Dave Freudenthal
Governor

Steve DeCecco
Chairman

State of Wyoming

Public Safety Communications Commission

WyoLink Operations Work Group
January 26, 2007 Meeting

Chairman Jerry Kennedy called the meeting to order at 1:00 pm in Room 223 of the Emerson Building, 2001 Capitol Avenue, Cheyenne, WY.

Members present: Jerry Kennedy – Chairman, Kim Lee – PSCC Commissioner, Mark Harshman – PSCC Commissioner, Earl Atwood – PSCC Executive Director, Tom Mahon – WyoLink project Manager, Marty McCoy – WyoLink Support Manager, Jim Archerd – Homeland Security, Dan Perko – APCO, Bob Symons – PSCC Administrative Support, Bob Wyatt – PSCC Commissioner – Phone Conference.

Others in attendance: Jack Knutson – Laramie County Commissioner, Rob Cleveland – Laramie County EMA, Glen Crumpton – Laramie County SO, Rich Hillegas – Laramie County SO, Jim French – Homeland Security, Bob Mason – Homeland Security, Steve Willoughby – AMR, Tim Rumph – Cheyenne PD, Barb May – Motorola, Bill Fleming – Motorola, Gary Caprioglio – Motorola, Jerry Shinefeld – Motorola, Danny Glick – Laramie County Sheriff – Phone Conference.

Minutes of the October 30, 2006 meeting were reviewed. **Pat Byrne made a motion to approve the October 30, 2006 minutes. The motion was seconded by Jim Archerd and the motion passed on a voice vote.**

Motorola presentation on Cheyenne/Laramie County portable radio solutions:

Bill Fleming introduced the Motorola personnel attending the meeting. Bill Fleming presented a Power Point presentation on 2 proposals for improving portable radio coverage in the identified "D" zone around Cheyenne at the October 30, 2006 WyoLink Operations meeting. The quote is provided for budgetary purposes only and does not constitute an offer for sale. WyoLink is in the process of licensing 5 VHF frequencies pairs at 5300 Bishop. Nine (9) potential tower locations were provided by the Laramie County/Cheyenne representatives.

VHF Solution:
The assumptions that were used in the proposal includes the "in building' requirement and the portable radios are worn on the hip with speaker microphones. The "talk in", portable radio to radio site, is the limiting factor. The site environmental noise for VHF of 15 dB was used and spectrum fingerprinting and noise floor measurements will be required for any final plan. The antenna efficiency for a radio worn on the hip with speaker mic is -17.6 dB and the antenna efficiency for a radio used at the head level is -11.6 dB. Each -3 dB is a 50% loss of efficiency – essentially a 6 dB loss is equal to a 5 watt radio operating at 1.5 watts. The building type and the dB losses for VHF were explained. The medium (small to medium size stores, small apartment

buildings or a small to medium office building) used an assumed loss of 20 dB and a light (residential buildings and small commercial buildings) used an assumed loss of 8 dB.

The assumptions used for a radio site were that the transmit antenna (2) would be mounted at 50 feet and the receive antenna (1) would be mounted at 95 feet and each antenna would be a 7 dB gain Omni antenna. The proposal would provide 95% area reliability and microwave paths exist between sites. Another assumption was that the towers exist and can be loaded with 3 antenna and microwave dishes. Existing equipment shelters have space for the new equipment and existing power is adequate. All equipment is designed for 120 VAC and a 7.5kW UPS has been included to provide approximately 4 hours of back-up.

The frequencies licensed for 5300 Bishop are acceptable at all new sites and no intermodulation studies have been performed.. The customer is responsible for all FCC licensing, microwave path surveys and tower stress analysis. Customer is responsible for site improvements and/or site development.

A coverage map was presented that indicate the "D" area and expected coverages of the six (6) site simulcast system. The simulcast system will be a sub-system of the WyoLink system and act as if it is one site. All 6 sites will be receiving and transmitting radio transmissions simultaneously. This type of system has very close design tolerances. Adding additional sites would not provide an improvement that could cost justified.

The budget figure for this solution is $6,803,112.00 and includes all "RF" equipment including microwave, field engineering, project management, system installation, optimization and documentation. Discussion on the cost figures and that the actual costs would probably be less as the figures are conservative and include many risks.

800 MHz Solution:

The 800 MHz solution would build upon the current Cheyenne Fire and Rescue 800 MHz system. The assumptions used for this solution includes the antenna efficiency for the radio worn on the hip with a speaker mic is -10 dB and the antenna efficiency for the radio used at the head is -1.6 dB. The same building types were used – medium and light. The building losses are less using the 800 MHz solution because of the physics of the higher frequencies. The medium building median loss is 14.6 dB and the median loss for a light building is 4 dB.

