipment purchased by hospitals and public health departments must support statewide interoperability and have access to statewide frequencies.
23. **Any new radio equipment purchased by hospitals and public health departments needs to be narrow band capable.**
24. Each hospital and health department must have an Interoperability Plan for its home county.

Note: Appendix E: “Example of a County Interoperability Plan” is on page 24. The intent of the plan is to have each emergency responder list the frequencies that they use and then for other emergency responders to determine with whom they need to communicate and on which frequencies and then to determine if their equipment will permit them to communicate on those frequencies.

25. Each hospital and health department should have an Interoperability Plan for its collar counties.

Note: The emergency responders should do the same process described in #24 for their collar counties if applicable.

26. Any new equipment purchased by hospitals and public health departments should have the capability to communicate on all channels identified by the Interoperability Plan.
27. Each hospital is encouraged to have an additional multi-channel radio to communicate on ALS and EMS Coordination channels. A) This additional radio must also have scanning capability. B) This additional radio must have access to 155.280 for inter-hospital communications.
28. **Each hospital and health department must have internal radios so that critical functions can communicate with one another and with others outside the facility (if necessary).**

29. **If internal radios are used to communicate with others outside the facility, there must be authorization to use their channel and also agreement on which channel to use.**

Tier 3: Satellite Telephone

Why Satellite Telephones: Landline circuits can get overloaded or damaged. Cellular telephones do not work everywhere. Radios do not work everywhere. Amateur (HAM) radios: you are usually dependent, due to FCC regulations, upon a non-staff person to operate the Amateur (HAM) radio.

How Does the Satellite Telephone Work?: A satellite telephone can call another satellite telephone. 1) The call signal goes from one satellite telephone to the satellite 2) The signal then goes from the satellite to a ground station. 3) The signal goes from the ground station back to the satellite. 4) Then the signal is sent to the satellite telephone that is being called.

A satellite telephone can also call a landline telephone. 1) The call signal goes from the satellite telephone to the satellite. 2) The signal then goes from the satellite to a ground station. 3) The ground station then connects your call to the landline network.

30. **Hospitals and public health department need to have a fixed satellite telephone.** (In the State of Wisconsin, hospitals and public health departments were encouraged to buy a specific brand of satellite telephone because this brand offered the following benefits:

- This satellite telephone is widely used by Wisconsin Emergency Management and by many emergency response agencies throughout the country.
- This satellite telephone allows calls to be made anywhere in the United States and throughout most of the world without any coverage gaps.
- This satellite telephone provider has LEO (Low Earth Orbit – 853 miles up) base stations (48) in outer space so the calls are not affected by hurricanes, earthquakes, landline or cellular overloads.
- This satellite telephone allows the user to call any other brand of satellite telephone or any other type of telephone, pager, cellular phone, etc.
- This satellite telephone provider system is built for 14% capacity.
- The user can connect up to six extensions (using corded or cordless telephones) to the satellite telephone; a cordless telephone allows the user to be mobile. However, it must be remembered that there is only one line. For example, a hospital could have a satellite telephone extension in the Command Center, Emergency Department, Medical Director's Office, Security Department, Plant Operations, and Nursing Director's Office.
- With this satellite telephone there is no "rain fade" effect.
- With this satellite telephone there is no voice/signal delay ("as seen on CNN").
- This satellite telephone allows for voice mail (The user can access voice mail simply by dialing the satellite telephone number from any telephone anywhere, inclusive of the satellite telephone. There is no cost for accessing voice mail.)
- This satellite telephone allows the user to send and receive email.

- This satellite telephone allows for the transmission of data and documents. (The user can connect the computer to the satellite telephone and can transmit data and documents through the computer as per usual.) The satellite telephone can transmit at “dial-up speed”: a 10K document is transmitted in 10 seconds (1 minute of air time usage); a 100K file in 100 seconds (1.6 minutes of air time usage); a 1,000K file in 1,000 seconds (16.6 minutes of air time usage).
- The satellite telephone has multiple call plans similar to a cellular telephone. (If hospital or health department has more than one satellite telephone line, all minutes can be pooled).
- The satellite telephone provider is also an Internet Service Provider (ISP) and its Internet service is independent of the ISP of the hospital or the health department (users must establish a separate email address, e.g. “gmail”, “hotmail”, etc.).
-

Note: The features and benefits listed above are only to provide a guide for a user when considering various vendors.

Is the Satellite Telephone Call Secure? It is very difficult to intercept a satellite telephone call. All calls from the satellite telephone are encrypted. The weakest link is from the ground station to the landline or cellular telephone being called or from the personal computer to the satellite telephone (these are the same weak links in normal day-to-day communications).

