A PLAN FOR TIMELY, EFFECTIVE, LOCAL SEVERE WEATHER WARNINGS

IOWA CIVIL DEFENSE DIVISION

Iowa
a place to grow

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service

NOAA

S K Y W A R N

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PREFACE:

Of all the winds that sweep this planet's surface, tornadoes are the most violent. The march of these shortlived local storms through populated or rural areas leaves a path of incredible destruction. Any person who has experienced the horror of seeing an ominous funnel of a tornado suddenly appear from a thunderstorm knows that a quick warning is necessary to save those in the path of the storm. Since the destructive effects of a tornado are usually concentrated in a relatively small area and over a short period of time, much of the burden and responsibility of warning falls upon public officials at the county and community level charged with public safety as well as the individual citizen.

The National Weather Service attempts to lighten the burden of local warning by defining those areas most favored or likely for severe thunderstorms and tornado development through the issuance of a WATCH. Nevertheless, before the WARNING can actually be sounded, one must wait until the tornado or funnel cloud has actually been sighted visually or indicated by radar. To further emphasize the need for local warning capacity is the fact that time delays of National Weather Service initiated warnings will occasionally be encountered because of the breakdown in or saturation of communications systems and the time taken to relay the report and prepare the warning for dissemination.

There is, in addition, widespread misunderstanding concerning the effectiveness and capability of radar. As Dr. Cressman, Director of the National Weather Service,points out, "Radar is very important, but it is not the whole answer." It is the opinion of most experts in the field that even with the densest networt of weather radars possible, radar will probably not be able to detect more than 1 to 2 out of every 10 tornadoes that scour this country. Radar is extremely important in tracking the tornado producing thunderstorm, but only one instrument can detect a tornado funnel itself with complete certainty--the human eye.

Most tornadoes **detected** before they strike a community are picked up by the eyes of volunteer observer networks. Citizens who make up these reporting networks are members of a vital team, the SKYWARN team. What is SKYWARN? Simply, SKYWARN is a program and an effort to save lives and reduce injuries during tornado emergencies by expanding networks of volunteer spotters, developing local warning procedures and systems, and by encouraging the widest possible participation in tornado preparedness planning.

Why? Over the last 20 years approximately 550 confirmed tornadoes have touched down in Iowa killing on the average of 3 to 5 people each year but injuring scores more. However, statistics indicate that the real threat is much greater than the one tornado per county per three to four years based solely on confirmed tornadoes because many tornadoes are never seen

or the lack of confirmation of many questionable tornado sightings by untrained or casual observers. It is theorized that, on the average, one tornado will touch down in each county per year; maybe in an open field or maybe in a city suburb. Also there is the possibility of one large tornado hitting a densely populated area threatening the lives of hundreds.

This booklet is designed to give you the basic ideas, guidelines, suggestions, and examples of how a SKYWARN spotters network and local warning system can be established for either your city, town, or county. Chapter I discusses the basic warning process and the system used or that can be made available. Chapter II covers examples of how a SKYWARN program can be developed for nearly any community using a variety of different communications and reporting procedures. Chapter III, Planning, gives you a process to follow so that after you have surveyed and located the various possible resources as exampled in Chapter II, you can mold these resources into a workable and functioning warning program. The remaining chapters on training, operation, tests and drills outline instructional material and programs available, additional procedures for the network operation during storm conditions, and methods to test the effectiveness of the entire program. You may already be familiar with some or many aspects of the warning process. Nevertheless, this booklet should be read and reviewed again so that there is no misunderstanding or misconception as to the goals and methods to achieve them.

Should problems or questions arise, the National Weather Service office serving your local area or the Iowa Civil Defense Division can assist by making recommendations, answer questions concerning any phase of development or operation, and provide the needed training materials and/or instructors.

CHAPTER I. Elements and Systems of WATCH/WARNING Dissemination

The word WARNING, as defined by Webster means, "to notify in advance; to tell of a danger, coming evil, or misfortune," however, with present-day technology, there is no way to forecast in advance the exact time and location a tornado will touch down. It is possible, though, to predict general areas where the probability of severe thunderstorms and tornado development is greatest by detecting the larger-scale elements which are usually associated with such storms.

This important forecasting function, which is one of the first elements in the warning process, is performed by the National Severe Storms Forecast Center in Kansas City, Missouri. Weathermen constantly monitor conditions in the North American atmosphere using information gathered from surface reports to satellites. From these thousand of pieces of information, they determine the area that is most likely to experience severe thunderstorms or tornadoes. Information on this area is then issued to the National Weather Service offices and the public in the form of a WATCH Bulletin. Although not all occurrences of tornado and severe thunderstorms are preceded by the issuances of WATCHES, because forecasting has not yet been developed to that fine a point, research continues to improve the techniques. Therefore, immediate LOCAL WARNINGS based on reports of actual sightings, are of the utmost importance.

Public dissemination of the WATCH tells people to go about their business but to keep an eye on the sky and informed as to the progress or lack of progress of storms or systems in the area. The WARNING on the other hand tells people that the hazard has actually been sighted or is indicated and that immediate action should be taken for their personal safety. To officials charged with the responsibility for public safety, the WATCH alerts them and supporting services to a higher degree of readiness and sets in motion action plans which cause posting a storm watch and making ready for the possibility of an issuance of a warning or recovery in the event of a touch down in a populated area.

Unquestionably, the single most effective method to reduce loss of life and injuries as the result of severe weather is through adequate and effective warning. By receiving adequate warning, people can make the necessary preparations for protecting themselves. Since warning is simply nothing more than an exchange of information concerning an approaching or impending hazard, comprehensive and reliable communications systems are essential for dissemination of WATCHES and WARNINGS, and for exchange of information within the system. It should be a functional system based upon existing or improved communications channels and established on the principle of mass distribution through teletypewriter and radio communications.

Its purposes are to:

a. provide the public with advance information that severe weather is likely;
b. provide progress reports concerning the development or lack of development of severe weather;
c. arrange to receive severe local storm reports from cooperative severe local storm observing and reporting networks.

d. distribute warning information to the areas toward which the hazard is moving;
e. inform the public when the threat is over, and
f. provide backup communications.

The initial notification of the potential for development of severe weather, namely severe thunderstorms and tornadoes, will usually come in the form of a WATCH. The WATCH is transmitted to all Weather Service Offices in the affected area by special teletype. The Weather Service Office in the state which is responsible for preparing and issuing statewide and zone forecasts (Weather Service Forecast Offices-WSFO), which for Iowa is located in Des Moines, plots these WATCHES on special maps to determine what portions of their states, specifically counties, are affected.

There are several communications channels used by each agency responsible for dissemination of WATCHES and WARNINGS which must eventually reach the general public. The following is a summary of each of those systems as they are used in the State of Iowa.

NOAA Weather Wire Service: (Iowa Weather Wire) This is a teletype system which is operated by the National Weather Service. The system is confined to the state boundary of Iowa although there are similar systems in each of the states around Iowa. The Weather Service Forecast Office (WSFO) in Des Moines is the control point for the operation of this system. However, each Weather Service Office (WSO) in the state has a transmit capability on this circuit. The weather wire principally serves mass news disseminators such as radio and TV stations. The majority of the time routine weather information such as forecasts, weather summaries and the like are transmitted over the circuit. However, the main reason for the existence of the weather wire is for the rapid dissemination of severe weather information to all those subscribers on the circuit. Therefore, a number of Civil Defense Agencies, both at the county and state level are also on the system. During severe weather emergencies, routine schedules are abandoned and the highest priority is given to severe weather WATCHES, WARNINGS, and related statements and bulletins.

Iowa Warning System Telephone (IAWAS): This is the second system which is considered on the list of highest priority methods for message dissemination. The IAWAS is the state circuit of a National Civil Defense Warning System. It is essentially a state-wide party line type of telephone system. The largest percentage of these telephones are located in county, state, and federal agencies responsible for warnings of all types and weather type WATCH dissemination. In addition, telephones are also located in city warning points of populations over 20,000. Each telephone line is secure from outage due to most weather related events, therefore, it is not subject to the same problems using standard commercial circuits. Simply, the system operates by a given warning point on the state circuit picking up the telephone and verbally calling the desired station. Each station on the circuit has an open speaker and can hear the request or call. As a result, The Weather Service or any other point on the system can call several points on the circuit and relay a message such as a WATCH or WARNING. The message can be directed to only one point but all will hear it. This circuit provides a free exchange of information between

Civil Defense, the Weather Service and the various warning points. In essence, it is similar to making a conference call on a standard commercial telephone circuit, with the exception that the conference call capability is available continuously without prior operator arrangement.

Weather Service offices near the state boundary of Iowa who have warning responsibility for counties in Iowa or a need for information exchange with Iowa warning points are also on the Iowa circuit. Examples of such offices are Sioux Falls, Omaha, Rochester, Minn., Moline, Illinois, and the National Severe Storms Forecast Center, Kansas City, Missouri. Offices of the Weather Service within the State of Iowa include Des Moines, Waterloo, Dubuque, and Sioux City. It would be possible for any warning point in the state equipped with IAWAS to speak directly to the various Weather Service Offices.

Traffic Records and Criminal Information System (TRACIS): the TRACIS system is a high speed teletype network used by various law enforcement agencies throughout the state, ranging from the Highway Patrol to the Bureau of Criminal Investigation to County Sheriff, and city police departments. This network is controlled by a computer in Des Moines which can store and distribute information used by these various law enforcement agencies. Since many law enforcement communications centers also serve as a Civil Defense Emergency Operations Center or a Civil Defense/public safety function by dissemination of severe weather information, the National Weather Service's Iowa Weather Wire has been electronically connected to this TRACIS teletype computer.

Upon issuance of a severe weather WATCH or WARNING, the National Weather Service Office will transmit the message on the weather wire. The message, plus going to other subscribers on the weather wire, will be received by the TRACIS computer. Upon complete transmission of the message on the Iowa Weather Wire and receipt of the complete message at the TRACIS computer, the message will be sent immediately ALL POINTS BULLETIN (APB) to all agencies equipped with TRACIS teletypes in one minute or less.

Area Warning Point (AWP)/ Iowa State Patrol District Radio Station: One of the most expeditious methods of verbal warning or message dissemination individually to a group of people is through the fanout system. In the event of a number of locations being subject to an impending disaster, it would be inefficient for one agency such as the State Civil Defense or National Weather Service to notify individually by telephone a large number of points concerning the hazard. As a result, the Iowa Civil Defense Division with the cooperation of Iowa Police Radio Network Communications has developed an area warning point concept designed to assist in the fanout of messages to counties which are not on any of the systems previously mentioned and outlined. Therefore, each of the area warning points, which are the various Iowa State Patrol District Radio stations around the state, is equipped with a TRACIS and IAWAS telephone drop.

The District Radio station in Des Moines also serves as the State Warning Point and Control Point for the IAWAS telephone system, and in the event of malfunction of the TRACIS computer in relaying weather type WATCH and WARNING messages, manually transmits these messages to the field stations and the area warning points. The Weather Service Office issuing the WATCH or WARNING

will contact the affected area and local warning points via IAWAS. At the same time the TRACIS teletype system will be delivering hard copy to each terminal. The supervisor and/or radio operator on duty at each of the affected AWPs is responsible for the dissemination of all messages received via the various communications systems. The operators of the AWPs will re-transmit the message (WATCH/WARNINGS) as received from the National and State Warning Centers and the National Weather Service via point to point radio to each affected county sheriff, or designated county warning point within each station's jurisdictional area.

Further information and details can be obtained from Annex A of the "IOWA WARNING SYSTEM OPERATION PLAN". These warning points have direct communication with the Weather Service through the IAWAS telephone and they can and do relay back reports from the county level to the Weather Service and the State Civil Defense.

County Warning Points: All counties in the state are under the Iowa Civil Defense Division's Warning Plan and have designated warning points. In most cases it is the communications center of a law enforcement agency which is operating 24 hours a day. It may be a police department, sheriff's office, combined county fire/police communications center, or preferably a Civil Defense Emergency Operations Center. Regardless of the county warning point location, this center has the responsibility to disseminate the message (WATCH/WARNING) to all officials, agencies, and residents in the county according to the county plan.

The WATCH/WARNING messages are received from the AWP via point-to-point radio and through the TRACIS system if available. In some cases, these county warning points receive the messages directly from the Weather Service via the IAWAS telephone. Therefore, it is possible, one warning point could receive the message three different ways.

This county warning point may serve as the collection point for all reports of severe weather and operate and control the activities of the SKYWARN spotters network. In the event warning points are established at the local or town level, they may assume the responsibility of operating the spotters network and collecting reports from the local level for relay to the county warning point. In most cases, it will be the county warning point which will communicate with the appropriate Weather Service Office.

The county warning point may contact the National Weather Service either by a direct call on the IAWAS telephone, if available, by a call on the commercial telephone system or by relay through the point-to-point radio of the Iowa Police Radio Network who in turn will contact the Weather Service on the IAWAS telephone.

Telephone calls on the commercial telephone may be made collect or, some Weather Service offices equipped with area wide WATS telephones may be called directly.

Town or Community Warning Points: Ideally, each town or community should have a designated warning point to handle message dissemination at the local level. This might be the police or fire department, city mayor, telephone company, etc., whatever will best serve the local community's needs. The purpose of this warning point would be to activate local warning devices, call spotters to action, receive reports and relay messages to the county warning point.

Local Warning Systems: Essentially there are two types of systems (outdoor or indoor) that can be used by county and local community warning points to disseminate WATCH messages, WARNINGS, and sound warning alarms. They are outlined as follows:

Radio Broadcast Systems:

General Radio Broadcast: Upon receipt of a warning or weather type watch, a general or blanket broadcast of the message could be made over all frequencies available to the county such as road maintenance, fire, police, sheriff, etc; In addition, with the growing popularity of citizens band radio, many homes, especially rural, have CB base station radios on all the time. Operators of such radios in the county can be instructed to turn to a specific channel during times of severe weather. Over this channel, a general broadcast of the WATCH or WARNING can be made. The channel might be the emergency channel, 9, or some other locally agreed upon channel.