The other assumptions made for this solution are that there are 20 new licensable frequencies available, there are no high level environmental sites noises and 10 dB antennas could be used. All of the other VHF assumptions hold true for this solution and the customer is responsible for the 800 MHz subscriber equipment. The Cheyenne Fire & Rescue fleet must be upgraded to P-25, Smartzone.

A coverage map was presented that indicated the "D" area and expected coverages of the 4 site (including Cheyenne Fire & Rescue's current site) multicast system. With this solution each site would be linked back to the zone controller via microwave. This solution provides a much better portable radio coverage than the VHF solution.

The budget figure for this solution is $3,000,464.00 and includes all "RF" equipment including microwave, field engineering, project management, system installation, optimization and documentation. The costs for providing the access, tower, building and power to a new site could be $250,000 to $500,000 for either solution.

Discussion on being able to cut the costs for the system by reducing the number of sites and what affects that would have on coverage. By removing a site from the plan the coverage predictions would be less.

With this solution there are many variables that could be used, the portable radios could be 800 MHz and the mobile radios could be VHF. The WyoLink system is capable of using either system and is capable of linking the VHF and 800 MHz systems together seamlessly. The draw back would be that each radio system must be able to affiliate with a corresponding site to be able to communicate. If an 800 MHz radio is not able to affiliate with an 800 MHz radio site it will not be able to operate on the system and inter-connect to a VHF radio. The same holds true for the VHF system. Discussion on how the blended system would operate, talkgroups and drawbacks. The important issue to remember is that each member group needs to have a system that communicates with the users that they need to on the daily basis and 95% of the time.

The Motorola Power Point presentation is attached for reference.

Portable Radio Testing in Cheyenne/Laramie County

Bob Symons presented a radio test that was completed recently using the north water tower as a possible radio site. The results of that testing were presented to the group. All testing was in-building.

Marty McCoy explained the test procedures. The Water Tower off Tranquility Road was used as a radio site and a vehicle mounted 100 watt VHF radio with a 5/8 wave 3 dB antenna. The portable radios were the XTS 2500 portable radios using an analog simplex (car to car) frequency. The delivered audio quality (DAQ) scale that was used for the September testing was used during this test and 50 of the buildings that were used for the September test were used for this test. Of these buildings only 6 sites had a DAQ of less than a 3. Further testing was completed on the 6 sites. The basement of the WyDOT building, the fire training center and the Emergency Room had poor coverages. Marty's conclusion on the testing was that it is not as good as the Motorola presentation but provided coverage better than the current conventional system used in Cheyenne.

Jim Archerd offered to set up the Homeland Security portable tower (105 ft) and a digital radio repeater to further test this site. Discussion on the differences between analog and digital radio testing. Some other considerations that need to be explored is the use of the frequencies licensed at 5300 Bishop could be used at the water tower and the use of digital frequencies. It may be prudent to prove the results of this testing in a digital radio system. Noise floor measurements and spectrum fingerprinting will need to be completed on the site. The project budget can handle the costs for these tests. Any tower installed at the water tower would need to have the antennas mounted above the water tank.

Due to the results of the testing at the Water Tower it is worth exploring this option more. The portable radio coverage is not as extensive as the Motorola proposals but could offer a solution that improves the current system. Tom Mahon stated that there are project funds available to improve the microwave system and this location is one that the project is looking at to provide a redundant microwave link to the north. These funds can be used to develop the microwave site and then the low level radio suite already purchased could also then be installed.

Are there other options that may be available? The one low level site is a good alternative, but if it does not meet the local requirements, more sites may need to be developed. Adding more multi-sites may need to be developed and there are frequency availability risks associated with adding sites. The two Motorola solutions would then need to be further explored. Adding bi-directional antennas to buildings could help improve pocket coverages, these have an approximate cost of $75,000 to $100,000. Pat Byrne stated that more extensive testing should be completed to further define the portable radio coverage in Cheyenne and Laramie County. The solution may not be the best but could provide a majority of the coverage that is expected. The Board of Public Utilities (BOPU) needs to be contacted for their concerns and access to using the water tower. Rob Cleveland and Pat Byrne will contact BOPU and develop a dialog between them on using the water tower site and gaining access for further testing.

Kim Lee made a motion to have more extensive and technical radio testing in the Cheyenne/Laramie County areas by the WyoLink team. The motion was seconded by Pat Byrne and passed on a voice vote. The testing will include more portable radio testing using the Homeland Security tower and digital radio system and include technical evaluation of possible radio sites.

