

MINUTES OF THE SUBCOMMITTEE ON ELECTED OFFICIALS AND HIGHWAYS  
February 15, 1983

VICE-CHAIRMAN HAROLD DOVER called the meeting to order at 7:34 p.m. in Room 104 of the Capitol. Present were REP. EARL LORY, SENATOR FRED VAN VALKENBURG, REP. MARY ELLEN CONNELLY, SENATOR THOMAS KEATING.

Vice-chairman Dover noted the committee would resume work it began on telecommunications by starting with Item No. 4 on the agenda. (Attached.)

John Neraas, administrator of the Communications Division of the Department of Administration, noted that at the earlier meeting, his agency presented an overview of land/mobile radio programs and also presented information from five other state groups: the Highway Patrol, the Board of Crime Control and the departments of Highways, State Lands and Military Affairs. Tonight, he said, the situation with the state telephone system would be discussed.

The 1981 Legislature approved a plan to replace the existing telephone system because of economic, technological and regulatory considerations. Neraas distributed to committee members copies of an address given by an official of Centel Business Systems, which is the bidder chosen by the state for the new telephone system. He said it "helps to underscore the major issue this legislative body was aware of two years ago." (Attached.)

As a result of the legislative action, he said, the Department of Administration undertook a feasibility study and retained a consulting firm. In May 1982, based on the study and recommendations by the firm, the state made a request for bids. The study projected a possible long-term savings of \$5.5 million. Neraas said the Department decided the state should undertake the major project. Centel got the award, presenting a good product line with equipment manufactured in the United States. He said the proposed project would have 10 separate switching locations: six in Helena, two in Missoula, one each in Bozeman and Billings for telephone system replacements. He said it is based on computer-controlled digital switching with features that would enhance management control, design and route selection. He said it would improve services to the state.

Plans include future new equipment at Great Falls, particularly at the School for the Deaf and Blind; the Deer Lodge valley institutions; Northern Montana College, and the more than 400 smaller offices around the state. The latter must be dealt with in a uniform and consistent fashion so they will mesh with the state system. The central issue in switch replacement is to ensure that the

systems are compatible. Technical issues are important as well as economic, he said.

Neraas addressed the outcome of the Department's planning sessions brought about by House Bill 827 in the 1981 Legislature. He said prior to that measure, frustration was common with the state's telephone system. Speaking to one point, he said it is not always reasonable to share all resources. Sometimes special frequencies and some other sorts of dedicated resources are necessary.

Neraas said servicing current equipment accounts for 42 percent of present spending and network costs account for 48 percent. Network charges include long-distance calling, data communications and land/mobile radio links.

Also, he said, projections were made based on non-economic factors about future use and needs of the system and the state.

Consultants on the project are Associated Engineers of Billings, which served as an independent consultant for the project. That firm brought expertise and an independent view to add to the situation. The firm prepared a report to assist the state in making a decision about the most cost-effective system. Neraas introduced Tim Johnston, of his office, to speak about the proposed transmission system.

Johnston said alternatives must be considered because of the regulatory environment and other reasons. Regarding the regulatory network, he described the current situation regarding the state system, commonly called the "hotline" system. (See diagram, attached.) What that system amounts to, he said, is nothing more than a paper system of billing to the state--called "Telpak"--that offers the state savings on long-distance communications. Savings are almost two-thirds in some cases. Telpak is not a set of circuits or equipment, but merely a method of billing by the telephone company.

Telpak has been grandfathered by the regulatory agencies, he said, which means it is not flexible. If the system is to be expanded, the Telpak rates would not apply. More expensive rates would apply. In short, he said, Telpak is being phased out. Mountain Bell has advised it will ask to be allowed to eliminate Telpak in 1983, effective in 1984.

Other considerations for looking at alternatives are economic considerations; the loss of Telpak will significantly

affect the state. Also Telpak rates themselves have gone up about 74 percent during the past five years. The most recent tariff took them up by 41 percent, he said. There is no cost-effective alternative. If Telpak is lost in 1984, the state telephone network will go from \$450,000 to \$560,000 a year. Even more startling is the effect on data transmission: The LETS network costs would increase about 180 percent. The cost to computer services would increase 185 percent.

The consulting firm recommended as the most feasible alternative the proposed microwave system. Johnston said it would serve many more communities and offer 27 data and voice points. It would also increase control of costs because it would go from one to five switching centers. It would have enhanced electronic mail capabilities and improved data speeds and transmission quality.

As an overview, he said, the proposed transmission system would be tripartite: land/mobile radio, telephonic and data communications. It is important to note that the five switching centers would be an improvement because at present the state has one big switching center in Helena. A call from Miles City, for instance, goes to Helena to be switched (tying up one line) to Billings, and goes out again (tying up another line). But with regional switching, much redundancy would be eliminated.

Other advantages are that the system would cover 75 percent of the LETS network at present, meaning the costs for LETS could be reduced. Another 30 percent of the toll calls and intrastate WATS charges could be eliminated, he said. When the state loses Telpak rates, it is estimated \$30-\$40 million would be saved during the projected 15-year life of the microwave system.

Responding to a question by SENATOR KEATING, Johnston said the projected growth in state needs was based on a 10 percent figure that was derived from a review of recent history.

REP. LORY asked about the cost of maintenance. Johnston said that was figured at about four percent of the system price, after considering the 12-month warranty.

Answering the question by Vice-chairman Dover, Johnston said the cost estimates include the costs of land acquisition. He also said land acquisitions were planned with an eye to making the most efficient use of existing facilities and installations.

The plan calls for a total of 37 sites, he said, but the plan also calls for using existing sites where possible.

Rep. Lory asked about construction time factors, and Johnston said he has been told about 18 months would be needed from time of contract-signing to completion of installation. Rep. Lory noted that Telpak may soon expire, and Johnston said that as a result, one thing that might be done is ask the Public Service Commission to require Mountain Bell to maintain Telpak until the system is functional. He said it would take about one year to get to the point of signing contracts, assuming the Department got going in Spring of 1983.