Indoor Warning System Receivers: To eliminate the need for officials to continuously monitor radio frequencies for occasional emergency messages, special types of receivers have been designed to respond to special activating tones which alert the officials to an important message.

Simply, these specifically designed units are assigned to each of the key officials institutions, or local warning points where warnings or weather type watch information is needed. The receivers usually monitor an existing radio frequency already available at the county warning point communications center. This might consist of a fire or county/city engineers frequency in the upper VHF band or a law enforcement frequency in one of the lower VHF bands. In any case, the receiver can be set in an alert state such that they are electronically receiving signals from the transmitter continuously but not allowing them to be amplified and broadcast through the speaker.

When the county warning point radio dispatcher decides an emergency message must be retransmitted, all that is necessary to turn the muted receiver speakers on is to send out a specially coded tone produced by a device called an encoder which is connected to the transmitter of the radio used for warning broadcasts. The warning receiver will detect this tone and electronically switch on the receiver speaker and produce a sharp alerting tone. The warning point dispatcher will then transmit the message such as a WATCH or WARNING.

In many communities, the fire departments' personnel are summoned to a fire through the use of a special tone activated receiver system similar to the indoor warning system just described. In many counties, the indoor warning system uses a countywide fire frequency. One tone on the encoder is used to activate the indoor warning receivers, while other separate tones are used to activate the receivers used by the various fire departments. It is possible that through the use of one radio frequency located in one countywide communications center, the dispatcher could use one tone for each of the fire departments, and by activating all of these tones, notify all systems of an impending hazard and thereby expand the number of persons receiving the warning through one single broadcast. In many cases, fire departments serve as the spotters for their respective communities and this would be a way of calling the spotters to action.

Commercial Broadcast Media: Although the National Weather Service and local Civil Defense agencies are responsible for warning the public of the sightings of tornadoes and other severe weather, both agencies have limited means of communicating WATCHES AND WARNINGS directly to the public. Instead, the National Weather Service and Civil Defense agencies rely heavily on the public-spirited cooperation of the broadcast industry, composed of the AM, FM, TV and cable TV facilities as the primary method for reaching as large a part of the general public as possible. Cooperation of the broadcast industry in this public service has been uniformly excellent, and many people owe their lives to it.

Commercial broadcast stations are not required by any government regulations to broadcast emergency messages including WATCHES and WARNINGS. All messages of this type are transmitted at the option of the licensee, who maintains control of the station facilities at all times.

To get messages to these broadcasters, each station at its option has the opportunity to subscribe to the weather wire. The National Weather Service pays the cost of the line charges to have the circuits run to every community with a broadcaster. These stations and other interested groups can have receivers on this circuit for a moderate connection and monthly service charge for the rental of the printer. These machines have a positive alerting device which calls the immediate attention of station personnel to the urgency of the message so it can be broadcast immediately.

For those stations not equipped to receive messages directly from the Weather Service over the weather wire, most, if not all of the news wire services carry such messages. Most, if not all, broadcasters subscribe to one of these services. However, during times of widespread severe weather, the news wire service may be backlog with messages and time delays may be encountered. In addition, messages

being originated by several weather service offices in the same state may cause for some delay in transmission of messages on the weather wire. Therefore, it is important that each county or local community warning point have direct access to the local broadcast stations co-operating in WATCH/WARNING dissemination.

One of the most effective methods for a local warning point to get a message to a broadcaster in the local area, would be for the broadcasters to have receivers of the indoor warning system positioned in the stations' studios. Therefore, when the message is broadcast over the indoor warning system, the broadcaster will get it simultaneously. This can be most effective and timely when the warning is originated by the local or county warning point.

To increase the effectiveness of such a system, the indoor receiver at the broadcast station can be hooked up in such a manner that a warning or watch broadcast over the indoor receiver can be directly rebroadcast over the local station. This can be accomplished by the warning point dispatcher making an initial statement of the type of message and then delaying for a short but predetermined time period (example: 30 seconds), then broadcasting the message in its complete form. This procedure would allow the broadcaster to interrupt the program in progress for a live and direct broadcast of the message from the warning point.

For cable TV systems, arrangements can be made such that a special telephone at the communications center or warning point, when lifted from the cradle, would override the voice or audio portion of all channels on the system. The message such as a watch or warning could be read and regardless of the channel being watched, the voice portion would be that of the person dispatching the message. At the conclusion of the message the phone would be returned to the cradle and the cable television system would then automatically resume normal operation.

NOAA VHF FM Continuous Broadcast Stations: Due to the increased demand for weather information on a more frequent basis and the need to reach the general public with watch/warning information when some regular commercial broadcast stations are off the air, the National Weather Service has established a limited network of VHF-FM continuous weather broadcast stations. Besides providing routine weather information including, among others, local and regional weather forecasts, weather statements, and radar summaries, these radios are equipped with special tone-emitting device capable of activating suitably equipped receivers similar to the indoor warning systems previously mentioned.

These stations operate on a frequency of 162.40 or 162.55, 162.475 MHz. The range of these stations, depending on the type of receiver, is limited to about 40 miles radius from the transmitter. Although the number of these stations is presently limited, plans call for the expansion of this system into most areas of the country. However, the timetable for completion has not been firmly established and should not preempt or eliminate the need for the warning systems previously mentioned. This system is primarily designed to reach the general public with

emergency and routine weather information whereas indoor warning systems may be used for a number of other reasons at the county level which would preclude transmission on the Weather Services FM broadcast stations.

Outdoor Warning Systems:

Sirens: The most difficult problem to overcome in effective warning is to reach the segment of the population which may not be listening to broadcast stations or have access to other warning systems. To reach these people, signaling devices have been developed which are used to alert the public of certain expected conditions. For the most part, these devices are used only as a warning signal usually indicating either attention or take cover and are of an outdoor nature generally limited to tornado warnings. The vast majority of such devices are either combined civil defense and fire sirens or just fire sirens.

Local or community warning points should be established such that they have the ability to activate these devices in the event of a warning.

Some siren systems have been established so that the same type tone that activates an indoor warning system radio or calls firemen to a fire can be used to activate a siren. One of these special tone activated receivers is connected to a switch on the siren. A separate tone, when transmitted, would activate the receiver and close a switch similar to turning on the speaker, and then the siren would sound. A timer can be attached to the siren so that at the end of a predetermined period of time the siren would automatically return to the alert position. An alternative to the timer shut-off would be another tone code used to open the switch and thus silence the siren.

The advantage of such a system would be elimination of monthly line charges and the benefit of receiving warning in the event of a tornado being sighted when no one at the local level can get to the siren and turn it on. The County warning point dispatcher could, upon receipt of a warning and the push of one button, send out the tone to activate the siren and thereby provide warning to the community.

Other Systems: Other devices that can be used at local option might be whistles on steam plants or bells on churches or schools or fog horns. As an additional option, where adequate sirens are not available, sirens or PA systems on fire trucks and other emergency vehicles circulating throughout the community can be moderately effective.

Telephones: Unquestionably the slowest and least effective method of reaching the public would be by individual telephone calls. In the period of time it would take to call one person on the telephone, the message could be delivered to an unlimited number of people over the indoor warning system. In addition, many telephone lines are susceptible to the effects of storms. The telephone method, however, should not be discarded just because it is weak and no other system exists. A telephone call to a local multi-phone fire system may be

able to reach 25 to 30 families who in turn could each reach two or three more. In those communities with telephone companies capable of ringing numerous telephones at once such as a party line, this could prove to be a good method although not the best.

The need for warning dissemination on the local level first cannot be over-emphasized. Further information on all of the previously discussed systems can be obtained by contacting either the Communications and Warning Officer of the Iowa Civil Defense Division or the National Weather Service as appropriate.

.....REVIEW EXAMPLE.....

The following example is how the WATCH/WARNING process works at the state level, to the area warning point level and how it works at the local level in one county. The attached diagram will help give you some idea as to the direction of information flow and channels used.

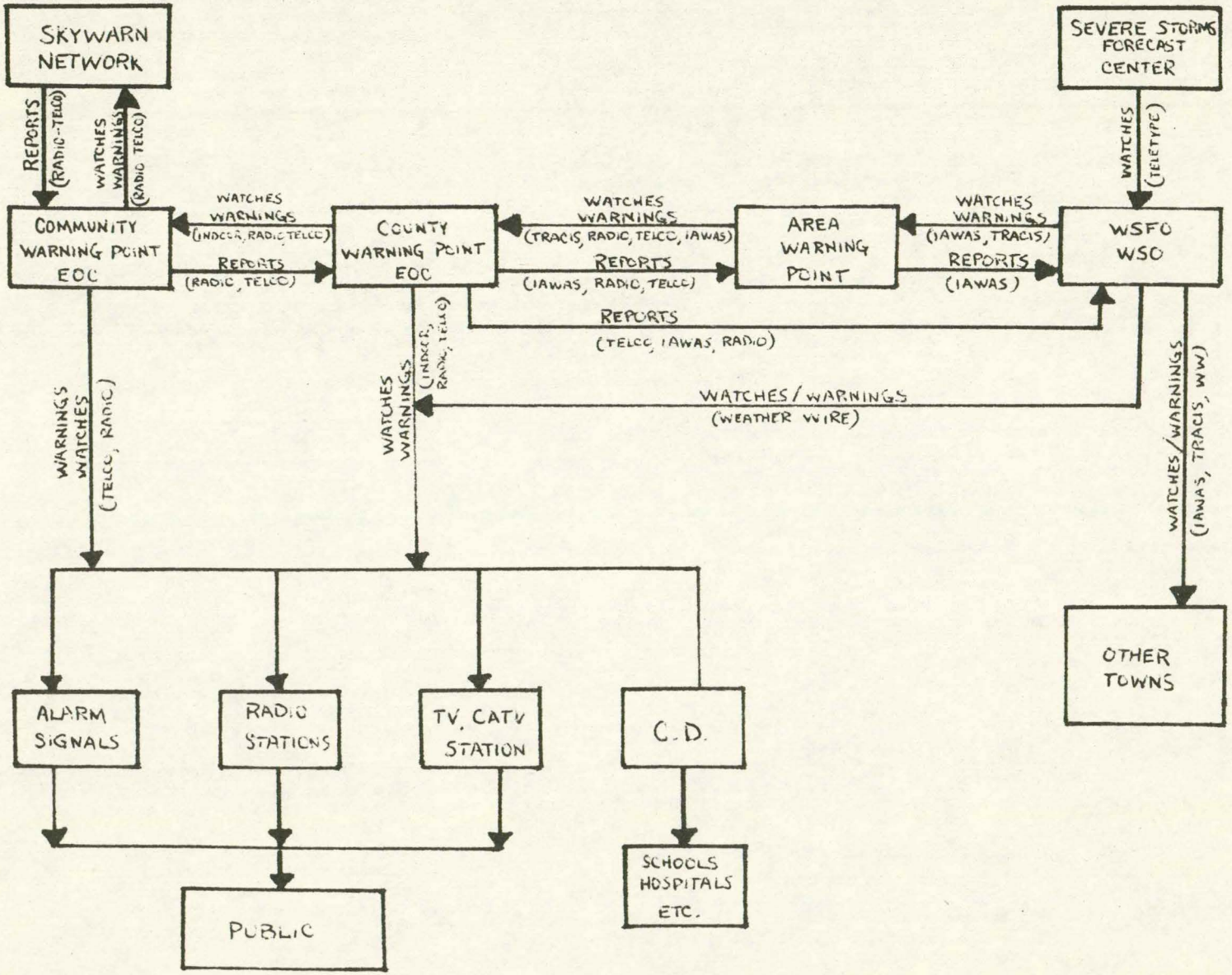
The WATCH issued by the Severe Storms Forecast Center is transmitted to all Weather Service Offices. The State Forecast Office in Des Moines plots the **WATCH** on a special map to determine the affected counties. The WATCH message is then retransmitted on the Iowa Weather Wire including an additional statement as to the portion of the State of Iowa affected. The WATCH is received by all broadcast media on the Weather Wire and at the press wire service offices for relay on their circuits to the remaining broadcast stations in Iowa. At the same time, the WATCH message is transmitted over the TRACIS to the various law enforcement and communications centers and to the Iowa Police Radio Network/CD Area Warning Points. In addition the Weather Service Office in Des Moines broadcasts the messages to the affected warning points on the IAWAS.

Each area warning point with counties covered by the WATCH retransmits the message via point-to-point radio to each of the designated county warning points. At one particular county, upon receipt of the WATCH via the area warning point point-to-point radio and the TRACIS, dispatches the message to all of the schools, hospitals, nursing homes, local warning points and some scattered businesses and delivery company dispatchers by way of the county's indoor warning system. In addition, the local radio station is equipped with an indoor warning system receiver and broadcasts the WATCH message. A blanket broadcast of the WATCH is made over the designated county emergency CB channel and over other existing frequencies at the communications center. Notification is made to each of the county fire departments through either a telephone call to the multiple phone fire call system or by tone activation of receivers used by two fire departments. Each community warning point activates its spotters network according to existing plans and the local EOC is manned to receive reports or to disseminate warnings if necessary.

In the event of a confirmed tornado, funnel cloud or other severe weather sighting reported to the community warning point, the various warning systems such as a fire siren are activated, two fire trucks are dispatched to further spread the warning, a radio message is transmitted to the county warning point for activation of the county indoor warning system and the message is spread to other communities in the local area.

The Weather Service Office having warning responsibility for the county is notified, the Weathermen on duty try to determine accurately the direction and speed of movement of the storm so that additional areas likely to be affected by the storm can be notified and warned. The Weather Service Office is notified by the county calling in on a special toll free WATS line. After it has been determined what other areas are to be affected, the WARNING from the Weather Service is disseminated through or by the same systems used to disseminate the WATCH.

It is through this system that the Weather Service Offices throughout the country, in cooperation with State and local Civil Defense Agencies and the broadcast industry provide information to the public which will help reduce the threat to human life from weather related events. It has worked in the savings of many lives. Applied properly and effectively along these guidelines, it will work for you.