Discussion on Executive Committee Meeting of January 17, 2007

The Governor, through WyDOT Director John Cox, has asked for a state-wide portable radio solution. The solution will include a budget that will be presented to the Wyoming Legislature during next year's budget session. The solution that will be developed will include a partnership between the state and local entities. Each entity will need to provide part of the solution. A policy needs to be developed on how, who, what and where portable radio coverage will be enhanced. The WyoLink Operations Work Group has been delegated this task by PSCC Chairman Steve DeCecco. An objective means of developing an acceptable means of portable radio coverage and how to determine that threshold has been achieved. Each area analysis will be developed individually and not be a set number of dollars or equipment in each area. A portable radio coverage enhancement proposal developed by WyDOT was presented to the work group.

The proposal includes a gap analysis to formulate a final coverage enhancement plan. This gap analysis should evaluate the actual portable radio coverage after the core WyoLink system is built, which will then be compared to the coverage requested. The development of the enhanced sited is proposed as a shared process, agencies will be asked to identify, coordinate and support suitable facilities for a WyoLink site. The local agencies are in a much better position to help identify sites and negotiate with the landowners on securing a site. A budget will be developed that will include the radio frequency equipment and microwave equipment required for each site.

Some concerns were discussed pertaining to development of the current build-out and then the re-deployment of construction crews to develop the portable radio enhancement sites and the design of completing the sites after the completion of the core system. Frequencies for the additional sites will be a challenge. The frequency planning process included 24 additional radio sites, one in each county seat and two in Lincoln County – Afton and Kemmerer. The current contract includes the development of 57 radio sites and not all of the sites have been identified at this time.

The Portable Radio Coverage Enhancement proposal is attached for reference.

Current WyoLink Additional Site Development:

On potential site is being looked at in Colorado on Pinkham Mountain. The landowner has been contacted and is willing to continue further dialog on developing the site. Power is being brought to the area. A microwave link through Jelm Mountain will be part of adding this potential site.

There is continuing work with developing sites on Forest Service properties on the western part of the State. WyDOT Right-of-Way is continuing efforts on leases and environmental issues with the federal agencies.

Another site in Albany County, Marshall, will be looked at after the build-out and optimization of the WyoLink sites in the area. This site might provide improved mobile radio coverage in Northern Albany County and into the Laramie Peak areas.

Other Business:

Mark Harshman raised an issue about pushing a system about the state without the completion of the pilot project. The pilot project needs to be completed and tested before moving forward with the core project, need to use the lessons learned in the pilot project to help the rest of the project. There is a concern on having enough frequencies to develop more sites that may be needed to enhance the project and grow with the state. Having already cut the sites to five channels indicates the problems with VHF frequency acquisition and may limit the abilities of the project.

Pat Byrne felt the issues pertaining to accepting members to the project (talkgroups, membership details, polices, etc.) and getting dispatch centers on line have not been thoroughly developed. The Laramie County area should be used as the guinea pigs and let the rest of the state learn from their experiences. We don't need to re-invent the wheel as the project is brought on-line across the state.

The Executive Committee has discussed these issues and they are a concern. Getting a dispatch center on the system is key to being able to fully test the capabilities of the system. The Laramie County Dispatch Center Grant agreement was finalized on January 26, 2006 and will be presented to Laramie County after this meeting. This will be the first grant and hopefully will provide the means to connect to WyoLink and start the process of really identifying the features and weaknesses.

The PSCC Interoperability Executive Committee met on January 19, 2006 and should have the WyoLink Handbook and Membership Agreement ready for the March PSCC meeting. The handbook and membership agreement provides the information on the development of the interoperability talkgroups and the county and local agency talkgroups. The PSCC rules were filed in January.

A concern was noted on having to have the local agencies having to re-program the radios multiple times. The talkgroup plan should be complete enough to limit the number of times that a radio needs to be programmed. The frequency licensing is another key element in providing all of the control channel frequencies available for the radio programming.

Pat Byrne felt that developing a set of goals and steps for getting local agencies on WyoLink. This would provide a map to what the process is. Provide a checklist for the other counties as they are preparing to become a member of WyoLink.

Discussion on the frequency plan. The frequency plan includes the 57 site plan for the core WyoLink project and 24 local sites.

The PSMC plan called for two procurements, one for the pilot phase and one for the build-out. During the negotiations with the contractor, this was changed to one procurement. There are contractual obligations that must be met or financial obligations will be realized. At the last PSCC meeting WyDOT asked for and received the blessing to have a contractor complete the Phase 4 civil construction and use the $2 million of equipment sales rebate toward that construction. We have a goal that has been chosen and we need to maintain the goal and work together we will reach that goal. There will be many challenges and we need to work together to overcome those challenges. The future is in our hands and me must remain positive to be able to achieve the goals.

Kim Lee made a motion to adjourn the meeting, Pat Byrne seconded the motion and the motion passed on a voice vote.

The meeting adjourned at 3:00 pm.

Respectfully Submitted,

Robert Symons
PSCC Administrative Support.