Responding to a question by Rep. Lory, Johnston said the 26-mile distance repeaters is about the maximum. Calling on one of the consulting engineers (named "Gary"), Rep. Lory was told the 26-mile distance was a "comfortable, conservative distance." The engineer said the design calls for 384 channels on the microwave. Johnston told Vice-chairman Dover the bid letting would be done after the sites are obtained. Vice-chairman Dover asked who would provide maintenance, and Neraas said it would be provided by the bidder.

Vice-chairman Dover asked what kind of budgeting program the Department has developed, and Neraas said the Department takes no position as to the options available to the Legislature. He said the Department is not committed to any particular sites or systems. Vice-chairman Dover told Neraas, however, that "if you want funding, we've got to know how much it's going to cost, what's your financial program, how you're going to go about it. Or we can wait around for two more years." Neraas said the Department has developed a financial plan.

SENATOR FRED VAN VALKENBURG asked what the effect on "everyone else's telephone rates" will be if the state goes to this proposed system. Johnston said he didn't see much correlation. In the switching process, for instance, the state pulled out of Mountain Bell and rates went up for the state. He said possible effects on other non-state users were not considered as part of this study. Sen. Van Valkenburg said it "seems obvious that increased costs there weigh against the savings to the state." Neraas said it is difficult to quantify that kind of result. He said the Department is not in a position to do so.

Rep. Lory observed that if the 1983 session does not act

on this proposal, because of the time factors, it would be 1988 before any new system would be functional.

Vice-chairman Dover asked if there were a private firm available to provide these services to the state. Johnston said the Department had searched for a cheaper alternative, and the proposed system is but one alternative, presented by the department as the best.

Rep. Lory asked if fiber-optics technology is practical, and Johnston said it was--and would be used--in short-haul uses.

Neraas said the AT&T divestiture issues have moved pricing structures to meet actual costs. As a result, pricing structures will change rapidly and the state must respond. He said the Department of Institutions does not propose or plan to control the various state systems, but is concerned about the available systems.

Vice-chairman Dover told Neraas that "What we are really interested in right now--we've left the budget open on the Highway Patrol, the Highway Department's going to be coming down this next week, the LENS has been left open, and we're waiting for you to get these figures coordinated and put together as to what will make the best system. If you'll look at that letter from Senator Himsl, that's exactly what it directed; that your department coordinate and get this put together for us so we can either plug it in separately to these departments under the general budget or get it put together in long-range. But we need that right away. That's what we're really waiting for and we still don't have a figure here tonight to put that thing together." Neraas said the department has put together some preliminary figures.

Sen. Van Valkenburg asked Col. Landon of the Highway Patrol how the central dispatch plan of the Highway Patrol for all enforcement can work. The Senator said he did not know how it would work. Landon said the system worked in Wyoming and North Dakota. He said without centralized dispatch, all there is is decentralized dispatch. The problem with that is that there are a number of people working 24 hours a day providing localized dispatch. By centralized dispatch, the number of Full-Time Equivalents is saved. A smaller number of employees would do the work.

Sen. Van Valkenburg said almost every sheriff in the state will have a 24-hour dispatch, and how would centralized dispatch save? Landon said a savings was made in Wyoming and

North Dakota. Sen. Van Valkenburg asked how the savings was made in those states. Landon said that in Wyoming the sheriffs have their own frequencies and they work within their own counties and they are an entity in themselves. In North Dakota, the sheriff's offices work out of central dispatch in Bismarck. They also have frequencies on which they work independently. The savings is in the number of people employed.

Sen. Van Valkenburg said that would make sense if you were going to reduce the number of people involved, but as the plan is, the people now doing the dispatch would stay around. He said he did not understand how the savings would be effected. Landon said it would not be advisable to do away with the sheriffs. Sen. Van Valkenburg said he knew that, but he was interested in how a savings would be made in the sheriff's dispatch function. "That's still going to exist after we go with a central dispatch for the Highway Patrol," he said. "I don't see the savings you're talking about. You're saying there's going to be a savings by going to a centralized dispatch. Where is the savings?" Sen. Van Valkenburg said that earlier Landon had said that in one place--Missoula--the Highway Patrol was paying for dispatch service, but that was the only place. "I see a \$15,000 savings there," he said. "Where's the savings elsewhere?"

Landon said there are other counties that have asked to be paid for dispatch, "but we haven't been able to pay them because we don't have the money." He said the counties are unhappy to be providing dispatch services for free. "I don't know if you would consider a savings of potential debt or not," he said, "but the savings of central dispatch is in the savings of FTE's. There will be no savings in the sheriffs' offices. The sheriffs need and always should have their own communications system."

Sen. Van Valkenburg asked how practical a Helena dispatcher could be to a situation somewhere else in the state. Landon said the method has proven workable in other states because dispatchers learn regions with experience. He said he envisions five dispatchers would be working at a time once the system was up to speed.

Vice-chairman Dover asked if Landon foresees the use of common frequencies plus local ones? Landon agreed.

Vice-chairman Dover turned the discussion to the budget handout distributed by Neraas. (Attached.)

Neraas said that in the \$7.2 million entry for "Telephone

Switch Replacement" it is the "Big Four Project," change-over of the Eastern Montana College, Montana State, University of Montana and Helena Capitol Complex. He said it is now under option No. 3, an operating lease, which was written with the option to make a change in the option if needed. The land/mobile item for \$3.1 million is the price to convert state agencies.

REP. FRANCIS BARDANOUVE asked what method was being used to pay off the general obligation debt for the land/mobile radio program. Neraas said the debt was structured to use the biennial appropriations to pay the yearly service on the debt, while one appropriation was needed up front to make the capital investment.

Rep. Lory asked if consideration had been given to using a 10-year figure rather than 15 years. Neraas said the 15-year plan was made in order to match the annual appropriation level to the payments.

Sen. Van Valkenburg asked if there was any duplication of the various proposals for radio services among the law enforcement and military affairs offices. Neraas said there were two considerations: that separate frequencies were needed for the various offices, but at times common frequencies were needed as well. Sen. Van Valkenburg asked if each needed repeaters and base stations and towers, or can the various agencies share? Neraas said the Department proposes that it oversee utilization of facilities.