SKYWARN NETWORK
REPORTS (RADIO-TELCO)
WATCHES WARNINGS (RADIO TELCO)
SEVERE STORMS FORECAST CENTER
WATCHES (TELETYPE)
COMMUNITY WARNING POINT EOC
WATCHES WARNINGS (INDOOR, RADIO, TELCO)
REPORTS (RADIO, TELCO)
COUNTY WARNING POINT EOC
WATCHES WARNINGS (TRACIS, RADIO, TELCO, IAWAS)
REPORTS (IAWAS, RADIO, TELCO)
AREA WARNING POINT
WATCHES WARNINGS (IAWAS, TRACIS)
REPORTS (IAWAS)
WSFO WSO
REPORTS (TELCO, IAWAS, RADIO)
WARNINGS WATCHES (TELCO, RADIO)
WATCHES WARNINGS (INDOOR, RADIO, TELCO)
WATCHES/WARNINGS (WEATHER WIRE)
WATCHES/WARNINGS (IAWAS, TRACIS, WW)
OTHER TOWNS
ALARM SIGNALS
RADIO STATIONS
TV, CATV STATION
C.D.
SCHOOLS HOSPITALS ETC.
PUBLIC

CHAPTER II. Consideration for Network Organization
(For Counties, Cities, Schools, Nursing Homes/Hospitals, Industry, Mobile Home Parks, Shopping Centers.....)

The type of organization established for reporting of severe weather will depend largely on the resources available and tabulated on the survey forms you will find in Chapter III. Each community or city will have to be organized independently or differently from the other communities within the county simply because of the different resources available to a given community. One thing that must be kept uppermost in the minds of people organizing the network is the need for warning information dissemination locally. Each community should be able to provide warning and to operate as independently as possible from other communities. It is vitally important to warn the local community and residents first.

Ideally, trained spotters should be stationed at points about two to three miles apart within a radius of about 20 miles around population centers. Heaviest concentration of spotters usually should be to the southwest, west, and northwest. For large population centers, spotters should be positioned throughout the city as well to guard against the possibility of formation and development of a tornado after the thunderstorm has moved well into or over the city. A spotters network designed to have one spotter position to cover each 8 to 10 square miles in non-metro areas, such as rural areas, should be adequate. For smaller communities, a minimum of 3 to 5 spotter positions a mile to three miles from the city should be developed in addition to those positions established and manned in the more rural areas. It is recommended that, where possible, spotter positions be manned by two people. Storm watches can extend over a period of time and can be quite lonely. The second spotter provides an extra margin of safety, provides for on-site real time training and there is less likelihood of two people over-reacting to questionable cloud formations and this should cut down on a false alarm.

In Iowa, most tornadoes do come from a southwest or westerly direction. However, exhaustive research has shown that in Iowa around 30% of the tornadoes do come from the northwest. These tornadoes for the most part are the most difficult type to predict and for which to issue timely and effective watches and, in some cases, warnings.

The most efficient and dependable spotters network would be one comprised of paid, trained personnel such as fulltime police, sheriff's deputies, fire departments, civil defense, and highway patrol personnel, but such is not possible for most communities. Even though a community may have fulltime professional staffs, their serving as severe weather spotters is only a secondary duty to providing higher priority service such as police and fire protection. Although they usually form the backbone for the network and the first line of defense, they must be supported and supplemented by volunteers who can remain on station until relieved by another volunteer spotter or until the threat has subsided.

Recruitment of volunteer spotters is not always an easy task. Many people feel that during severe storm or tornado emergencies they should be at home with their respective families. Little do they realize, however, that if everyone took this attitude, there would possibly be no warning and consequently they as well as their families would be in greater danger without

the warning. The theory of "Let George Do It", fails to take into consideration that each individual is always George to someone else.

Recruitment can be done as detailed in Chapter III through the various other existing networks and through various civic organizations in the community. There is a need for supplemental severe local storm spotters for schools, sporting events, medical facilities such as hospitals, large shopping centers, industries, and mobile home parks during threatening weather conditions. They would watch for storm development near the facility or event and report directly to someone inside who would sound the "take cover" alarm. These spotters can be made up of personnel whose jobs do not require their continuous attention such as janitorial, administrative, supervisory, or security personnel. The supplemental spotters should have direct contact with the community system if at all possible.

Approximately four times as many spotters should be recruited and trained as there will be spotter sites to be manned. This will help insure against the possibility of positions not being manned because of someone on vacation, out-of-town, or ill. In addition, many times after people have gone through the training, they become disinterested or have other commitments which will preempt their assistance and participation in the network from time to time.

News media generally are glad to cooperate with a committee desiring to develop a spotters network by informing the public of the need for spotters. This often brings forth the right type of well-motivated private volunteers.

By assuming a minimum of 10 square miles being observed by each spotter, here is a formula that can be used to determine the required number of spotters. Take 40% of the number of square miles in the county; this would be the number to cover rural areas of the county. Then add the number of supplemental spotters for the various towns and cities plus the industries and other facilities.

$$\frac{\text{(Square miles (County)}}{\text{}} \text{X } 40\% + (4\text{XCity Spotters}) + \text{Supplemental} = \text{Number to be Trained}$$

Example 1 describes how a county-wide network can be established using the various combinations of reporting and receiving equipment and community warning facilities or centers. A network may consist singly of one of the elements described, but more likely, it will be a combination of several.

Regardless of the combination used, one of the most critical elements to be considered in organization of the network is the need for control and maintaining discipline. When organizing networks, one of the biggest problems will be with using volunteer amateur or C.B. radio groups. Traditionally, use of frequencies set aside for these groups results in considerable non-essential transmissions which, if allowed to persist during severe weather emergencies, will destroy the effectiveness of the network and can and does give community residents a bad impression of such a group, its members, and mission.

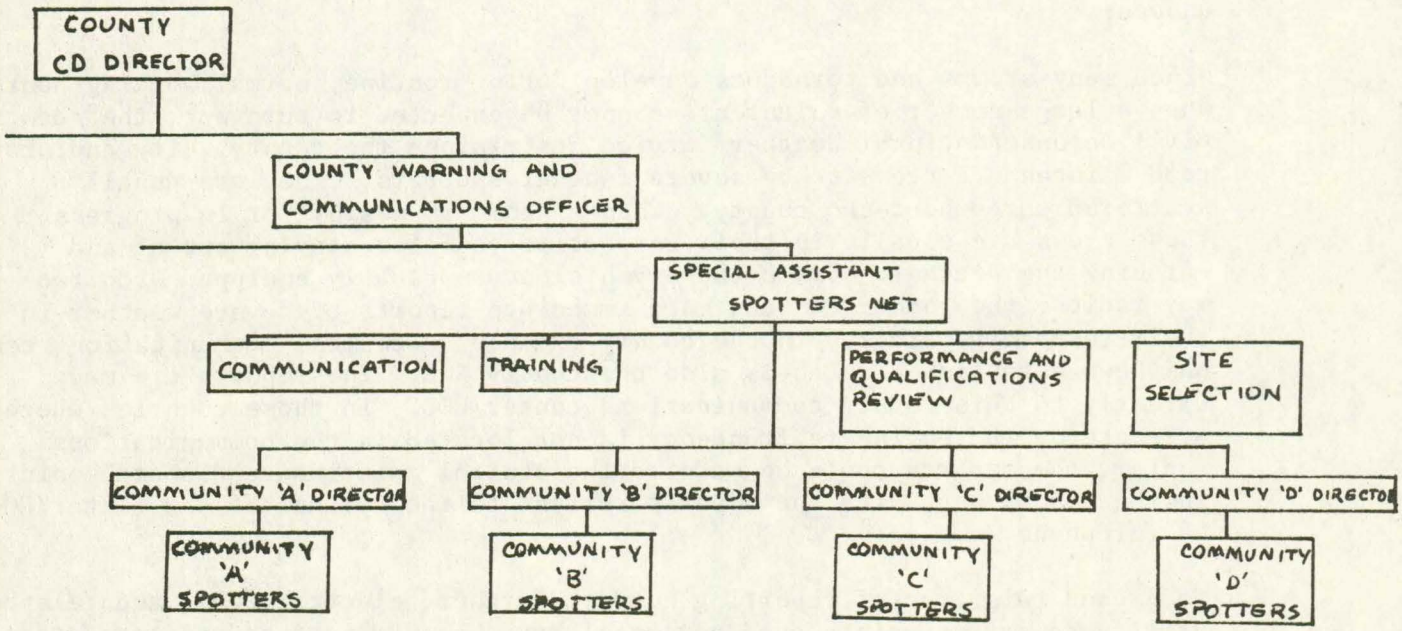
Professional communication channels, such as police and fire departments, are under constant supervision and radio discipline is maintained through employer-employee authority. Radio discipline in volunteer groups can be maintained through effective use of a communications review committee and proper use of letters of a multiple unit license. If the network operates on channels or frequencies which allow only base station or licensee to unit of licensee communications, then some degree of discipline can be maintained. Additional information concerning this can be obtained from FCC regulations governing the type of operator, the Warning Communications Officer of the State Civil Defense Division, or the Community Preparedness Specialist with the National Weather Service in Des Moines.

A County or local community Civil Defense Director may find it effective to appoint a special assistant to the director who would be responsible for establishing observation sites, coordinating reporting procedures and maintaining operation of the network.

This person should be conscientious and familiar with communication equipment and have a genuine desire for unselfish community service; willing to cooperate with the local director, rather than compete.

A committee could be established to handle each phase of development and operation of the network, review volunteer qualifications and performance, and to provide for continued training and possible public education programs concerning safety during severe weather emergencies.

The following table of organization of such a committee is offered for consideration.



The examples 2 through 10 are individual community or area network organizations within the county showing plans, warning point, its reporting and information receiving facilities and procedures. It also lists the recommended spotter sites and recommendations on how the reports will be made from these sites to the community warning point. There is also a set of blanks to list the members who have been recruited and what sites they are assigned and the warning action plan.

A review of the county, example 1, shows a typical distribution of towns throughout a county. The county plan shows that each of 6 of the 9 towns or cities has an established warning point ranging from a C.B. radio operators home to a temporary EOC at a volunteer fire department building to a fully operational Civil Defense EOC manned by trained volunteers and professional people. The need for such established community EOCs or warning points can not be over-emphasized.

The county has been gridded into 10 square mile areas. In each of these 10 square mile grids a spotter position has been designated. The site was selected for its visibility vantage point. It also takes into consideration the use of surrounding towns and cities'lights for help in spotting during nighttime. The sites have also been selected for the most effective transmission of information via radio. These sites are for the most part manned by volunteer observers. The 10 square mile value was arrived at by assuming an average minimum visibility of 1 1/2 to 3 miles in a thunderstorm. With this density of spotters, it is highly unlikely that a tornado could pass unseen.

Since many storms and tornadoes develop during routine, normal working hours when a large number of volunteers cannot be expected to turn out, the county Civil Defense/National Weather Service has trained the county, city and state road maintenance crews to be severe weather spotters. They are usually scattered throughout the county. When a storm is nearby, or in progress, these crews are usually in their respective vehicles staying out of and watching the weather. Since these vehicles are usually equipped with two-way radios, the road crews can make immediate reports of severe weather in their respective areas. In the county example, a central communications center has been established which is also the county EOC. The reports are made directly to this county communications center/EOC. In those counties where a remote of the engineers frequency is not located in the communications center, the reports could be made to the central maintenance dispatch point in the county seat with the reports relayed to the communications center/EOC by telephone.

To expand this type of reporting network further, electric, gas, and telephone utility companies maintenance personnel have been trained as spotters since in most cases their work is generally out-of-doors in the countryside using vehicles which are two-way radio equipped. In addition, companies which have radio dispatched delivery vehicles such as gas, feed/grain, lumber, etc., plus salesmen for various businesses have been recruited and trained to help in the spotters network. These spotters report directly to their respective dispatch centers and the reports are relayed via telephone to the county

warning point/EOC or to the city warning point depending on where the vehicles have their base of operation.

The various utility and delivery companies are alerted to the issuance of a watch or of a warning by the use of an indoor warning receiver positioned at each of the respective dispatch points. This way they can alert their personnel in the field to keep a special watch.

These resources as spotters are in addition to those CB and amateur radio operators, CAP volunteers who can respond, police, sheriff's deputies, state troopers and fire department personnel who are already on duty or who can be called to duty.

In those locations not covered by spotters with mobile radios, service station operators, farmers and similar people whose homes or businesses are so located that they can see in all directions, especially north through west through south, have been contacted and trained as spotters and they report by phone to either the nearest community warning point or to the county EOC.

When a confirmed sighting of a tornado, funnel cloud, or other reportable observation is made which requires a warning; the county indoor warning system is activated along with telephone calls to key officials or to nearby radio or TV stations. Other warning systems such as sirens are activated and broadcasts over other radio channels in the county as needed. The reports are relayed to the National Weather Service and adjoining counties using one of the methods outlined in Chapter I.

Examples 2 through 10 are how a variety of cities and towns can use the different reporting and warning resources to develop a complete spotters network and warning system.

A-ville, Example 2, has a volunteer fire department that serves principally as the spotters network. It is supplemented by a few farmers and CB radio operators. The community warning point is the fire hall which also serves as the town's EOC during any emergency situation. The fire department has four fire trucks that are radio equipped. The fire hall has a fire base radio and a CB base unit. There is also an extension of the department's multiple fire telephone. A siren is located on the water tower near the center of town that can be activated from the fire hall or by several of the firemen from their homes or businesses.

During times when a watch is in effect for the area or when weather conditions appear to be threatening, the fire hall is manned by at least one fireman. Three of the fire trucks are dispatched to predetermined locations ranging from one to three miles outside of town to the southwest, west and northwest. Additional firemen are positioned near and around town. Their cars are equipped with the fire frequency radio or CB. To add additional support, a couple of CB operators take up positions more distant from town to give early warning and in some cases to follow suspected thunderstorms back toward the town watching for possible funnel development.

The initial notification that a watch has been issued or that a particular thunderstorm in their area needs to be watched carefully can come either through the indoor warning system or called to the fire department from the county warning point.EOC through the multiple fire phone The spotters are then notified through a call list.

