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National Institute of Justice
United States Department of Justice
Washington, D. C. 20531

3/8/83
COMMUNICATIONS STUDY - TASK 790085

by

Bernard A. Kallner

for

Dakota County Law Enforcement Association

February - 1979

A. INTRODUCTION

In 1977 a study by Ralph Wight proved the feasibility of consolidating the Dakota County communications into a single serving agency. Since that study, a County Government Center has been built.

The Dakota County Law Enforcement Association asked for technical assistance from the Associated Public Safety Communications Officers, Inc. (APCO) to consider the recommended consolidation of services into the new county facility. This report is submitted in response to the request.
B. PROBLEM STATEMENT

The task assigned was to determine the current status of consolidation and provide advisory recommendations towards completion of this consolidation.

1. Agencies

Within Dakota County it appears there are 14 active law enforcement agencies in operation. For communications, eight different frequencies are employed. In some cases two or more police departments share a frequency. Some municipalities use a single channel for police, fire, and/or other municipal agencies and are licensed in the local government radio service. Most are police only systems, however, and licensed in the police radio service.

Within the county there are ten separate police dispatching facilities, including the Sheriff’s facility. Six are in operation 24 hours a day, while four are part-time operations and depend upon the Sheriff’s facility for dispatch during the remainder of the day. The part-time facilities counted for purposes of this task were those manned at least eight hours a day. Not included were base stations only occasionally operated on an unscheduled basis as need arises.

The Sheriff’s radio channel (the Sheriff’s radio system employs a two-frequency mobile relay operation; however, for purposes of this task it shall be referred to as a “channel”) is installed in virtually all law enforcement radios within the county. For some agencies, including the Sheriff’s department, this channel is the primary dispatch channel. Other agencies consider this channel secondary, and use it where coordination with the Sheriff or other departments is needed.

Those agencies who use their own channels for dispatching also have a Sheriff’s channel base station capability in their dispatch facilities. Conversely, however, there is no provision in the Sheriff’s dispatch facility for monitoring or transmitting on the radio channels of departments assigned their own unique channel.

The current Sheriff’s radio system employs a high band VHF mobile relay station located at Hastings. A backup mobile relay station is installed in Rosemount and is available should the station at Hastings fail.

Although the time available and scope of this task did not permit a field survey, it was evident that the present Sheriff’s radio system does not provide adequate radio coverage of the county, particularly over those areas to the northwest. This coverage limitation has prevented the effective use of hand-held radios in much of the county.

The Sheriff’s dispatch facility is located at the Sheriff’s office and county jail in Hastings. One control console operating position is available, with a backup position available at a second console. This facility, adjacent to the public access areas of the Sheriff’s office, is enclosed by glass picture windows. The area is small and appears overcrowded. It is evident there is no room for expansion in the immediate area of this facility.

2. Status of Consolidation

The Sheriff’s dispatch facility is currently acting as a consolidated dispatch operation for seven police agencies. There is no written
agreement for allocating costs for these services.

Two communities in the county, Mendota Heights and West St. Paul, have entered into a consolidated operation which involves, but is not limited to, dispatching. A written agreement details cost sharing based on a formula involving population. In this operation a dispatch facility located in and operated by West St. Paul serves both communities. This arrangement was originally established in 1970.

Other countywide measures of cooperation that have been instituted include a universal radio identification system assigning blocks of unit numbers to each department, the installation of the Sheriff’s radio channel in virtually all police vehicles and dispatch facilities in the county, and the installation of the nationwide police emergency radio channel in most police vehicles in the county.

Further progress toward consolidation has been requested by the Dakota County Board of County Commissioners through Resolution No. 7, enacted December 28, 1978, requesting the Dakota County Law Enforcement Association to recommend to the county a fair share charge for dispatch services provided by the county to the municipalities.

In addition, the county has conducted a survey of the various police agencies within the county as to their opinion on advisability of centralizing dispatch facilities. Of the 13 respondents, 8 favored centralized dispatch, 3 were against, and 2 had no opinion at this time; 20 municipalities did not respond.

The city of West St. Paul, which did not respond to this survey, has passed a resolution urging the charging of those communities using the county dispatch facilities, or reimbursing communities providing their own dispatch facilities.