Vice-chairman Dover told Neraas that "You are the people who are going to put this thing together so we haven't got everybody doing their thing and you can come back and tell us, 'Well, now we've got these systems put together and see how much you can get done.' We've got to put a figure and money is tight and we've got to get the most for the buck and we're looking to you for it. Maybe what you need to do in the next week or two is do some real fast work and fine-tune this radio thing. We've got to have figures."

Les Graham of the Department of Livestock said a centralized dispatch would help in the counties where officers are working alone without radio contact or where there is not 24-hour dispatch locally.

Gil Gilbertson, Director of the Office of Disaster and Emergency Services, said the distinction should be made between a high-band system and a high-frequency system. Sen. Van Valkenburg asked if federal law required the high-frequency system. "No, it doesn't, but the system allowed

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the agency to piggyback on military frequencies and also mutual aid frequencies would be available."

Vice-Chairman Dover declared the meeting adjourned at 9:23 p.m.



SEN. HAROLD DOVER, Vice-Chairman



STATE OF MONTANA  
TELECOMMUNICATIONS PRESENTATION 1983

AGENDA

1. Introduction: Morris L. Brusett, Director  
Department of Administration
  
2. Overview of Land/Mobile  
Radio Program Hiram Shaw, Telecommunications  
Development Bureau  
Department of Administration
  
3. Agency Presentations
  - A. Montana Highway Patrol
  - B. Department of Highways
  - C. Department of State Lands
  - D. Department of Military Affairs
  - E. Board of Crime Control
  
4. Telephone System Replacement John Neraas, Administrator  
Department of Administration  
Communications Division
  
5. Alternate Transmission Systems Tim Johnston, Telecommunications  
Development Bureau  
Department of Administration
  
6. Subcommittee Discussion

BUSINESS TELECOMMUNICATIONS OF THE FUTURE

NATIONAL ASSOCIATION OF STATE TELECOMMUNICATIONS DIRECTORS  
OKLAHOMA CITY, OKLAHOMA

SEPTEMBER 15, 1982

PRESENTED BY: CAPTAIN JAMES LOVELL  
CENTEL BUSINESS SYSTEMS

IT IS A PLEASURE FOR ME TO BE INVITED TO SPEAK BEFORE THE NATIONAL ASSOCIATION OF STATE TELECOMMUNICATIONS DIRECTORS HERE IN OKLOHOMA CITY.

ABOUT ONE HUNDRED AND SIX YEARS AGO, ALEXANDER GRAHAM BELL SAID "DR. WATSON, COME HERE - I WANT YOU" AND THE TELEPHONE WAS BORN.

THIRTEEN YEARS AGO - A YEAR AFTER TOM CARTER GOT HIS DECISION FROM THE FCC, NEIL ARMSTRONG SAID "THE EAGLE HAS LANDED". SHORTLY AFTERWARD THE PRESIDENT OF THE UNITED STATES PERSONALLY CONGRATULATED THOSE PIONEERS ON THE MOON --HOW? BY PICKING UP THE TELEPHONE IN THE OVAL OFFICE.

IN HIS WILDEST DREAMS, ALEXANDER GRAHAM BELL COULD SCARCELY HAVE IMAGINED THAT HIS SIMPLE DEVICE ONE DAY WOULD BE USED TO TALK TO MEN ON THE MOON.

AND NEVER IN A MILLION YEARS WOULD HE HAVE GUESSED THAT THE TECHNOLOGY DEVELOPED IN PUTTING MAN INTO SPACE WOULD BE APPLIED TO IMPROVING THE TELEPHONE ITSELF.

WELL, HOW FAR WILL TECHNOLOGY TAKE TELECOMMUNICATIONS? I DOUBT IF WE CAN PREDICT ALL THE WAYS WE WILL BE USING THE TELEPHONE 20 YEARS FROM NOW -- JUST AS IT WAS FOR MR. BELL TO FORECAST THE FUTURE.

IT IS GENERALLY AGREED HOWEVER, THAT WHAT WE ARE WITNESSING IS AN EVOLUTION IN THE COMMUNICATIONS INDUSTRY.

THE EVOLUTION WILL NOT BE INSTANTANEOUS -- IN THAT ONE DAY WE WILL WALK INTO OUR OFFICE AND FIND IT SUDDENLY CHANGED WITH MOST OF THE PEOPLE REPLACED BY STRANGE, EXOTIC NEW ELECTRONIC DEVICES. THAT HARDWARE WILL COME ON THE SCENE -- BUT IT WILL COME OVER A PERIOD OF TIME, AND WE WILL HAVE A CHANCE TO GET USE TO IT.

AFTER BEING IN A PROGRAM THAT INCLUDED TWO FLIGHTS TO THE MOON YOU MIGHT THINK IT WOULD BE DIFFICULT FOR ME TO FIND AN INTERESTING SECOND CAREER. HOWEVER, BEING IN THE TELECOMMUNICATIONS INDUSTRY AT THIS TIME IS ABOUT THE CLOSEST THING TO A BLAST OFF I CAN THINK OF. CONTINUAL CHANGES IN TECHNOLOGY, COMPETITION, LEGISLATIVE AND REGULATORY ACTION INSURES EXCITING TIME AHEAD.

IT SEEMS TO ME THAT THERE ARE FOUR MAJOR FORCES INFLUENCING THE DIRECTION OF OUR JOURNEY INTO THE FUTURE OF BUSINESS COMMUNICATIONS. THE FIRST OF THESE IS FREE ENTERPRISE COMPETITION. THIS CONCEPT IS THE BUSINESS FOUNDATION THAT HAS BROUGHT THE UNITED STATES TO WHERE WE ARE TODAY -- AND, LETS FACE IT, COMPETITION IS HERE TO STAY IN THE TELEPHONE BUSINESS.