The reports are made directly to the fire hall by telephone or radio. The person manning the fire hall serves as the collection point for all incoming reports, including those from untrained and casuals observers. When reports are received from casual observers, they are checked out, if time permits, by directing one of the radio equipped mobile spotters in position to view the storm.

Once a confirmed report or sighting is made and a warning is required, the siren is sounded, the multiple fire telephone is called, a broadcast is made over the designated CB channel, and the report is relayed to the county warning point/EOC for activation of the county's indoor warning system and for relay to the National Weather Service and other communities. The remaining fire truck is driven throughout the town along with the other fire trucks with the sirens and PA system broadcasting the "take cover" message.

B-burg, Example 3, has neither police nor fire department, but there are a number of Citizen's Band (CB) radio operators in the town and surrounding countryside who serve as the spotters for the community. During a watch or threatening conditions, they observe from preselected positions around the city and report directly to one of two or three CB operators in the town who have large base station radios with high gain antennae.

The spotters network is notified that a watch or warning has been issued through the use of the indoor warning system which has a receiver at the home or business of one of the operators. When the forecast calls for the possibility of severe weather, one of the operators remains on standby by having a base radio at his business or if in the evening or weekend one of the other operators remains on standby at home.

When a confirmed report of severe weather is received which requires a warning, the information is relayed to the county warning point/EOC by radio. Since there are a large number of CB operators in the area, they have been educated that during threatening weather conditions, they can monitor the county designated CB emergency channel and when a warning or watch is issued, it will be broadcast over this channel. A telephone list is also used to fan out the warning to others in the community.

C-town, Example 4, has no police and only one fire truck for their fire department which has no radio and only a few firemen. However, there are a number of members of the county Civil Air Patrol Squadron who live in the area and have been recruited and trained to be severe weather spotters. The spotters are equipped with mobile radios and have a base station located in a town hall which is used for occasional meetings of the squadron and is also the place where the fire truck is garaged. The spotters observe from predetermined locations around the community and report directly to the base station in the town hall.

Since one of the CAP channels is close to the CB frequencies, their radios have been equipped such that they can also receive reports from casual observers over the CB channels.

The spotters are notified of a watch or nearby warning through the use of the county indoor warning system. Each day, one of the members of the squadron assumes the duty as Officer of the Day and has a warning receiver in his possession for the designated period of time. During the daytime this is at the business of one of the members.

Upon confirmation of a report requiring a warning, the report is relayed to the county warning point for activation of the county indoor warning system. The fire siren is turned on; telephone calls are made to key people in the community, and to as many others as time permits.

D-city, Example 5, is a small community with no public facilities or departments. Several amateur radio operators in the area have been recruited and trained as spotters. A few CB radio operators in the area are also spotters and report via CB radio to the amateur operators for relay to the county warning point. Amateur (HAM) radios are generally much more powerful than CB and not subject to the same degree of interference. The warning is broadcast via the county warning point over CB and the indoor warning system.

These spotters are notified of a watch or adjacent county warning through a telephone call to one of the radio operators. The warning locally is fanned out through a call list if time permits.

E-county Seat, Example 6, has both a paid fulltime police and fire department. The city is fairly large and there are frequent fire and police calls which could require their immediate attention at practically anytime. Therefore, a number of different resources have been tapped to provide additional spotters through volunteer services.

E-county Seat has a complete EOC which is co-located with a central communications center which services not only fire, but police, rescue, ambulance, and other municipal services. This center also handles the communications for the fire and police departments of other smaller communities plus the sheriff's department. This EOC is a combined city and county center.

When a watch or warning is received from the National Weather Service or when the weather looks particularly threatening, the EOC is manned and one fire truck is dispatched from each fire station, leaving one in reserve, to key locations within the city and along its limits. Fire stations along the western, northern, and southern edges of the city dispatch the trucks to the city limits. The stations in the central and eastern edge of the city take up positions which give them a commanding view of the remaining portions of the city in the event of development over the city once the storm passes the city limits.

Police department cars that can be spared from patrol are directed to concentrate along the southwest, west, and northwest edges of the city with the remainder of the cars instructed to maintain a careful watch on thunderstorms as they move through the city for possible development of a funnel.

A call list of volunteer spotters made up of CB, CAP, and amateur radio operators and fixed spotters such as farmers, service station operators, etc., is maintained at the EOC and called to action. Some volunteer positions are near the locations of the police and fire observation sites with some degree of overlap so that should an emergency arise which would require the abandonment of the site by the fire trucks or police, the area would still be partially covered. Other mobile spotters are positioned further from the city for more advanced warning.

All frequencies in the county are monitored at the EOC which is the nerve center for all incoming reports and the dissemination of all warning information. All schools, hospitals, nursing homes, and large businesses or industries in the city are on the indoor warning system. All sirens are activated by radio tone code. Each of these facilities have supplementary spotters to provide adequate warning in the event of development of severe weather near their respective facilities.

Once a confirmed report has been received which requires a warning, the indoor warning system is activated plus a CD siren system is activated by radio as explained in Chapter I. The local radio and TV stations receive the warning through the indoor warning system and the report and the actions taken are relayed to the National Weather Service via either IAWAS or point-to-point radio through the Iowa Police Radio Network.

F-junction, Example 7, has no local municipal services except for a town marshal who is on duty only at night or on call. Local and interested citizens in the area whose homes or businesses are situated such that they have a good view of the surrounding countryside have been recruited and trained but they must report any observations directly to the county warning point by telephone. There is no local warning point other than the local marshal, who, upon notification from the county warning point either by radio or indoor warning system, drives through the town with siren and PA system broadcasting the "take cover" message. A nearby school and nursing home have a spotter each but also receive advanced warning through the county indoor warning system of more distant sightings.

G-center, Example 8, has only a five member police force and a small volunteer fire department with a couple of trucks. A temporary EOC has been established in the basement of the town hall which also houses the fire department. A CB base radio and remote off the county law enforcement radio, which is also used by the local fire department, is also provided for radio communications with the local police and the county seat. The fire department uses tone activated radios for notification of fires.

Also, the fire siren which is used for civil defense or notification of a tornado is activated by tone as described in Chapter I. The combined communications center in E-county seat serves as the communities communication dispatcher for both fire and police calls.

The spotters network is made up of a combination of people. The foundation for the network is the members of the fire department supplemented by a number of CB radio operators and the police. The notification of a watch issuance is received over the tone activated fire radios for the community and a radio call to the police officer on duty. The senior fireman receiving the notification makes follow up calls to assign members to observation sites and to ensure that the town EOC is manned and ready to receive incoming reports or possible warnings.

When a report is received that requires a warning to be issued, the operator of the town EOC radios to the county seat and also activates the combination fire/CD siren. In the event a warning were received at the county seat which affected the community, and the town EOC is not manned, the siren could be activated from the county seat by radio transmitted tone.

The dissemination of a warning is made locally by a blanket broadcast of the message over a predetermined CB channel and by telephone calls to key officials and over the fire radio. Each of the firemen tries to call as many people as possible. In addition, the fire trucks are dispatched through the city with siren and PA system broadcasting the "take cover" message.

H-park, Example 9, is another typical small town with no local emergency municipal services. The spotters network is comprised of several CB operators, local residents whose homes are on high hills and an amateur radio operator who serves as the collection point for reports and relays them onto the county seat. Notification of a watch or warning is received over the county indoor warning system of which a receiver is in the amateur radio operators home which is a farm home on the west end of town. Due to the nature of his operation, someone is almost always nearby and in the event someone is not home, the receiver is passed along to an alternate. The spotters network is activated by a broadcast over the CB channel and a telephone call to the member of the network not using radios.

When a confirmed sighting is made, the warning is broadcast over the CB channel and telephone calls are made to as many people as possible. There is a school in the town that receives the warning over the indoor warning system which is activated from the county seat. The report is relayed to the county seat using the Amateur RACES radio in the local warning point operator's home.

I-springs, Example 10, has no local emergency municipal facilities or location for an EOC. However, a number of the sheriff's volunteer auxiliary patrol live in or near the town and serve principally as spotters network. Each of the members has a mobile radio unit of the sheriff's command frequency in their cars which can reach the county seat directly. The spotters network is activated by a telephone call to one of the patrol members who then calls the remaining spotters by telephone. They report directly to the county seat combined communications center/EOC and the warning is fanned out in the usual way with some additional telephone calls made locally if time permits. A CD siren was purchased and installed on a building in the center of town and is activated by radio tone code over the county indoor warning system.

The supplemental spotters, depicted throughout the various examples, can consist of members of the county road crews who have radios in the various trucks and graders. They report directly to the county combined communications center/EOC via a remote of the county engineer's frequency which is in the center.

Several large service and delivery companies in the county such as LP gas and oil dealers, feed/grain/seed dealers, lumber companies and ready mix concrete companies can be contacted to have their drivers serve as spotters during normal working hours. Each of the vehicles is equipped with a radio on the individual companies business band. Indoor warning receivers can be placed at each of the individual companies dispatch center. When watches or warnings are received, they can be passed along to the drivers who then report to the business dispatcher who then relays the report back to the county EOC via telephone.

Other supplemental spotters can be members of the local telephone company's outdoor maintenance crews and members of the electric company's linemen. They report to their respective dispatch offices who then relay their reports to the county EOC by telephone.

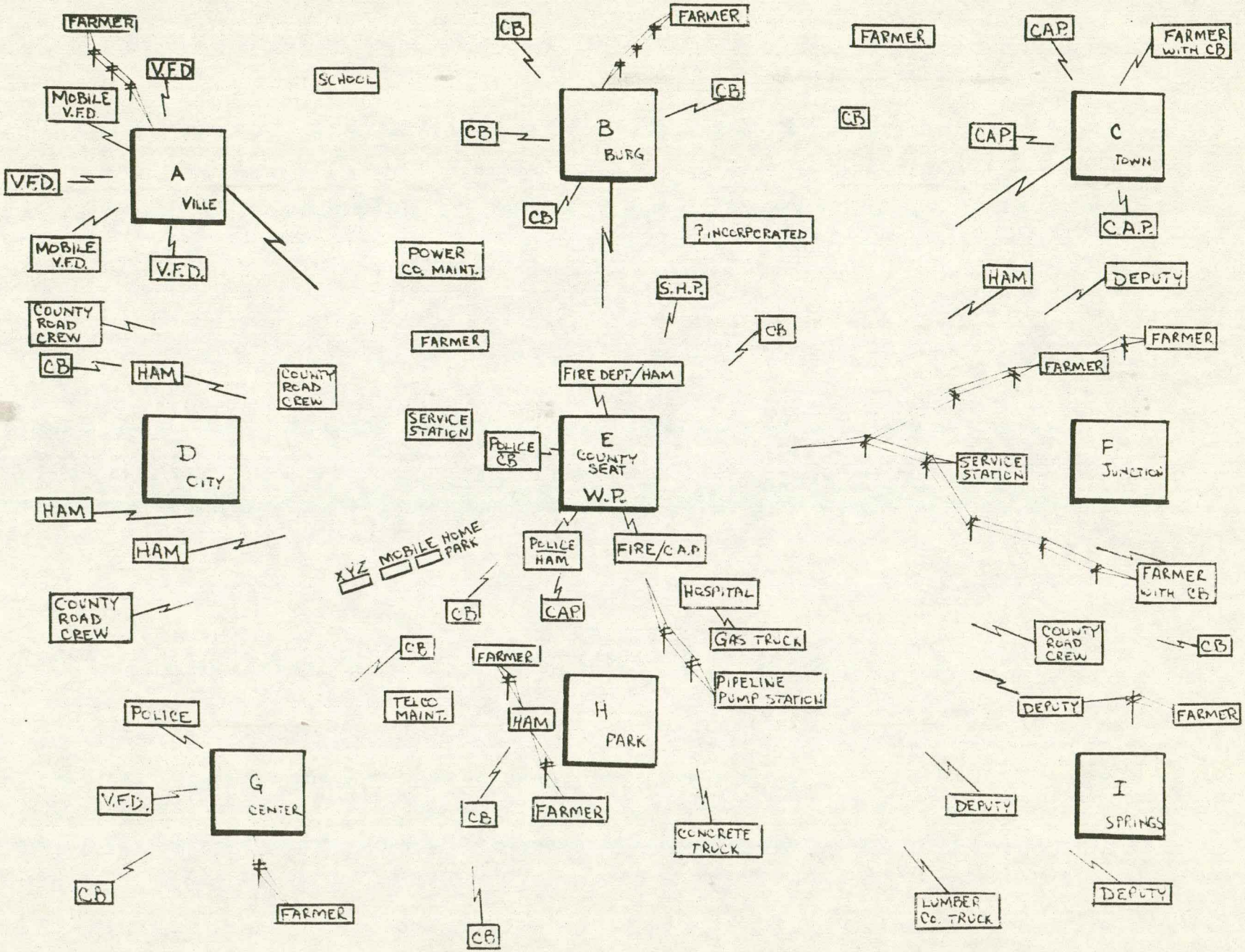
Supplemental spotters should be recruited and trained to serve the hospitals, schools, local industries and nursing homes in the area. The spotters for each of these facilities are usually in the employ of the local facility. For example a large industry could use members of its security staff who position themselves either on a high protected portion of the building or on a hill just to the west of the facility and report back to the switchboard operator by walkie-talkie radio. The warning would then be fanned out through the facility to key department heads or over the PA system. The schools, hospitals, and nursing homes can use either members of the maintenance or administrative staff who observe from the western side of the building usually from an upper floor window if available. The reports are given to the administrative office either by walkie-talkie or intercom and the take cover message is broadcast over the internal PA system or bull horn.

Additional supplemental spotters networks should be established for mobile home parks by using residents who are alerted of an approaching storm either by a telephone call or by a receiver on the indoor warning system which can be rotated to predetermined members of a committee. If a sighting is made, the warning could be passed out by runners going through the park with a bull horn or possibly by a small locally operated siren.