C. ANALYSIS

Some steps toward consolidation have occurred. For example, in several cases two or more agencies are sharing a common radio channel. In other cases two or more municipalities are sharing common dispatch facilities. The most significant example of consolidation is the use of the Sheriff’s channel and dispatch facilities by a number of agencies within the county.

The Sheriff’s radio channel has been recognized by all law enforcement agencies within the county as a common channel as evidenced by the fact that it is available on virtually all police radio units in the county and at all dispatch facilities. Although it is available, the use of this channel for communications is optional to many departments.

Another example of consolidation has occurred within some communities where a common channel is used for police, fire, or other municipal services. This provides for excellent coordination of services within that community, but would be difficult to integrate into a police-only centralized dispatch facility.

Cross-service communications of this type, by FCC regulation, must be conducted on a local government radio service frequency as opposed to police radio service frequencies on which only police-related communications are permitted. Some consideration must be given to this problem if this close community relationship is to be maintained.

The fact that the Sheriff’s department employs a mobile relay station has made it
simple for municipalities to install base stations in their dispatch
facilities to control the mobile relay station. The mobile relay station
negates the need for either high power or high antenna to provide extensive
community communications. The reliance on these control stations for
inter-agency communications has apparently caused some departments to fail
to provide for communications for this purpose on the nationwide point-to-
point channel. The mobile relay type of system as employed by the Sheriff's
department is a popular method for police communications. It allows mobile-to-
mobile communications through the relay over distances much greater than that
obtained with direct communications; however, the entire system fails should
the mobile relay station become inoperative. This problem has been addressed
with provision for a backup mobile relay station and for an alternate car-to-car
channel in some radios.

With the mobile relay station being the heart of the system, therefore, the
quality of communications within the county is only as good as this station
permits. The system in Dakota County does not provide adequate area coverage
due to...and design of the mobile relay station.

The mobile relay station is located at Hastings in the far eastern portion of
the county. Major areas of coverage difficulty in mobile-to-base communications
occur in the area of the bluffs along the river on the northern border of the
county. This area has a higher population density and concurrent higher radio
service needs. Low power hand-held and portable radios cannot communicate in
many areas of the county due to the inability of the unit's transmitter to
reach the mobile relay station.

The backup mobile relay station location at Rosemount, although more centrally
located, also provides inadequate coverage of the county.

Based on this information, using the Sheriff's current system as a model,
it can be determined that additional system planning and design is necessary to
provide adequate radio coverage of the county. Some additional tests have been
made to determine coverage from various locations in the county. These have
shown a site atop the water tower at West St. Paul to be effective.

Satellite receivers are the most popular and effective means to provide improved
talk-back coverage to the mobile relay station. These should be considered as
a possible solution to the radio coverage problems. A properly designed
satellite receiver system should provide more effective use of portable radios
over the county.

The output frequency 155.595 MHz of the Sheriff's mobile relay is 15 kHz removed
from the output of Hennepin County 155.610 MHz. These frequencies should not
be operated near each other due to a potential for mutual interference. This
proximity effect occurs along the northwestern border of Dakota County, the area
where coverage improvements are most needed. A new frequency compatible with
the surrounding agencies/users should be obtained for the Dakota County mobile
relay to reduce potential interference problems in the metropolitan area.

There is no charge made by the Sheriff's department for providing dispatching
services to client communities. By resolution, the county Board of Commissioners
has requested an equitable program for cost sharing be established.
D. CONCLUSIONS

The communications consolidation efforts that have taken place within Dakota County have arisen out of need. Those communities without the need or financial means for their own dispatch facilities have depended upon the Sheriff's department to provide this service. The fact that there is no charge made is obviously attractive to these communities.

The law enforcement agencies in the county realize the need for common communications capabilities, as all have provided for and maintain the Sheriff's radio channel in their offices and vehicles. The various agencies can monitor the radio traffic of the Sheriff's department and those other communities who use the Sheriff's radio channel, taking appropriate action as necessary. This is one way of coordinating law enforcement efforts that may span more than one political boundary. However, in those cases where communities do not use the Sheriff's channel for dispatch, inter-agency monitoring and coordination is difficult and requires the relaying of traffic between vehicles of two different departments.