THE PROGRESS WE WILL SEE WILL COME FROM MANY DIFFERENT COMPANIES, ALL COMPETING WITH ONE ANOTHER TO DEVELOP SOMETHING BETTER AT LOWER COSTS. THAT IS HOW WE GOT TO THE MOON -- AND AFTER MAKING TWO APOLLO FLIGHTS, I AM CONVINCED THE SPACE PROGRAM WAS A TRIUMPH FOR THE FREE ENTERPRISE SYSTEM. OF COURSE, THE INDUSTRIAL GIANTS CONTROLLED THE MAJOR SHARE. BUT THE SMALLER COMPANIES PROVIDED MANY OF THE BREAK-THROUGHS TO GET ME INTO SPACE AND BACK TO EARTH SAFELY. THIS ENTREPRENEURIAL SPIRIT WAS THE CATALYST NECESSARY TO GET US OFF THE LAUNCH PAD.

ENGINEERING ADVANCES FROM THE SPACE PROGRAM BEGAN TO FILTER DOWN TO THE PRIVATE SECTOR ABOUT THE SAME TIME THE CARTERPHONE DECISION OPENED UP THE TELEPHONE INDUSTRY TO COMPETITION. PRIVATE MANUFACTURERS STARTED APPLYING SPACE TECHNOLOGY --ESPECIALLY COMPUTER TECHNOLOGY -- TO COMMUNICATIONS RESULTING IN A WHOLE NEW GENERATION OF TELEPHONE EQUIPMENT.

TODAY MORE THAN A THOUSAND AMERICAN COMPANIES ARE SUPPLYING PRIVATE TELEPHONE SYSTEMS FOR BUSINESS, INDUSTRY AND INSTITUTIONS - AND MANY STATE GOVERNMENTS. 1982 REVENUES WILL BE WELL OVER A BILLION DOLLARS.

HOWEVER, THE TELECOMMUNICATIONS INDUSTRY WOULD BE WELL ADVISED TO REMEMBER THAT ALTHOUGH TECHNOLOGY MAY BE THE GLAMOROUS PART OF THE INDUSTRY, --- COMPETENT, PROFESSIONAL SERVICE IS THE REAL NAME OF THE GAME.

THE WINNERS IN THE BUSINESS COMMUNICATIONS MARKET PLACE WILL BE THOSE COMPANIES - BOTH LARGE AND SMALL, REGULATED AND UNREGULATED -- WHICH DO THE BEST JOB OF DEMONSTRATING GENUINE DEDICATION TO MEETING THE NEEDS OF THEIR CLIENTS -- INCLUDING SERVICE AFTER THE SALE.

THE SECOND THRUST OF TOMORROW'S BUSINESS COMMUNICATIONS IS CONSOLIDATION. AS COMPETITION GAINS INCREASING ACCEPTANCE - AND AS TECHNOLOGY CONTINUES ITS RAPID ADVANCES - AND AS THE BUSINESS COMMUNICATIONS MARKET GETS WIDER, AND DEEPER, AND BROADER - MORE AND MORE COMPANIES ARE GETTING INTO THE ACT.

THE STAKES ARE HUGE -- TELECOMMUNICATIONS WILL BE A 300-BILLION-DOLLAR MARKET BY 1990. AND THIS MARKET WILL INCLUDE BOTH THE COMMUNICATIONS AND INFORMATION PROCESSING INDUSTRIES, WHICH ARE NOT ONLY GROWING CLOSER TOGETHER, BUT ARE MERGING.

WE ARE SEEING MERGERS AND ACQUISITION BY SOME OF AMERICA'S LARGEST CORPORATIONS. AT&T AND NORTHERN TELECOM ARE GETTING INTO THE DATA BUSINESS, WHILE IBM AND XEROX NOW ARE DEEP INTO COMMUNICATIONS.

WE ARE SEEING INDEPENDENT TELEPHONE COMPANIES DIVERSIFYING FROM THEIR FORMER ROLES AS STRICTLY OPERATING COMPANIES TO EXPANSION INTO ALL SORTS OF THINGS -- DATA PROCESSING, CABLE TV, SATELLITE TRANSMISSION.

SUCCESSFUL INTERCONNECT COMPANIES ARE BEING ACQUIRED BY EVEN LARGER COMMUNICATIONS FIRMS. THAT ENABLES THE PARENT COMPANIES TO EXPAND RAPIDLY INTO THIS FAST-GROWING FIELD. AND IT GIVES THE INTERCONNECT COMPANIES MORE FINANCIAL AND TECHNICAL RESOURCES TO GET LARGER SHARES OF THEIR MARKETS.

LET ME GIVE YOU A SPECIFIC EXAMPLES OF HOW THIS WORKED WITH AN INTERCONNECT COMPANY CALLED -- FISK TELEPHONE SYSTEMS.

FISK WAS FORMED IN 1971 WITH A DREAM AND ABOUT A HALF-MILLION DOLLARS. A LOT OF PEOPLE PREDICTED THEN THAT IT WOULD NOT TURN A PROFIT UNTIL IT HAD ABOUT FIVE YEARS OF OPERATION UNDER ITS BELT. WHAT ACTUALLY HAPPENED WAS THAT THE FIRST PROFITABLE YEAR OCCURRED IN 1974, AND IT HAS BEEN IN THE BLACK EVER SINCE. AT THE END OF 1976 GROSS SALES WERE ABOUT 6 MILLION DOLLARS...THAT GREW TO MORE THAN 33 MILLION DOLLARS AT THE END OF 1979.

MEANWHILE, THE COMPANY EXPANDED FROM TWO ORIGINAL OFFICES IN TEXAS TO MORE THAN A DOZEN FULL-SERVICE OFFICES IN SIX SOUTHWESTERN STATES, AND FISK FOUND ITSELF LARGER THAN 94% OF ALL THE INDEPENDENT TELEPHONE COMPANIES IN THE ENTIRE COUNTRY.

HOWEVER, FISK COULD NOT CONTINUE THAT KIND OF GROWTH YEAR AFTER YEAR WITH ITS PRESENT RESOURCES. IT LOOKED FOR A PARTNER AND FOUND ONE. CENTRAL TELEPHONE AND UTILITIES -- NOW KNOWN AS CENTEL CORPORATION: IT IS THE FIFTH LARGEST TELEPHONE COMPANY IN THE NATION SERVING 1.8 CUSTOMERS IN 11 STATES. IT ALSO OWNS AND OPERATES ELECTRIC UTILITIES AND IS ONE OF THOSE DIVERSIFYING INDEPENDENT I JUST MENTIONED.