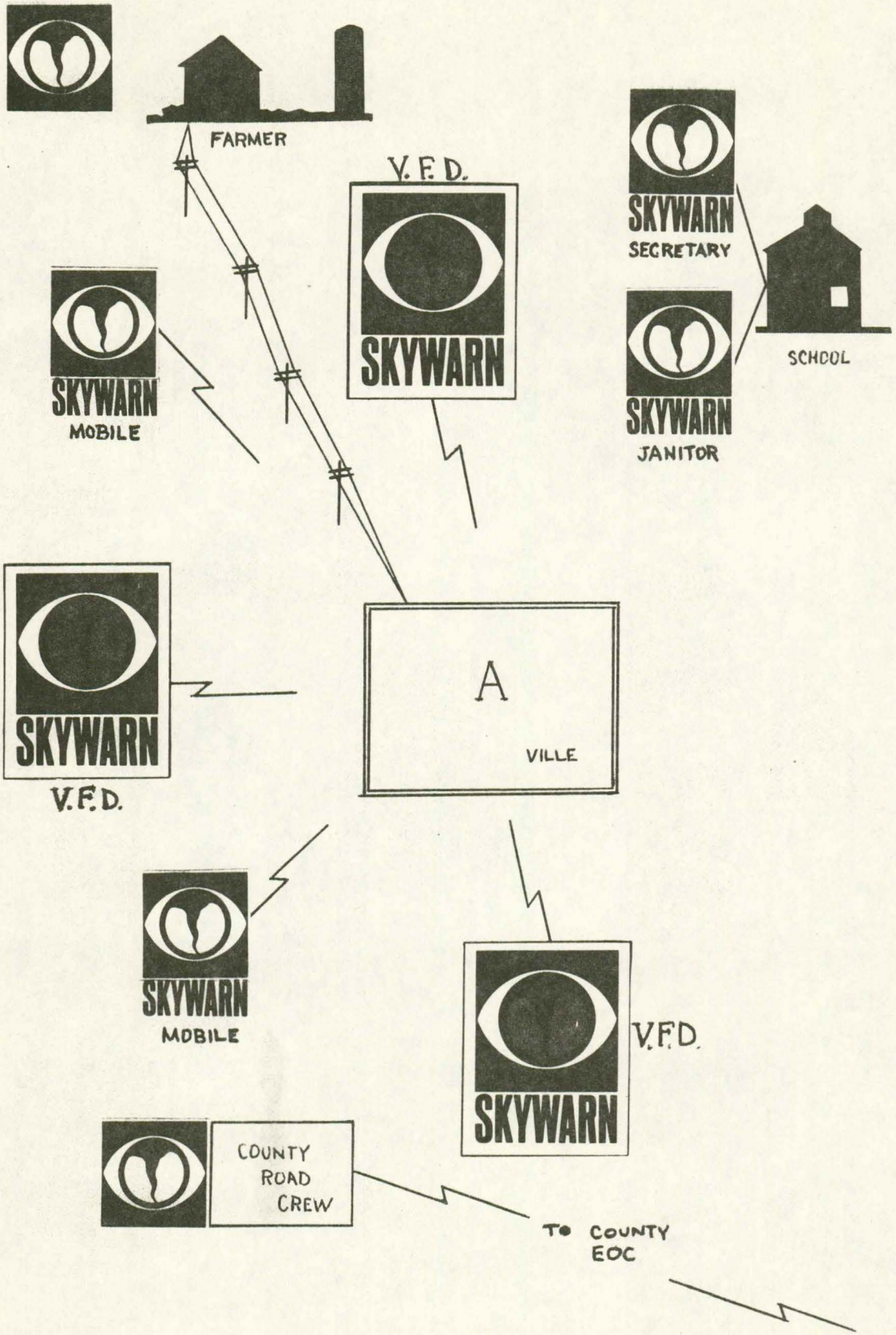
Large shopping centers can be particularly vulnerable to damage and destruction from tornadoes and severe thunderstorms, and require special attention.

To the extent possible, each should arrange for supplemental spotters, identify a safe shelter and train employees to use public address or other means to assist shoppers to reach this shelter when a tornado or a severe thunderstorm approaches.

Once a complete survey has been made of the existing facilities and resources for each community, compare each to the examples and develop a network for each community which best matches or applies. If an example does not completely match the existing or planned facilities, select the features of the example or examples which best apply.


FARMER
V.F.D.
MOBILE V.F.D.
V.F.D.
A VILLE
MOBILE V.F.D.
V.F.D.
SCHOOL
COUNTY ROAD CREW
CB
HAM
COUNTY ROAD CREW
D CITY
HAM
HAM
COUNTY ROAD CREW
CB
FARMER
CB
B BURG
CB
CB
CB
FARMER
POWER CO. MAINT.
? INCORPORATED
S.H.P.
CB
FARMER
FIRE DEPT./HAM
SERVICE STATION
POLICE CB
E COUNTY SEAT W.P.
POLICE HAM
FIRE/C.A.P.
XYZ MOBILE HOME PARK
CB
CAP
HOSPITAL
GAS TRUCK
PIPELINE PUMP STATION
CB
FARMER
TELCO MAINT.
HAM
H PARK
CB
FARMER
CONCRETE TRUCK
POLICE
V.F.D.
G CENTER
C.B.
FARMER
CB
FARMER
CB
CAP.
FARMER WITH CB
CB
CAP
C TOWN
C.A.P.
HAM
DEPUTY
FARMER
FARMER
SERVICE STATION
F JUNCTION
FARMER WITH CB
COUNTY ROAD CREW
CB
DEPUTY
FARMER
DEPUTY
I SPRINGS
LUMBER CO. TRUCK
DEPUTY

Example -1-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V.F.D.
SKYWARN
SKYWARN
SECRETARY
SCHOOL
SKYWARN
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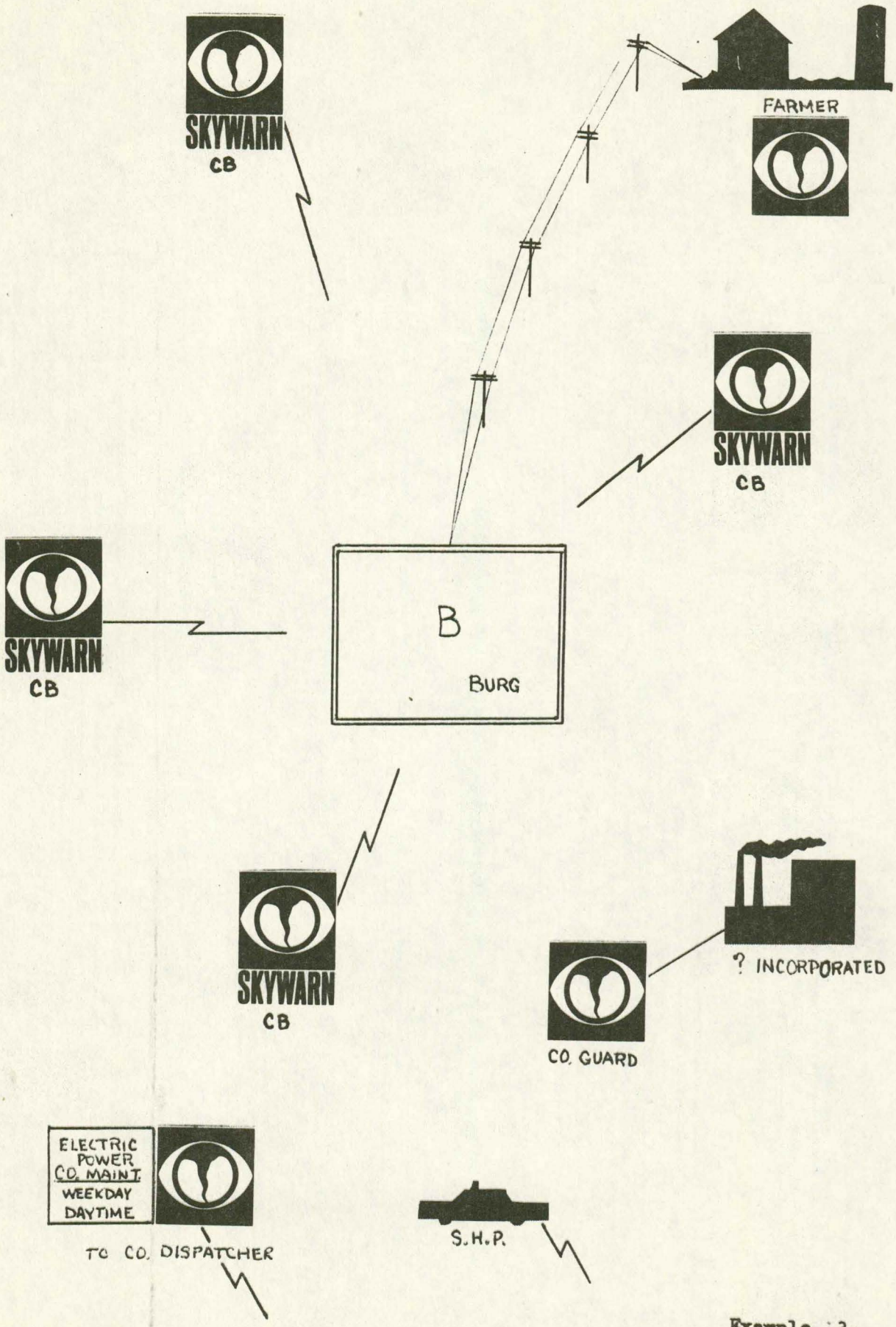
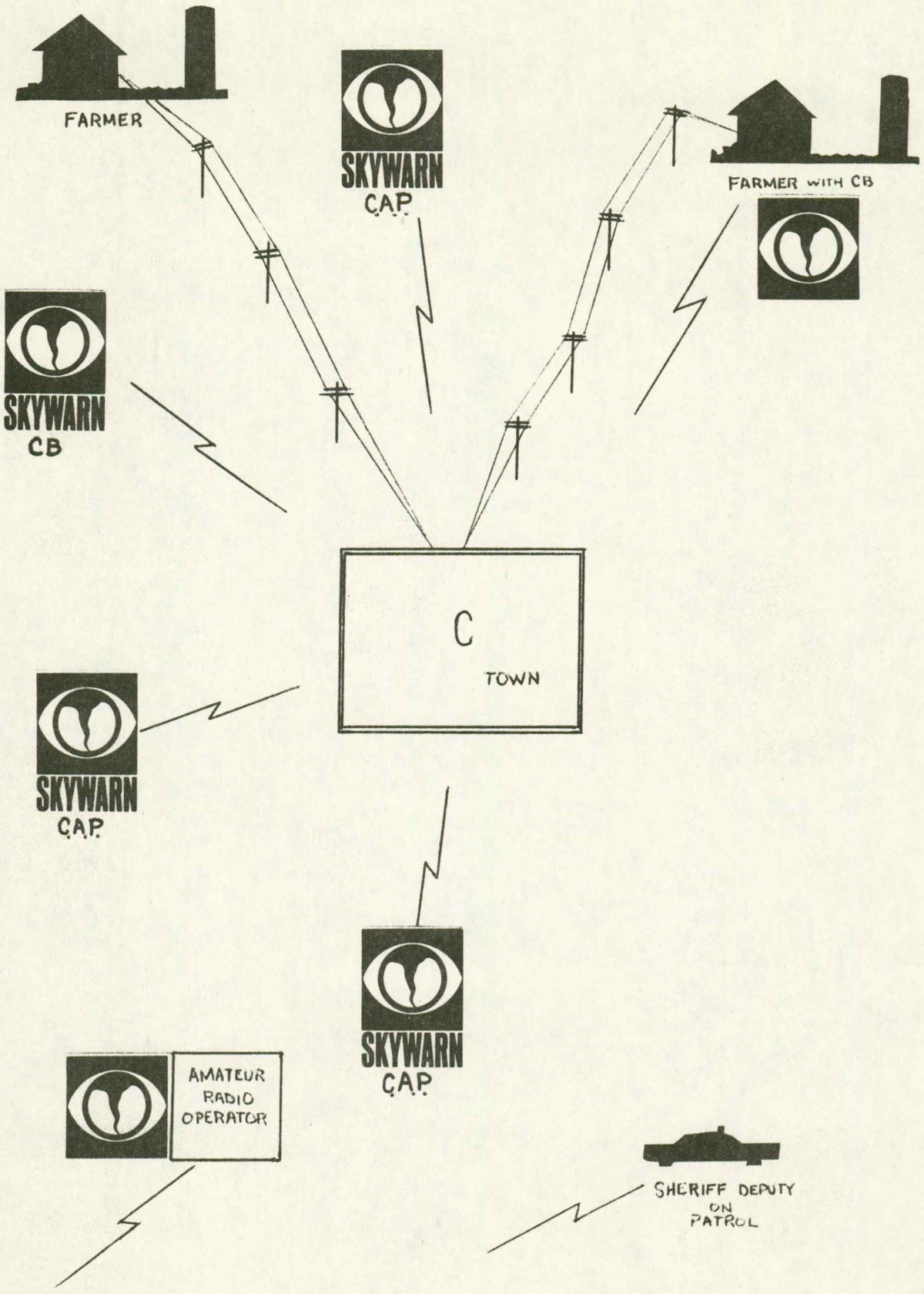
SKYWARN
JANITOR
SKYWARN
V.F.D.
A
VILLE
SKYWARN
MOBILE
V.F.D.
SKYWARN
COUNTY
ROAD
CREW
TO COUNTY
EOC