31. **All hospitals and public health departments need to have a fixed satellite telephone, capable of transmitting voice, email and data.**
32. All hospitals and public health departments should have satellite telephone capability for critical functions.
33. **All satellite telephone extensions should be cordless telephones with battery-back-up for portability.**
34. All satellite telephones should also have connectivity to the computers in the critical function areas so that they can email and access the Internet.
35. **All hospitals and public health departments need to have a protocol to test the satellite telephone and its various functions (voice, email, data transmission) at least quarterly.**

What About Hand-Held Satellite Telephones? Hand-held units have limited utility. Obviously, it must be used outside and in areas where there are no obstructions 10 degrees above the horizon. At times, the user may be faced with inclement weather conditions. An antenna may be used and mounted to the outside of a vehicle allowing the user to stay inside the vehicle during inclement weather.

Tier 4: Amateur (HAM) Radio

Many people think of HAM radio as a large metal box with all kinds of glowing tubes (that was yesteryear). Today a HAM radio can be as small as a credit card.

Who Uses HAM Radio? HAM is a free radio service, authorized by the FCC and utilized by licensed operators. HAM radio is used by these operators to assist in emergency situations. Amateur Radio Emergency Service (ARES) and Radio Amateur Communications Emergency Services (RACES) consist of licensed amateurs, who have voluntarily registered their qualifications and equipment for communications duty when a disaster strikes.

How Far Can HAM Radio Reach? A small five watt radio can transmit up to 15 miles. Using a repeater, the same radio can transmit up to 100 miles. Using shortwave radio frequencies, HAM radios can transmit anywhere in the world.

How Does HAM Radio Work in an Emergency? Hospitals and public health departments have been encouraged to have a Memorandum of Understanding (MOU) with an ARES/RACES team. The ARES/RACES team provides the hospital and the health department with an operator to assist the facility with communications. The ARES/RACES operator operates the radio; the facility controls the communication messages. Some hospitals and public health departments have an antenna fixed and available for the ARES/RACES operator. If there is no available antenna, the ARES/RACES operator will provide the temporary infrastructure.

HAM radio can serve multiple purposes within a hospital or health department. The most obvious function is for HAM radio to be used to communicate with emergency responders outside the hospital. Another very valuable use is for HAM radio to serve as a proxy for the hospital telephone system, should that system become dysfunctional. In this case HAM operators at various locations can communicate with one another much like a PBX telephone system.

Note: Appendix A: “Sample of an ARES Emergency Communications Hospital Plan” can be found on page 16.

Can an Employee Operate a HAM Radio? No, the ARES/RACES operator must operate the HAM radio. However, if an employee has a HAM radio license, they may operate the radio even if radio operations are not part of their daily job responsibilities.

36. **Each hospital and health department must include HAM radio as part of their redundant communications plan.**
37. **Each hospital and health department must have a Memorandum of Understanding with the ARES/RACES team to provide HAM radio services, when requested, in an emergency.**
38. **Each hospital and health department must provide orientation to any new HAM operator regarding their responsibilities in an emergency.**

39. Each hospital and health department needs to involve the Ham radio operator in at least one exercise annually.
40. Each hospital and health department should have a pre-designated area in which the HAM operator will work.
41. Each hospital and health department should have a fixed antenna and power supply available to the HAM operator (if applicable).
42. Each hospital and health department should consider having someone with a HAM radio license on staff.

Exercising Telecommunications Redundancy

Funding from ASPR and CDC Preparedness Cooperative Agreements will help hospitals and public health departments to enhance their telecommunications CAPACITY (equipment). Since the CAPABILITY (ability and proficiency) of hospitals and public health departments to know who, where, how and when to use these communications technologies comes only through EXERCISE, the Expert Panel made the following recommendations:

43. All hospitals and public health departments need to include use of redundant communications in each exercise (as appropriate).
44. All hospitals and public health departments need to ensure that critical functions exercise the use of communication technologies assigned to them.
45. All hospitals and public health departments should involve their emergency response partners, at least annually, in a test of the redundant communication systems.
46. All hospitals and public health departments should hold an exercise of their four tiers of communications redundancy without commercial electrical power.

“Recommendation 47”

The Expert Panel recognized that it was not possible to address every telecommunications recommendation to fit the unique situation of individual hospitals and public health departments. “Recommendation 47” is for each hospital and health department to complete a telecommunications needs assessment to determine what telecommunications technologies and set-up is needed for its unique situation.