AS A MATTER OF FACT, CENTEL IS INTO ALL SORTS OF INTERESTING THINGS. IT OPERATES CABLE TV AND MASTER ANTENNA SYSTEMS -- IT MANUFACTURES TELEPHONE BOOTHS AND DATA PROCESSING TEST EQUIPMENT.

THE CHEMISTRY BETWEEN FISK AND CENTEL WAS GOOD -- THEY HAD THE SAME KINDS OF STANDARDS AND VALUES --AND I AM HAPPY TO SAY THE ACQUISITION HAS BEEN WELL RECEIVED ON BOTH SIDES. NOW FISK PROVIDES ENTRY FOR CENTEL INTO THE ECONOMICALLY STRONG SOUTHWEST. AND FOR FISK, THE NEW PARTNERSHIP MEANS A BROADENING OF ITS PARTICIPATION IN THE COMMUNICATIONS INDUSTRY, AND THE RESOURCES TO EXPAND MORE RAPIDLY WITHIN ITS MARKET -- AND PERHAPS BEYOND.

THE THIRD DYNAMIC FACTOR MOVING US TOWARD TOMORROW'S BUSINESS COMMUNICATIONS IS A VERY OBVIOUS ONE: TECHNOLOGY. AND WHAT FANTASTIC CHANGES WE HAVE ALREADY SEEN.

THE TRANSISTOR WAS FIRST DEMONSTRATED IN 1948 --TODAY, ENGINEERS ARE WORKING ON PUTTING ONE MILLION TRANSISTORS ON A SINGLE CHIP BY THE MID-1980'S.

IN THE 1950'S COMPUTERS USED TO TAKE UP AN ENTIRE ROOM -- NOW WE CARRY THEM AROUND IN OUR POCKETS.

WE HAVE COMPUTERS THAT CAN DRAW PICTURES ON TELEVISION SCREEN.

IN GREAT BRITAIN, A VIDEOTEXT SYSTEM IS IN FULL SERVICE. SUBSCRIBERS IN HOME AND OFFICES MERELY PUNCH A FEW BUTTONS ON KEY PADS TO GET THEIR CHOICE OF 250,000 PAGES OF INFORMATION STORED IN A COMPUTER AND DISPLAYED ON THEIR TV SETS.

AND, OF COURSE, THERE IS THE COMPUTERIZED PBX, WHICH HAS BROUGHT NEW EFFICIENCIES AND MANAGEMENT CONTROLS TO COMPANIES AND INSTITUTIONS OF ALL KINDS.

BUT WE ARE STILL ONLY ON THE EDGE OF TOMORROW'S TECHNOLOGY. WHAT IS AHEAD? MORE AND MORE MINIATURIZATION FOR ONE THING. SEMICONDUCTORS WILL CONTINUE TO GET SMALLER, CHEAPER, MORE RELIABLE AND EASIER TO USE.

FIBER OPTICS WILL GIVE US MORE EFFICIENT CHANNELS FOR DATA, FACSIMILE, VOICE AND VIDEO TRANSMISSIONS. OPTIC NETWORKS ARE ALREADY IN PLACE AT THE LIBRARY OF CONGRESS - AND AT CAPE CANAVERAL.

COMPUTER MEMORY WILL BE GREATLY INCREASED THROUGH BUBBLE TECHNOLOGY. IBM HAS ALREADY ANNOUNCED A TECHNIQUE FOR STORING UP TO 22 MILLION BUBBLES PER SQUARE INCH.

AND...

THE NEXT GIANT STEP IN COMPUTER TECHNOLOGY WILL BE IN SUPER-CONDUCTORS. THE SPEED WITH WHICH TRANSISTORS CAN SWITCH FROM "ON" TO "OFF" OR BACK AGAIN HAS INCREASED NEARLY ONE BILLION TIMES SINCE THEY WERE FIRST INTRODUCED. NOW, CIRCUITS DESIGNERS THINK THEY CAN PRODUCE COMPUTERS BASED ON SUPER-CONDUCTORS THAT WILL PERFORM 100 TIME BETTER THAN THE BEST TRANSISTOR-TYPE PROCESSOR.

THAT, OF COURSE, IS JUST A GLIMPSE AT SOME OF THE THINGS WE KNOW NOW. JUST IMAGINE WHAT A LOOK AT FUTURE TECHNOLOGY WILL BE LIKE 10 OR 20 YEARS FROM NOW.

WE HAVE REVIEWED COMPETITION -- CONSOLIDATION --AND TECHNOLOGY. THERE IS ONE FINAL TREND IN PUTTING THIS ALL TOGETHER IN THE OFFICE OF THE FUTURE. IT IS THE INTEGRATION OF COMMUNICATIONS TO MEET THE NEEDS OF BUSINESS MANAGEMENT. THIS FACTOR IS EVERY BIT AS SIGNIFICANT AND EXCITING AS TOMORROW'S TECHNOLOGY.

WHEN YOU STOP AND THINK ABOUT IT, IT IS EVIDENT THAT OUR OFFICES HAVE NOT CHANGED MUCH IN THE PAST 50 YEARS. WE HAVE HAD A TELEPHONE HERE - A TYPEWRITER THERE - A FILING CABINET OVER BY THE WALL - AND A COPY MACHINE IN THE CORNER. THERE WAS PERHAPS A TELETYPE MACHINE OVER NEXT TO THE COFFEE POT - AND UP HERE, A THERMOSTAT TO CONTROL THE HEAT. FOR SECURITY, WE LOCKED THE DOORS AND MAYBE HAD A BUILDING GUARD.

ALL OF THESE COMPONENTS HAVE BEEN USED FOR CLERICAL AND SECRETARIAL FUNCTIONS. HOW OFTEN DID THE BOSS ACTUALLY GO IN THE FILE OR WORK THE MIMEOGRAPH MACHINE OR THE XEROX COPIER?