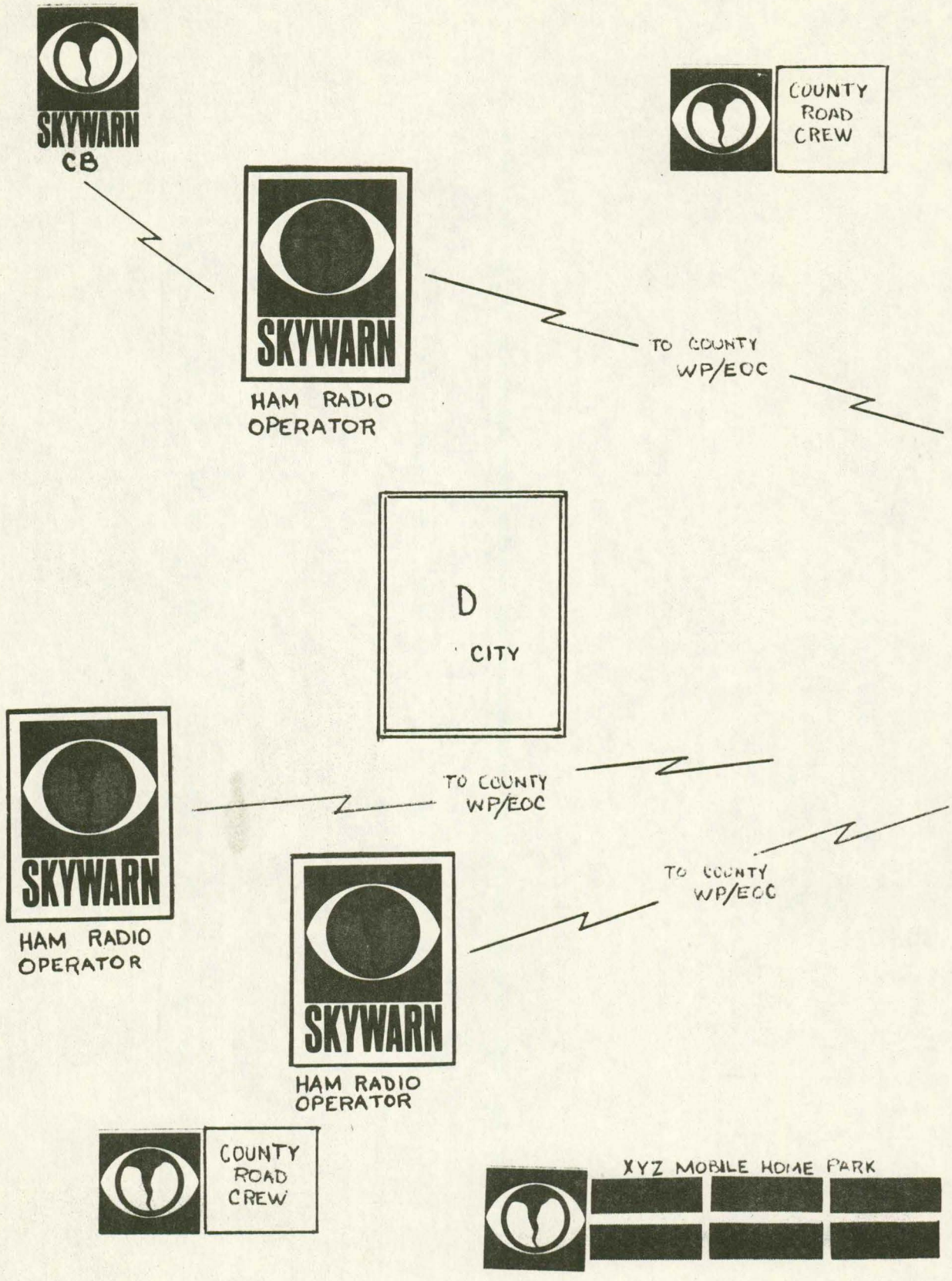
Example -2-


SKYWARN
CB
FARMER
SKYWARN
CB
SKYWARN
CB
B
BURG
SKYWARN
CB
? INCORPORATED
CO. GUARD
ELECTRIC POWER CO. MAINT. WEEKDAY DAYTIME
TO CO. DISPATCHER
S.H.P.

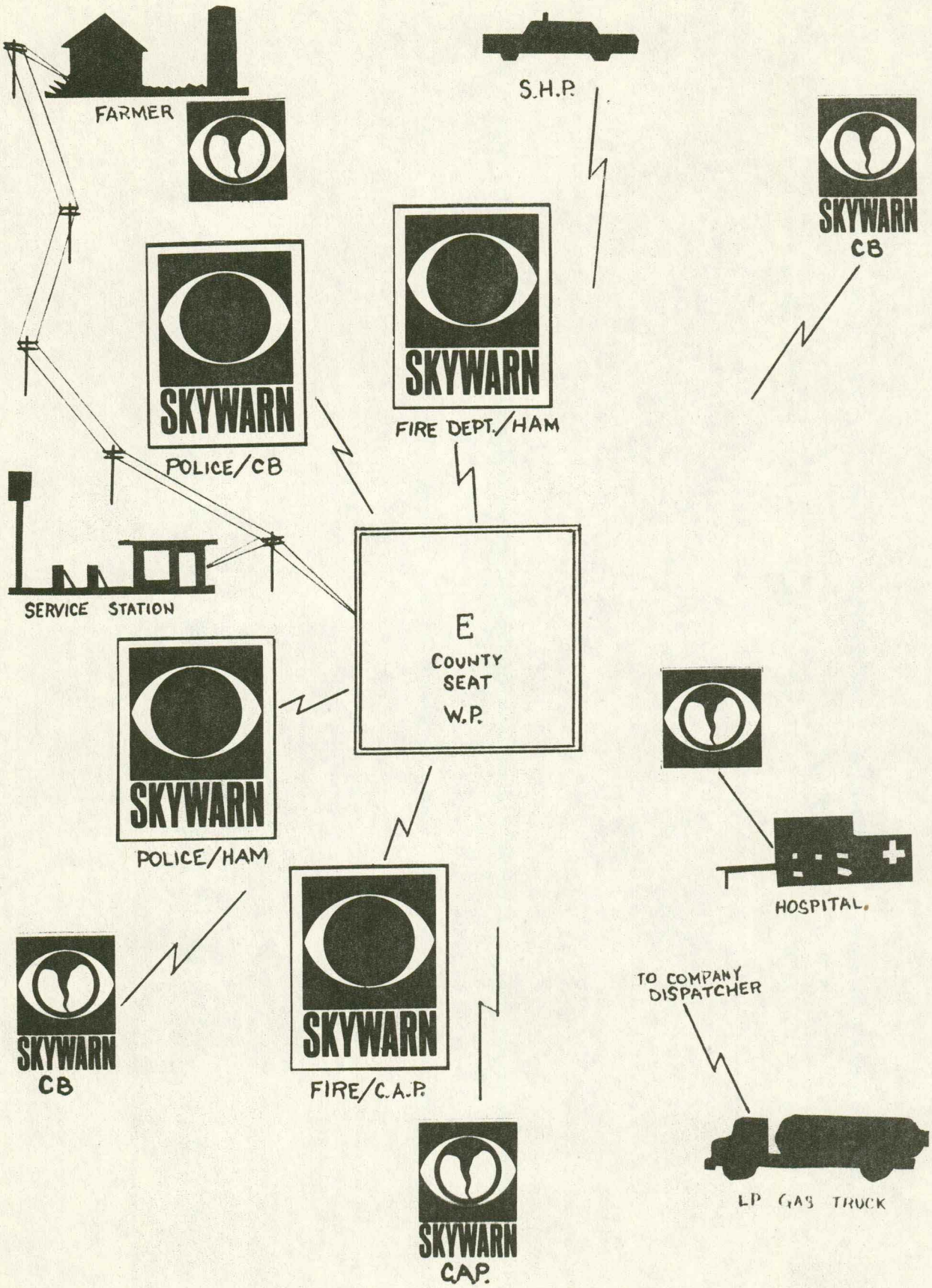
Example -3-


FARMER
SKYWARN
CAP
FARMER WITH CB
SKYWARN
CB
C
TOWN
SKYWARN
CAP
SKYWARN
CAP
AMATEUR
RADIO
OPERATOR
SHERIFF DEPUTY
ON
PATROL

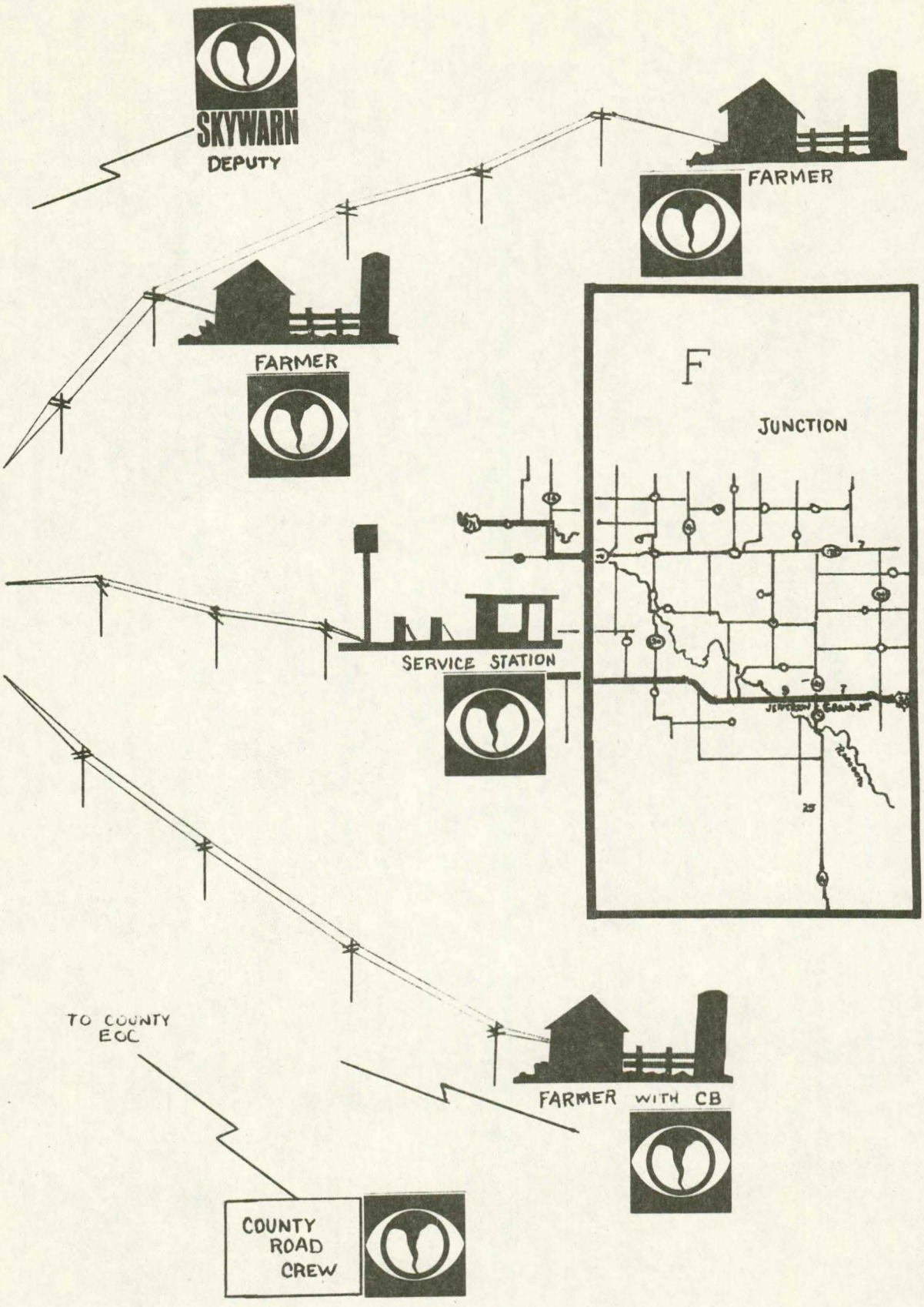
Example -4-


SKYWARN
CB
COUNTY
ROAD
CREW
SKYWARN
HAM RADIO
OPERATOR
TO COUNTY
WP/EOC
D
CITY
SKYWARN
HAM RADIO
OPERATOR
TO COUNTY
WP/EOC
TO COUNTY
WP/EOC
SKYWARN
HAM RADIO
OPERATOR
COUNTY
ROAD
CREW
XYZ MOBILE HOME PARK

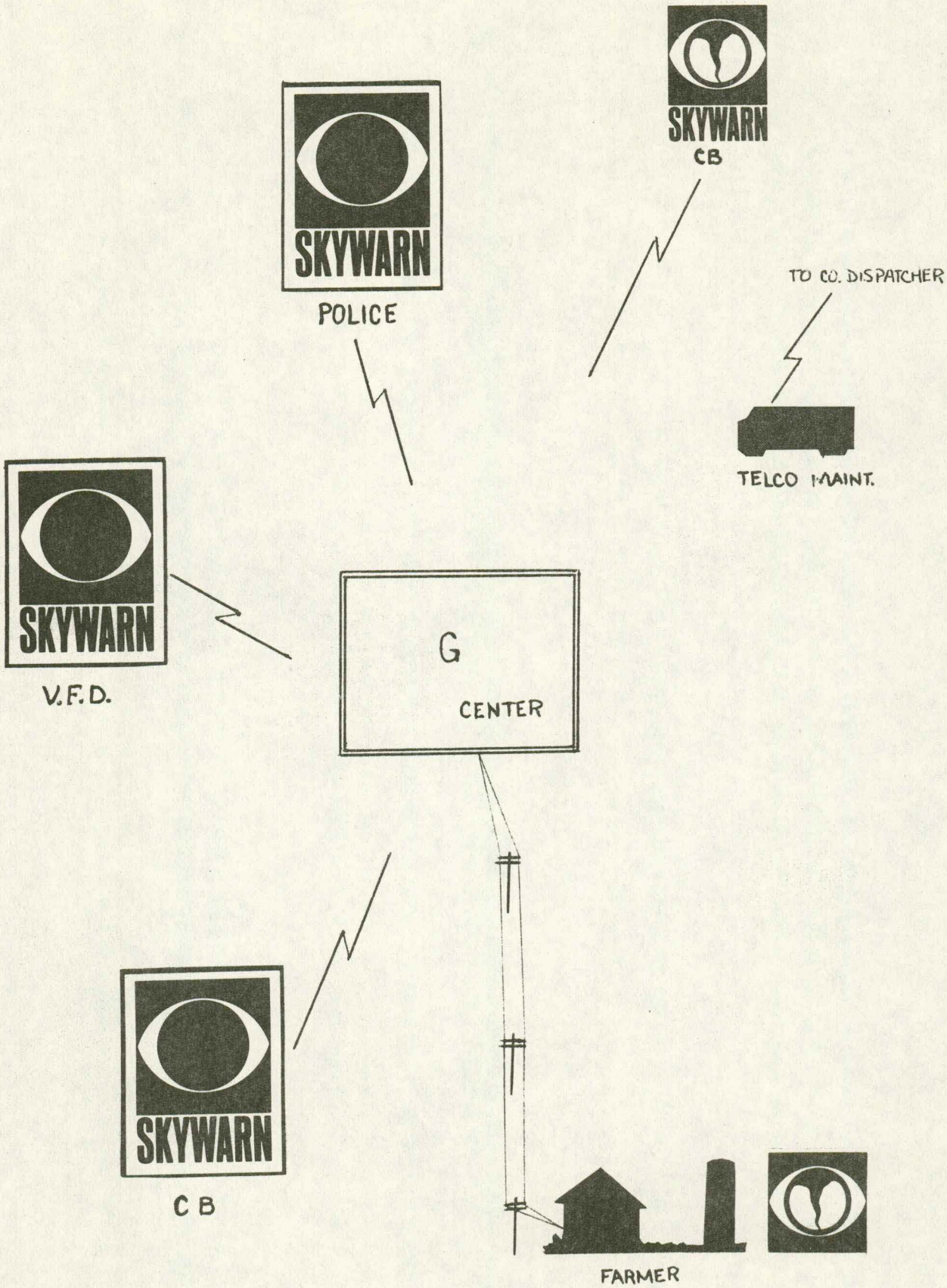
Example -5-


FARMER
S.H.P.
SKYWARN
CB
SKYWARN
POLICE/CB
SKYWARN
FIRE DEPT./HAM
SERVICE STATION
E
COUNTY
SEAT
W.P.
SKYWARN
POLICE/HAM
HOSPITAL.
SKYWARN
CB
SKYWARN
FIRE/C.A.P.
TO COMPANY
DISPATCHER
SKYWARN
CAP.
LP GAS TRUCK