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Appendix A: Sample ARES Emergency Communications Hospital Plan

St. Camillus Hospital Ozone County Emergency Communications Plan⁶

In the event that a communications casualty occurs at St Camillus Hospital (SCH) requiring OZARES⁷, the following plan will be activated. Upon notification by SCH, Ozone County Emergency Management will activate OZARES. A resource net will be established using 147.330 and available personnel will be directed to report to the Ambulance Bay at SCH.

- 1] **The first OZARES member to arrive at SCH** will go to the **Emergency Desk** and **contact** the Emergency Room Supervisor or the **House Supervisor** to determine the nature of the communications assistance required.
- 2] **Get the tote with radio equipment from the storage room** at the east end of the Ambulance Bay. The Emergency Department Supervisor or Hospital Security (ext. 797) can open the room. The combinations for the case locks are 5555 and 6666.
- 3] **Set-up the external antenna that is stored in the SW corner of the bay.** It is to be erected in the existing pipe located between the driveway and sidewalk, about 15 feet west of the west entry door. The coaxial cable from the antenna connects to a cable box adjacent to the vehicle entry door, above door level.
- 4] **Set-up the radio equipment on the counter at the east end of the EMT room.** Check in on the resource net (147.330). At this time activate the 800 MHz trunk radio located in the cabinet above the counter. The trunk radio will provide coverage for the **SCH** and Ozone County Emergency Management talk groups.
- 5] **Initially establish a tactical net using OZARES TAC 1 (146.400).** The net will provide communications between Net Control and the following locations:
 - Incident Command
 - Triage
 - Surgery
 - ICU (Intensive Care Unit)
 - Supply

These locations may be changed and personnel reassigned by the Incident Commander or the Emergency Room Supervisor if designated by the Incident Commander.

⁶ This is an actual plan. The names and telephone numbers are fictitious.

⁷ OZARES is the ARES Emergency Management Coordinator in Ozone County

- 6] **When a mobile unit capable of operating as a crossband repeater is available, it should be set up** on the eastern edge of the east parking lot adjacent to Main Street. **OZARES CBR1** will be the designated primary circuit. After the mobile unit has been placed and satisfactory operation verified, Net Control will direct all stations to shift operations over to CBR1, Primary.

- 7] **Two persons should be assigned to the Net Control position.** They may provide breaks for each other on an hourly basis or sooner as operations permit. Net control operators should be relieved on a two-hour schedule.

- 8] **All operators should be relieved on a four hour schedule** if replacements are available or they should be rotated between stations.

Frequency Plan

<u>OZARES CBR One</u>	<u>OZARES CBR Two</u>	<u>Primary Simplex</u>	<u>Secondary Simplex</u>
HT Transmit – 2M 146.490 pl 100.0	HT Receive – 2M 147.555 pl 100.0	OZARES TAC 1 146.400	OZARES TAC 2 146.580
HT Receive – 70cm 441.425 pl 100.0	HT Transmit – 70cm 446.425 pl 1000.		
Mobile Receive – 2M 146.490 pl 100.0	Mobile Transmit – 2M 147.555 pl 100.0		
Mobile Transmit – 70cm	Mobile Receive 70cm		

Appendix B: A True Story - February 2007

I don't know how many of you were affected by the cutting of the fiber cable on Sunday, but we were. I received the call a little before 6 am to tell me the cell phones and long distance was out. The staff had noticed the cell phones out of service about 1:30 am but didn't need them or need to make a long distance call until just before calling me at 6:00 am.

I checked out incoming T1 circuits and all seemed OK, but thought I would contact our long distance/circuit manager, Norlight Communications. I was surprised to find even the 800 numbers wouldn't work. No problem, I pulled out the satellite phone and went to dial, NO DIALTONE. I couldn't believe it, but it was dead also. I couldn't imagine there would be a relationship between a satellite device and a landline outage, but sure enough it seemed to be.

My next option was to fire up the amateur HAM radio and see if I could get to someone outside of the affected area. I got right through to a HAM friend not too far away, but one that had the ability to make an 800 call. I had them relay the information to Norlight Service to get a ticket started for me. He came back while the tech was on the line and told me there had been a major fiber line cut somewhere between Baraboo and Madison or near Madison and everything this direction was out.

Apparently it is a major backbone as many areas were affected. I could dial local to our own prefix, but not to other local areas. He couldn't dial out long distance other than the 800 number so I made a contact with someone further out that had all their services and they were going to just stand by in case I needed a messaging service. I let the nurses' stations know that if they needed to make a long distance call for an emergency to contact me in the Emergency Communication Center and at what extension and I would get it out of the building. Fortunately we did not have any emergencies that needed to have phone calls made but we could have gotten them through.