BUT LOOK WHAT HAS HAPPENED TO US IN THE LAST 50 YEARS. WE HAVE CHANGED FROM AN INDUSTRIALIZED NATION TO AN INFORMATION NATION. OUR ECONOMY IS BASED MORE ON THE DISPERSAL OF KNOWLEDGE THAN THE PRODUCTION OF TANGIBLE PRODUCTS. TODAY ABOUT 60 PERCENT OF OUR WORK FORCE IS INVOLVED IN INFORMATION. AND WE ARE PRODUCING IT AT SUCH A TREMENDOUS RATE THAT WE SIMPLY CAN NOT KEEP UP WITH IT ALL. WE CREATE 30 BILLION ORIGINAL DOCUMENTS EVERY YEAR. WE FLOOD THE POSTAL SERVICE WITH OVER 630 BILLION PAGES OF MAIL EVERY YEAR.

THIS IS MAKING IT HARDER FOR EXECUTIVES TO DO THEIR JOBS. WE ARE FLOODED WITH PAPER. I PROBABLY USE AN EXPRESSION HALF-DOZEN TIMES EVERY DAY WHICH IS FAMILIAR TO ALL OF YOU. I LOOK AT MY CLUTTERED DESK, MY CREDENZA, AND MY "IN" AND "OUT" BOXES AND I SAY ... "IT'S AROUND HERE SOMEPLACE".



THE NEED IS FOR EXECUTIVE TO GET EXACTLY THE INFORMATION THEY REQUIRE - AND GET IT FASTER - TO MAKE BETTER DECISIONS, AND MAKE THEM SOONER - TO INCREASE WORKER PRODUCTIVITY -- TO CONSERVE ENERGY - TO REDUCE PAPERWORK -AND TO CONTROL COMMUNICATIONS COSTS.

THE SOLUTION IS THE INTEGRATED OFFICE, WITH WORD AND DATA PROCESSORS - AND TELEPHONES - AND ELECTRONIC FILES -AND ELECTRONIC MAIL - AND FACSIMILE NETWORKS - AND VIDEO CONFERENCES NETWORKS - AND ENERGY CONTROL - AND ELECTRONIC SURVEILLANCE - ALL HOOKED INTO ONE CENTRAL COMPUTER.

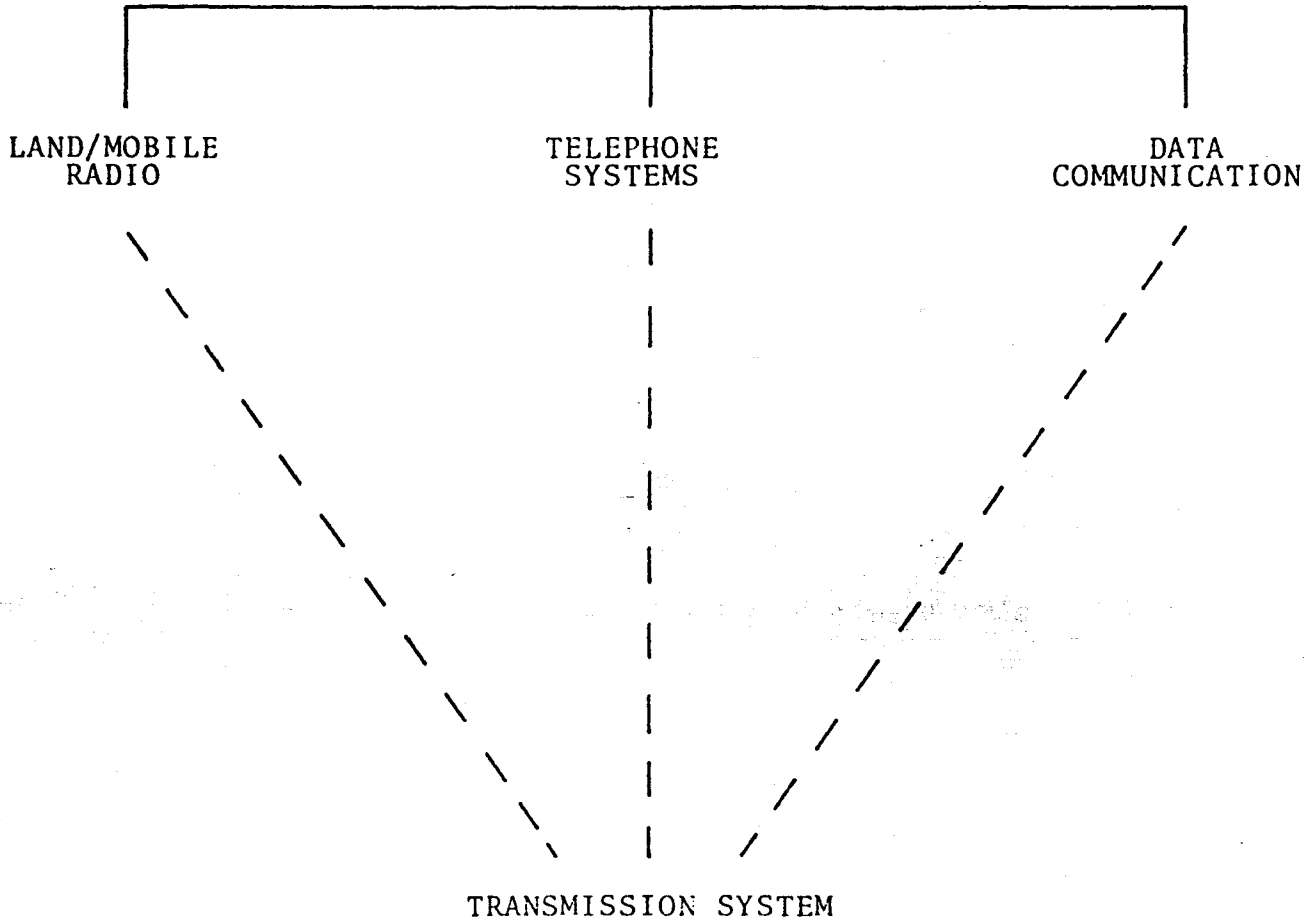
BUT, NOTE THIS. THE BIGGEST CHANGE IS THAT THIS SYSTEM WON'T BE A CLERICAL FUNCTION. IT WILL BE A MANAGEMENT FUNCTION. IT WILL BE USED BY EVERYBODY FROM THE CHIEF EXECUTIVE OFFICER ON DOWN. AND IT WILL BE TUNED TO MEET THE NEEDS OF MANAGEMENT FOR FASTER REACTION WITH BETTER DECISIONS AT LOWER COSTS.