Consolidation of dispatching services would provide improved inter-agency communications in spite of the fact that the agencies may not be employing the same radio channel. The dispatcher would be readily cognizant of events occurring in most areas of the county and could more effectively respond in situations involving more than one community or where mutual aid is required.

Much significance should be placed on the finding that the current Sheriff's radio system is incapable of providing adequate communications capabilities throughout the county. From the information provided, it appears the location of the mobile relay system is inadequate. Any plans to upgrade or consolidate communications should include attention to this problem as a first step.

The present dispatch facility at the Sheriff's office is inadequate in size and does not provide the physical requirements for a consolidated dispatch facility. It is extremely vulnerable. The location within the Sheriff's office is readily accessible to the public and physical security is difficult to obtain. For these reasons it must be concluded that the present Sheriff's facility could not serve as a consolidated dispatch facility. Space can be made available at the new Government Center near Hastings which would serve well as a room for construction of a consolidated dispatch facility.

Certain deficiencies are apparent in the present Sheriff's FCC license. The number of mobile units as well as portable units does not properly reflect the actual number presently in use. Also, the usage of a police frequency in highway department units is questioned.

E. RECOMMENDATIONS

It is apparent that considerable upgrading of the Dakota County communications facility is in order before a total consolidation is possible. The following actions are recommended.

1) The Dakota County Sheriff's mobile relay output frequency should be changed. At present it is 15 kHz removed from an adjacent county's frequency and if not changed problems will be encountered when signal levels are increased in the northeastern part of the county, as recommended below.

2) Move the Dakota County Sheriff's mobile relay station from its present location at Rosemount to the water tower in West St. Paul. As this is in...
the northern part of the county, an offset antenna pattern should be
used to assure coverage in the southern portion of the county. Recent
tests have proved the feasibility of this location.

3) Establish either microwave or wire line links between the Sheriff's
dispatch center and the West St. Paul mobile relay station for control,
and to pass the received audio signal from the relay receiver to a voting
system at the dispatch center.

4) Establish a receiver voting system in the county which places receivers
closer to the low power portables, and passes the received audio to a
voting comparator where it is compared with the signals' quality from
other receivers. The best quality signal is selected and presented
to (a) the dispatcher, and (b) the mobile relay transmitter for broadcast
to all other radios. Five sites, including Hastings and West St. Paul,
should be adequate (see sketch).

5) The present Sheriff’s dispatch center should be moved from its present
location at the Sheriff’s office and placed in the Government Center
building. This would allow for an efficient dispatch center as well as
room for expansion into a consolidated operation integrating a future
911 system and a future CAD system.

6) Enter into a contractual agreement with the interested entities for
provision of dispatch services. It is recommended that costs be shared
between the county and the utilizing agencies with costs prorated on the
basis of population.

7) It is recommended that the Sheriff's communication center have provisions
for communication with highway department units on the highway department
radio system. Certain selected highway department units would have an
alerting device to indicate to the Sheriff’s dispatcher a need for inter-
communication. The Sheriff’s dispatcher could then communicate directly
with any highway unit. It is further recommended that the FCC license
allow for tone signaling (15P2).
## DAKOTA COUNTY RADIO/TONE FREQUENCIES

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### DAKOTA COUNTY SHERIFF

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### APPENDIX

**DAKOTA COUNTY SHERIFF VOTING RECEIVER SYSTEM**

- **Southern Area Receivers**
- **West St. Paul Mobile Relay Station**
- **Hastings Mobile Relay Station**
- **Receiver Voting Selector** selects best signal
- **Best Audio from Selector**
- **Dispatchers** control the Mobile Relay used

**VOTING RECEIVER SYSTEM**

- **Mobile Units**
  - **Receive**
    - 155.595/3B
    - 155.415/3B
    - 155.475
  - **Transmit**
    - 155.475

**DAKOTA COUNTY SHERIFF FACILITIES**

- Uses Dakota Sheriff facilities via remote control.

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**Notes:**

- **Control & Audio from Center**
- **Receiver Transmitter Control** & Audio from Center
- **Revised Audio**
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