We got our satellite service back about 10:30 am and all services were restored by 2:30 pm. They had to do some rerouting and splicing around the site but managed to get everything up and going. I closed up the ECC by 2:45 pm. On Monday I called our Regional ASPR Coordinator for a satellite telephone contact to find out what was going on and was somewhat relieved to hear that their outage had nothing to do with the cut fiber. It was coincidental but they are in the process of relocating some satellites to make room for a couple new ones and said we will experience some periodic outages until they are done in May. It just happened to be at the same time as the other outage. What are the chances of that happening?

The bottom line is, if you have not met with your local amateur radio people to get your communication system up and going, it is a really good thing to do. It was our only means of communication out of our town for several hours on Sunday. I now have applied for the second go around of grant money to enhance the system to add packet data equipment to also be able to send emails direct from the amateur setup also. We will have the ability to set one up to cross band and then use a handheld at the nurses' stations on low power to repeat the signal out at a

higher power on the big antenna to message from a remote location while still having the other system for email or voice as needed.

We have requested some of the new Motorola 900 MHz digital radios for our in-house communications. If you haven't tried them they are unbelievable in their coverage. They covered easily our entire grounds and as far as a couple blocks away and the fact that they are digital, they are crystal clear in their voice quality. They have many options like group call which is the ability to call every radio that is turned on, only a specific group (maintenance, for instance) or even a private call to a specific radio without anyone else hearing anything. They are limited in that they can't be used to contact with outside agencies, but for us they are going to work great.

I know we all are struggling with the time and funds needed for someone to manage this redundant communications requirement, but I certainly am not going to look a gift horse in the mouth and will put in for all I can get. I have seen the results of the efforts so far and I say it works.

**Appendix C:
Worksheet A - Critical Functions and Telecommunications Capability**

This blank worksheet is available for you to use as a planning tool as you consider what telecommunications equipment. Please remember that these are telecommunications modalities that should be available to these Critical Functions in a disaster situation and not necessarily for day-to day communications.

Critical Functions	Landline	Cellular Phone	FAX	Internet Access	Email	GETS	WPS	Internal Radio	Satellite Internet Jack	Dedicated Line	Satellite Phone Extension
CEO/Administrator											
Medical Director											
Emergency Department											
Incident Command											
Plant Operations											
Nursing Director											
Security											

Appendix D: Example - Critical Functions and Telecommunications Capability

The following is only an example and is not meant to be a representation of the critical functions of what telecommunications modalities each critical function should have available. This planning tool is very important for helping you to determine what telecommunications equipment is necessary for which critical functions. Please remember that these are telecommunications modalities that should be available to these critical functions in a disaster situation and not necessarily for day-to-day communications.

Critical Functions	Landline	Cellular Phone	FAX	Internet Access	Email	GETS	WPS	Internal Radio	Satellite Internet Jack	Dedicated Line	Satellite Phone Extension
CEO/Administrator	X	X	X	X	X	X		X	X		X
Medical Director	X	X		X	X	X			X		X
Emergency Department	X		X	X		X		X	X	X	X
Incident Command	X	X	X	X	X	X		X	X	X	X
Plant Operations	X					X		X	X		X
Nursing Director	X	X			X	X			X		X
Security	X	X				X		X	X		X

**Appendix E:
Example of a County Communications Interoperability Plan**

White County Emergency Responders	WISPERN	POINT	MARC1	MARC2	WISTAC1	WISTAC2	WISTAC3	FIRECOM	State EMS	State ALS	WEM Car	White SO 1	White SO 2
Albany EMS		Y	Y						Y	Y		Y	Y
Albany Fire				Y	Y			Y	Y	Y	Y	Y	Y
Albany Police	Y	Y	Y	Y								Y	Y
Rochester Fire			Y	Y				Y	Y	Y		Y	Y
Rochester Police	Y	Y	Y	Y				Y	Y	Y	Y	Y	Y
White County Public Works													
White County Highway Dept.		Y						Y	Y		Y		
White County Sheriff	Y	Y	Y	Y	Y	Y	Y	Y	Y			Y	Y
White County Health Department													
Memphis Fire			Y	Y				Y	Y			Y	Y
St. Helen Hospital									Y				
Montana Police	Y	Y	Y	Y								Y	Y
Montana Streets												Y	Y
Montana Waste Water												Y	Y
Montana Water Utility												Y	Y
Boulder Police	Y	Y	Y		Y			Y	Y		Y	Y	Y
Boulder Public Works													
New Madrid EMS	Y	Y	Y	Y				Y	Y	Y		Y	Y
New Madrid Fire			Y	Y				Y	Y	Y		Y	Y