THE FIRST GENERATION OF ELECTRONIC COMPONENTS TO SORT, FILE, RETRIEVE AND TRANSMIT INFORMATION IS HERE. AND HUNDREDS OF COMPUTERIZED DATA BANKS ARE ON THE MARKET - COVERING EVERYTHING FROM WEATHER INFORMATION TO FOREIGN TRADE DATA TO DEMOGRAPHIC STATISTICS. SO IT IS NOT SURPRISING THAT SOME COMPANIES HAVE ALREADY BEGUN TO PHASE INTO THIS TOTALLY NEW KIND OF OFFICE OPERATION.

FINALLY, WHILE PEOPLE WILL BE COMMUNICATING MORE - AND BETTER - THEY WILL BE TRAVELING LESS. WE ALL KNOW THAT THE SUPPLY OF ENERGY WILL CONTINUE TO SHRINK - AND THE COST WILL CONTINUE TO RISE. SO VIDEO TELECONFERENCING AS A SUBSTITUTE FOR REGIONAL AND NATIONAL MEETINGS WILL GROW DURING THE 1980'S - AND EVEN MORE DURING THE '90'S. THAT IS ANOTHER IDEA WHOSE TIME IS NOT AROUND THE CORNER - IT IS HERE RIGHT NOW.

THE NEXT STEP MAY WELL BE LESS LOCAL TRAVEL, TOO. BUSINESS PEOPLE WILL HAVE VIDEO TERMINALS IN THEIR HOMES AS WELL AS THEIR OFFICES. THAT MEANS THAT A LOT OF SALESMEN WILL BE ABLE TO MAKE THEIR CALLS ELECTRONICALLY - TALKING FROM THEIR HOMES TO BUSINESSMEN IN THEIR OFFICES. AND INSTEAD OF OPENING BRIEFCASES TO MAKE THEIR PRESENTATIONS, SALESMEN WILL BE ABLE TO CALL UP DISPLAYS ON THEIR PROSPECT'S VIDEO SCREENS.

TELECOMMUNICATIONS



STATE OF MONTANA

TELECOMMUNICATIONS PRESENTATION

1983

STATE OF MONTANA  
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1983

OUTLINE: Telecommunications Transmission System

I. Issues

A. Regulatory

1. Definition of TELPAK tariff
2. Present TELPAK "grandfathered"
3. Proposed elimination of TELPAK
  - a. Letter from Bell
  - b. Other states
    - grandfathered in Wyoming & Idaho
    - to be eliminated this year in Colorado, N. Mexico and Oregon

B. Economic

1. TELPAK rates have increased 74% over last 5 years
2. No cost-effective alternative at this time
3. Examples of impact of elimination of TELPAK
  - a. LETS costs
  - b. CSD costs

II. Alternative Transmission System

A. Associated P & C Engineers' feasibility study

1. Analysis done by A.E.
2. Conclusion arrived at by A.E.
  - a. Additional communities
  - b. Increased cost and system configuration control
  - c. Enhanced electronic mail capabilities
  - d. Data speed and quality should be greatly improved

B. How transmission system addresses user needs

1. Land/Mobile radio
  - a. Control links
  - b. Central dispatch
2. Data communication
  - a. LETS (75% of the network)
  - b. CSD (90% of the network)
    1. Increased data speeds
    2. Should improve quality
3. Telephone systems
  - a. Increased cost control
  - b. Coupled with regional switching concept allows more efficient and cost-effective use of the voice network

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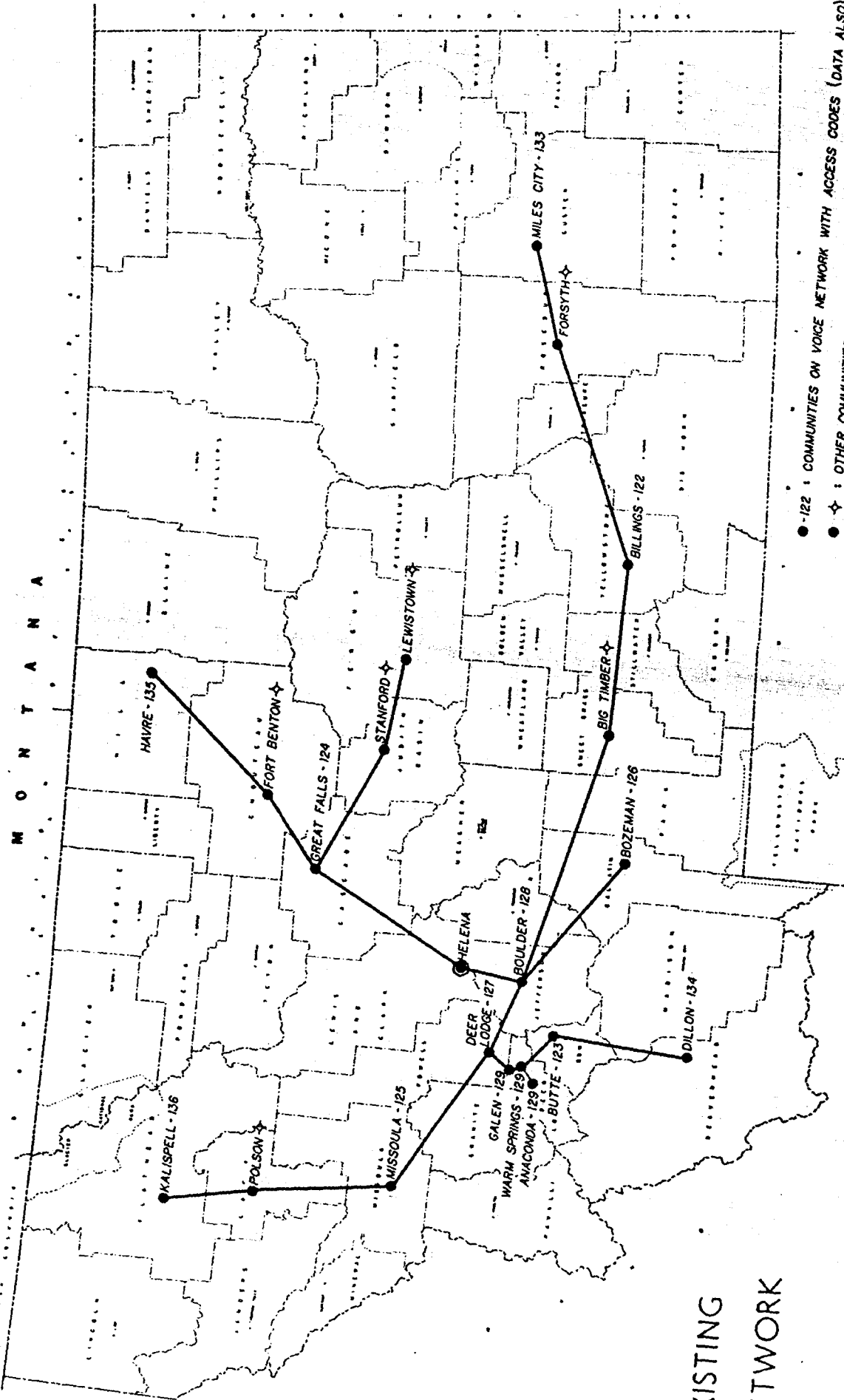
C. Projected savings