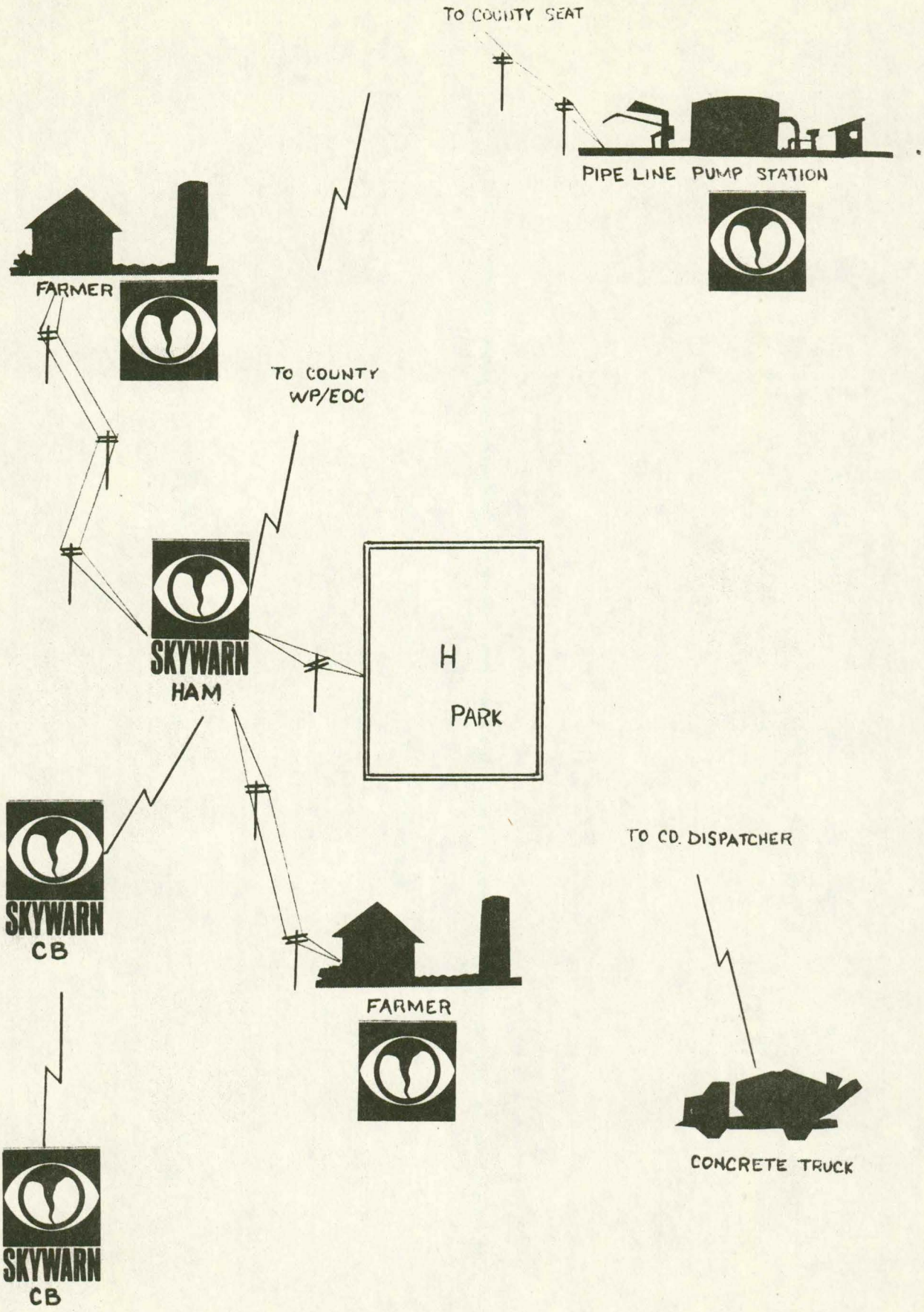
Example -6-


SKYWARN
DEPUTY
FARMER
FARMER
F
JUNCTION
SERVICE STATION
TO COUNTY
EOC
FARMER WITH CB
COUNTY
ROAD
CREW

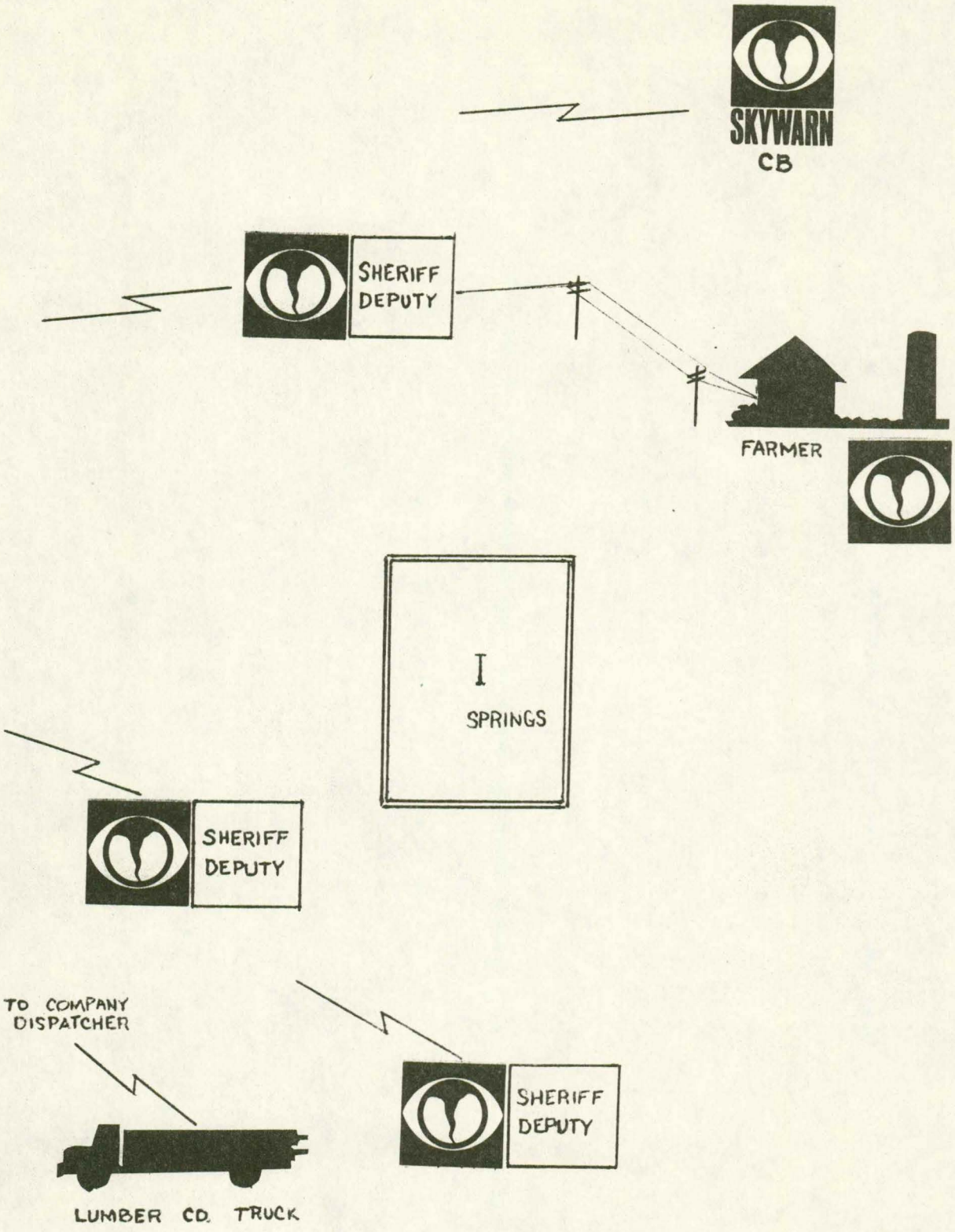
Example -7-


SKYWARN
CB
SKYWARN
POLICE
TO CO. DISPATCHER
TELCO MAINT.
SKYWARN
V.F.D.
G
CENTER
SKYWARN
CB
FARMER

Example -8-


TO COUNTY SEAT
PIPE LINE PUMP STATION
FARMER
TO COUNTY
WP/EOC
SKYWARN
HAM
H
PARK
SKYWARN
CB
FARMER
TO CD. DISPATCHER
CONCRETE TRUCK
SKYWARN
CB

Example -9-


SKYWARN
CB
SHERIFF
DEPUTY
FARMER
I
SPRINGS
SHERIFF
DEPUTY
TO COMPANY
DISPATCHER
SHERIFF
DEPUTY
LUMBER CO. TRUCK

Example -10

CHAPTER III. Planning

Your first step in developing the SKYWARN spotters network will be to conduct a thorough survey of networks that have been established for other purposes. These may include radio amateur and Citizens Band leagues, State and County Civil Defense units, community fire departments, Civil Air Patrol, public utilities, industrial security groups, stste, county, and local law enforcement agencies, and county and stste highway departments. These groups are trained to react capably to emergency situations and many have communications facilities for rapid reporting. Meetings should be arranged between the heads of these groups, their communications officers, and the local authorities establishing the SKYWARN network.

The law enforcement agencies, with their two-way communications facilities and mobility, are very effective in spotter networks. They can disseminate Watch bulletins, maintain a lookout for severe local storms, investigate rumored severe thunderstorms and tornadoes, activate local warning systems, and disseminate Warnings. They can also quickly report disasters and direct rescue agencies to points needed.

Citizens Band radio groups have been very cooperative in participating in the severe weather reporting networks. With their equipment, including mobile equipment safe from power outage, they can fan out quickly and report immediately when a tornado or severe thunderstorm is spotted. These groups will usually need yo go through some type of collecting point because of the limited range of the transmitters. On the other hand, amateur radio (HAMS) and Civil Air Patrol equipment is usually much more powerful and can, if needed, report directly to the local or county warning point. However, provisions must be made at the outset when organizing amateur andCB operators to have tight control to maintain a high order of radio discipline.

Where mobile or base station radios are not available to a community, then a survey will have to be made of people who live and work in locations with good visibility to the west, south and north of the given community. These people, if willing to participate, would have to report by telephone.

The second phase in the planning phase of developing the spotters network will be to determine what resources are available or needed for receiving these reports on the community level so that the warning can be disseminated locally first. Where possible, one location in each city or town should be designated as the community warning point. Ideally, this should be an emergency operating center of the local civil defense or an office that is open or operating 24 hours per day. Two-way radio communication in the office is nearly a must. This might be the police department, sheriff's office, fire department, combined law enforcement communications center, power or water plant, or the security office of a large industry.

If such dispatch centers are not available, then some local agreements might need to be made for someone in the community to act as collection center for reports to be relayed to the county warning point. This might consist of an amateur radio or C.B. operator using the base station in his or her home as the collection point for incoming phone calls or radio messages from mobile units. In some cases, persons confined to their homes because of physical disabilities are delighted to provide this service on a nearly continuous basis. If such agreements cannot be made, then the reports should be made directly to the county warning point or law enforcement center.

In organizing the network of a given community, the resources for dissemination of the warning "locally" should be considered equally as important when selecting the point or location receiving the reports. The details of warning and dissemination are contained in Chapter I and will not be repeated in this section. If you are not thoroughly familiar with the various types of equipment and methods used in warning and watch dissemination, it is recommended that Chapter I (Warning Dissemination) be reviewed again before proceeding to the next step. This way you can better understand how various surveyed facilities can fit into the warning and report collection process.

The following pages are blank resource survey forms to guide you in the detailed organization aspects of Chapter II of this booklet.

If the network is only being set up for one single community rather than for a whole county, then use only the portions of the survey forms designed for communities. The community examples shown in Chapter II (Organization) can be reviewed and the example most closely matching the resources of the community can be applied.