1. Assumptions

- a. 10% rate increases annually
- b. 15-year useful life of equipment
- c. G.O. bonds are 15-year issue
- d. Maintenance based on current switch replacement project

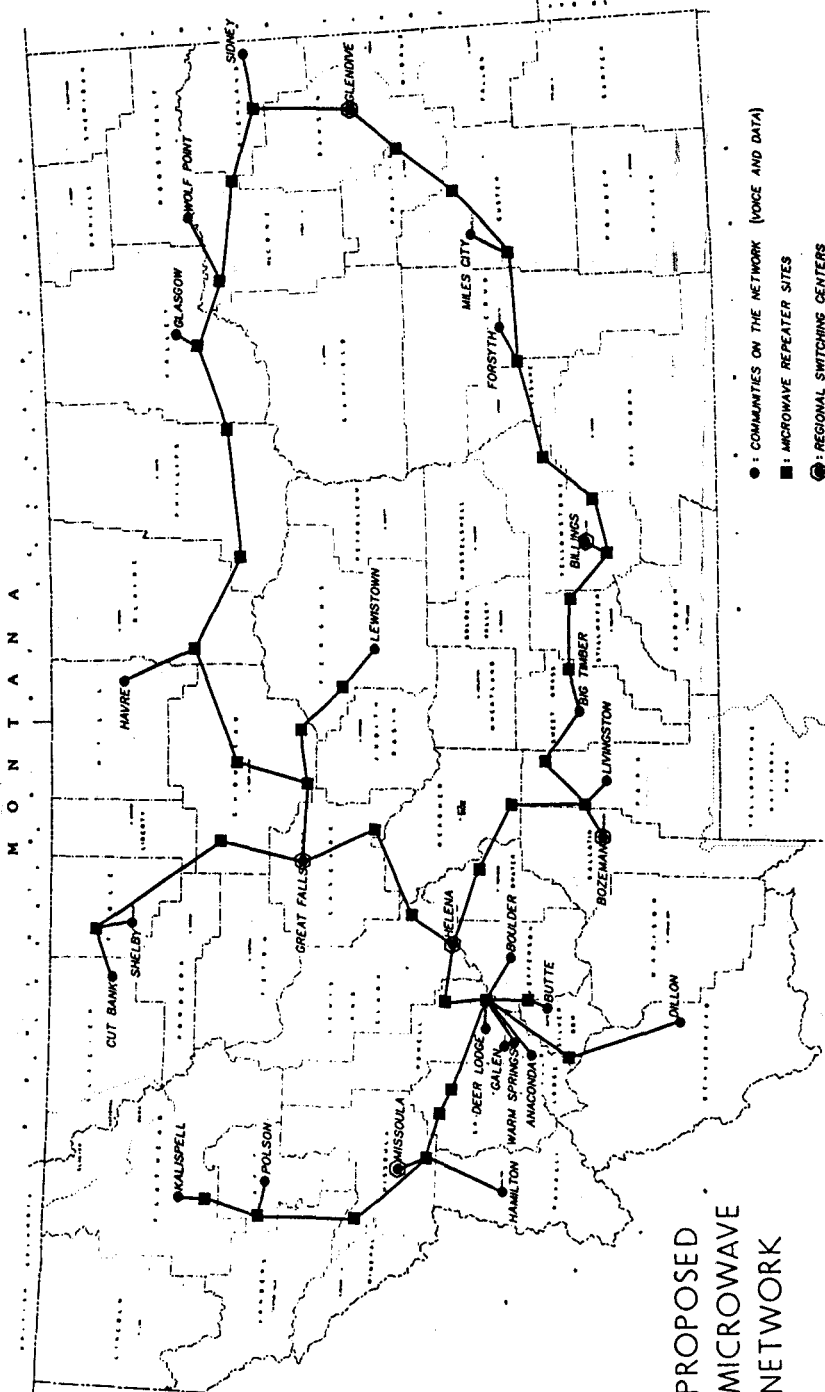
2. Total amount between \$35 and \$39 million

M O N T A N A



EXISTING NETWORK

- -122 : COMMUNITIES ON VOICE NETWORK WITH ACCESS CODES (DATA ALSO)
- ⊗ : OTHER COMMUNITIES ON NETWORK (DATA ONLY)
- ⊗ : CENTRAL SWITCHING LOCATION
- : TELPAK CHANNEL ROUTES



**PROPOSED  
MICROWAVE  
NETWORK**

- : COMMUNITIES ON THE NETWORK (VOICE AND DATA)
- : MICROWAVE REPEATER SITES
- ⊙ : REGIONAL SWITCHING CENTERS
- MICROWAVE PATH