COUNTY/CITY SEVERE WEATHER SPOTTER NETWORK RESOURCES SURVEY

DISPATCH/WARNING CENTERS
AND REPORT COLLECTION CENTERS

	HOURS OF OPERATION	DAYS PER WEEK	FREQ. MONITORED	LOCATIONS
GOVERNMENTAL				
SHERIFF'S OFFICE				
POLICE DEPTS.				
COMBINED COMM.				
CIVIL DEFENSE EOC				
COUNTY/CITY HWY DEPT.				
UTILITIES				
ELEC. POWER CO.				
WATER TREATMENT				
TELEPHONE CO.				
MISC.				

SURVEY CONTINUED

DISPATCH/WARNING CENTERS AND
REPORT COLLECTION CENTERS

PRIVATE	HOURS OF OPERATION	DAYS PER WEEK	FREQ. MONITORED	LOCATIONS
CIVIL AIR PATROL (base stations)				
C.B. BASE STATIONS				
AMATEUR BASE STATIONS				
INDUST. SECURITY				
COMMODITY AND SERVICE DISPATCH CENTERS (gas, oil, lumber, etc.				
MISC.				

POTENTIAL SPOTTERS LIST SURVEY

GOVERNMENTAL	FIXED (with telephone or radio)	MOBILE (with radio)	LOCATIONS
SHERIFF'S DEPUTIES			
POLICE DEPTS.			
FIRE DEPTS.			
CIVIL DEFENSE			
STATE HIGHWAY DEPT.			
COUNTY HIGHWAY			
CITY STREET DEPT			
MISC.			

POTENTIAL SPOTTERS LIST

	FIXED (with telephone or radio)	MOBILE (with radio)	LOCATIONS
UTILITIES			
ELECTRIC POWER			
TELEPHONE CO.			
WATER/GAS CO.			
PRIVATE			
CIVIL AIR PATROL			
AMATEUR RADIO OP.			
C.B. RADIO OP.			
COMMOD. DELIV.			
FARMERS			
SUPPLEMENTAL:			
SCHOOLS			
HOSPITALS			
NURSING HOMES			
MOBILE HOME PARKS			
INDUSTRIES			
SHOPPING CENTERS			

WARNING LIST SURVEY

	INDOOR WARNING RECEIVER (YES/NO)	NEEDED (YES/NO)	SIREN AUDIBLE	NEEDED (YES/NO)	MUST BE CALLED
SCHOOLS:					
A.					
B.					
C.					
D.					
E.					
F.					
G.					
H.					
HOSPITALS:					
A.					
B.					
C.					
D.					
NURSING HOMES:					
A.					
B.					
C.					
D.					
E.					
MOBILE HOME PARKS:					
A.					
B.					
C.					
D.					
E.					
INDUSTRIES:					
A.					
B.					
C.					
D.					
E.					
F.					
G.					
H.					
MAYORS:					
A.					
B.					
C.					
D.					
E.					
MISC. KEY OFFICIALS (Radio, TV, CATV)					
A.					
B.					
C.					

On the following forms fill in the basic network organizational plan of action for the county and each community plus the members of the network to serve each area and the designated observation sites and proposed reporting/warning procedures.

If you desire assistance with the organization of the network, forward a copy of these forms to the National Weather Service Office having warning responsibility for your county. If you do not know which office to contact, contact any office of the Weather Service or the Iowa Civil Defense Division. The staff of the Weather Service will review your plans and make possible suggestions for improvement or correct procedures which may be in conflict with existing or newly established procedures, policies, or capabilities. Since new improvements in techniques and equipment are constantly being made, the review by the Weather Service may result in a suggestion based on these new ideas which may not have received much publicity.

COUNTY SKYWARN ACTION PLAN

COUNTY _____

WARNING POINT _____ ALTERNATE _____

****

Methods of receiving reports _____

****

Methods of warning dissemination _____

****

Procedures for spotters net activation _____

****

OBSERVATION SITES OR LOCATIONS (non-community)

****

SPOTTERS RECRUITED

(City Name)
WARNING POINT _____ ALTERNATE _____
****
Methods of _____
Receiving Reports _____
****
Methods of Warning _____
Dissemination _____
****
Procedures for Spotters _____
Network Activation _____
****

OBSERVATION SITES OR LOCATIONS

_____ _____ _____
_____ _____ _____
_____ _____ _____
****

SPOTTERS RECRUITED

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____

(City Name)
WARNING POINT _____ ALTERNATE _____
****
Methods of _____
Receiving Reports _____
****
Methods of Warning _____
Dissemination _____
****
Procedures for Spotters _____
Network Activation _____
****

OBSERVATION SITES OR LOCATIONS

_____ _____ _____
_____ _____ _____
_____ _____ _____
****

OBSERVERS RECRUITED

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____
****

CHAPTER IV. Training

Regardless of the amount of prior observational experience, a spotter may have had, training is as important for the veteran as it is for the novice. Training for the veteran provides updated information on new techniques and reporting procedures and keeps skills sharpened while it provides for the novice the basics upon which to build good observational procedures and methods. Spotters need to have a thorough knowledge of tornado and severe thunderstorm characteristics, not only to ensure that they are able to recognize these hazards, but also to avoid erroneously reporting non-hazardous conditions thereby generating needless warnings.

Once you have completed the first two phases of this program, and your action plan for operation of the network has been reviewed, arrangements should be made with the Weather Service to conduct the training programs. You should arrange for a meeting room adequate to seat the anticipated number of participants plus having the layout necessary for good filmed audio-visual presentation.

Depending on the degree of familiarity with the need for the SKYWARN program the training sessions will normally take from 1 hour to a little over 2 hours, the latter length presentation being for newly formed groups while the shorter for veteran groups.

The training session will make use of both films and slides. Each spotter is supplied with detailed instructional material by the National Weather Service. Included are copies of the brochure, "Tornado", Spotters Guide for Identifying and Reporting Severe Local Storms, Severe Local Storm Warning Service, Thunderstorm, and a Pocket Guide to Estimating Wind Speed.

Periodic additional training sessions should be developed and planned locally with members of the network to ensure continued efficient operation. The cooperating National Weather Service official can assist with advice or in person.

It is especially important that principals of all schools and administrators of other various institutions such as hospitals, nursing homes and businesses understand the severe local storm warning service and the value of the supplemental spotters for their respective facilities and have their assigned spotters at such meetings.

CHAPTER V: Operation of the Network

Although it is not possible to predict the exact time of occurrence of tornadoes, or when they will strike, it is possible to identify areas approximately 100 miles wide and 250 miles long in which weather conditions suggests a high probability of tornado generation. In most cases, the notification that conditions are such that severe weather is likely to come in the form of a WATCH. The WATCH is used to define the area and time. However, not all severe weather occurrences are covered by WATCHES.

Therefore, it is important in the operation of the network to be prepared to alert the spotters to action upon receipt of essentially three different types of alerting conditions. One is through receipt of a WATCH or WARNING via one of the channels outlined in Chapter I. Second, through receipt ofa call from a Weather Service Office that a storm in the locality requires increased vigilance, or notification by an adjacent county that a particularly heavy storm is moving in your direction, and third, simply by local observation that the appearance of a storm looks unusually threatening.

The call to action can be disseminated to the spotters through various methods and has been outlined in Chapter I. The most efficient, however, would be to broadcast the need to activate the spotters over the indoor warning system. It is unlikely that funds would be available to have a receiver assigned to each designated spotter, although, one assigned to the community warning point would be sufficient to get the message to each community and then the alerting message could be fanned out to the spotters by a telephone calling list. In the case of a CB or amateur radio network serving as spotters, a broadcast over a specified channel may work satisfactorily. If an indoor warning system message dissemination method is not used, then a radio or telephone message to the community communications center, EOC, or warning point is the only other alternative.

If a fire department is serving as the spotters network, a call to the multiple fire telephone or broadcast over a tone activated fire radio system could be the method used. In either case, the spotters generally operate from fixed points such as homes, business, high hills, etc. Such spotters might consist of service station operators, farmers, a fire truck or police car assigned to a specific spot west of town or a CB or amateur radio operator with a mobile radio near high open ground on the southwest edge of the city limit or the supplemental spotters observing from their respective facilities. Outside of the home or business, each of these spotters may be assigned to one of these points on a permanent basis or assigned a position when responding to the call to action.

The place name assigned to the observing point is usually that of the nearest community or some prominent geographical location. Another method is to use a six-digit number which is the azmith and range from the county seat or some other central location. A third alternate method might be to grid the county similar to a state road map and use a number for the vertical columns and a letter for the horizontal rows. Then the transmission of an alpha-numeric code would locate the storm or report within the confines of the box or grid.

In any case, once a spotter has assumed the assigned position, a confirmation of such should be radioed or phoned to the appropriate warning point so that officials at the warning point will know the area is covered.

Upon activation of the spotters network, the county and local community EOCs communications centers, or warning points should be staffed to receive and relay reports, coordinate messages, direct movements of mobile spotters, and to disseminate appropriate warnings.

Mobile spotters such as law enforcement personnel, amateur or CB radio operators with mobile equipment, county road crews, or cooperating private radio dispatched vehicles indicate their positions and locations of observed weather by reference to a town, a cross road, or some other well-identified point. They may also provide a continuous watch across open country of a storm which appears to be particularly threatening.

The community or county warning point or EOC receiving the spotters' reports plots them, keeps up with the movement of the storm. When reports are received from casual observers, attempts are made to confirm tornado or funnel cloud sightings by checking with spotters near the reported locations or moving mobile spotters into position to be able to observe the storm.

The county warning point/EOC then relays the reports to the National Weather Service Office having warning responsibility for the county. The Weather Service Office receiving the reports plots them usually on its radar screen, which enables the radar operator to relate the reports to the radar "echoes" produced by the rain accompanying the severe weather. By this means, the Weather Service can quickly determine the direction and rate of movement of the tornado or severe thunderstorm threat, and determine which additional areas should be given immediate warning. This system is also used to follow the further progress of the storm or storms and to watch for additional tornadoes or severe thunderstorms -- for sometimes more than one may plague an area at the same time, and unless reports are continued and sorted out, confusion develops as to the location and direction of movement of the threatening conditions.

The spotters network is designed to operate in such a manner that the reports of spotters are received at the local warning point first for immediate warning with only the confirmed or highly suspected reports meeting a certain criteria being relayed to the Weather Service by the county warning point. In addition, coordination concerning storm movement or intensification can be more effectively handled between one point in a county rather than 40 individual reports which would have to be ultimately relayed back to the affected county.

The services performed by SKYWARN spotters have saved many lives. You may find that a high morale can be maintained if a periodic newsletter is prepared and circulated to the members of the spotters network who are helping to protect the local community or area. The newsletter could contain discussions on instructions, questions and answers in reporting procedures, and summaries of recent severe local storm activity, listing those spotters who particip-ted in reporting severe weather conditions. Officials of the National Weather Service can assist in answering questions and preparing summaries of recent warning actions to show the effectiveness of a report or the deficiencies in the system by the lack of a timely report.

CHAPTER VI. Test and Drills

To make certain that the Tornado and Severe Thunderstorm reporting network becomes, or remains, functional, the agency or organization in charge of operation of the network should arrange for test exercises to be conducted during "safe" periods. All participants, the communications media, and the general public should be notified in advance of the practice nature of the exercise, so that there can be no confusion with an actual severe weather situation. These tests can be coordinated with the Weather Service Office having responsibility for the county for additional input and realism.

A suggested format for a complete countywide drill or test of not only the spotters network but the entire warning system and process and its effectiveness in regard to the news media, schools, hospitals, etc., is outlined below.

Contact each of the agencies, departments, organizations or institutions to be included in the drill. Select a date and inform each of the participants involved what their response should be.

On the day of the test at a predetermined time, the Weather Service can disseminate a test or drill type WATCH via the normal communications channels. The local news media can be requested to go through all procedures in dissemination of the WATCH just short of an actual public broadcast. It may be that the station management would want its personnel to explain verbally or in writing what each of the broadcasters would do to ensure their staffs are familiar with existing procedures. They may want the broadcasters to actually make the broadcast except in such a manner that it would be taped or made into a microphone going to some other part of the building rather than over the air.

Upon receipt of the test WATCH at the county or community warning point, the test message could be disseminated over the indoor warning system. Telephone calls could be made to key officials according to the normal plan. The complete spotters network should be notified and activated to determine the response during normal working hours when a large percentage of volunteers would not be available. Schools, hospitals, and other facilities would put into action their severe weather WATCH action plans.

It is recommended that an exact time not be set for the test but rather the test should be conducted between agreed upon time limits which would span a couple of hours such as between 9:30 AM and 11 AM or between 1 PM and 3 P.M. This would allow for a more natural response on the part of the participants.

Each phase of the test would be monitored by local CD officials of the various institutions or facilities to assess whether actions taken were consistent with existing plans or whether they are practical in light of time or space constraints.

Once the spotters network is on station, a mock storm should be reported by the spotters network through prearranged and timed drill or test script messages. A coordination call to the Weather Service can be made through each of the various communications channel to ensure the Weather Service can be reached effectively and to ensure that the Weather Service is apprized of the progress of the test storm and that all channels are operating according to the plan.

Upon receipt of a test or drill sighting, the local warning point will disseminate the warning locally, relay the report to the county which in turn relays the report to the National Weather Service Office. The National Weather Service relays the test warning to the appropriate warning channels while at the local level, schools move students to shelter areas, hospitals and nursing homes review their procedures for moving patients to shelter areas. Where possible hospitals may move unoccupied beds to ensure that the time and personnel are adequate and that all personnel are aware of the proper methods in handling patients in such emergencies. CD and fire rescue teams can be marshalled to provide an assessment of the time needed to get initial recovery into operation.

Once all of these actions have been taken, the participants should resume normal activities, and officials of the participating agencies either meet or forward reports to the coordinating Civil Defense agency as to the success or failure of their severe weather action plans. Obviously, where needed, the plans should be altered to improve timing, message dissemination, shelter requirement, etc. Officials of the Weather Service and Civil Defense can provide assistance and make recommendations on improvements in the system.

A test of this type if conducted once or twice a year prior to the onset of the severe weather season should provide invaluable feedback as to the effectiveness of the total warning system to reduce the numbers of people injured or killed as the result of severe weather occurrences, which in essence is the only goal of the SKYWARN program.