

Forecasting Handbook No. 2



NOAA Weather Radio Operations

September 1978

Revised February 1981

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

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Forecasting Handbook No. 2



NOAA Weather Radio Operations

NOAA Weather Radio Network
Operating and Broadcasting Procedures

September 1978
Revised February 1981

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NATIONAL WEATHER SERVICE
Forecasting Handbook Number 2

NOAA Weather Radio Operations

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INTRODUCTION (I-1)

1. Purpose. This handbook provides guidance in some areas and specific instructions in other areas for the day-to-day operation of NOAA Weather Radio (NWR) stations. Commercial broadcast procedures, accepted speech and writing practices, directives from Weather Service Headquarters (WSH), regional headquarters, and local directives were drawn upon in developing this material. This handbook specifically supplements WSOM Chapter C-64, NOAA Weather Radio (NWR) Program. In case of conflict, WSOM C-64 takes precedence.

2. Description. This handbook consists of the following parts:

- Chapter 1, Introduction
- Chapter 2, Writing
- Chapter 3, Broadcasting
- Chapter 4, NWR Safety Messages
- Chapter 5, Console Operation
- Chapter 6, Operator Maintenance
- Chapter 7, Operator Diagnostics

These chapters are described below.

2.1 Introduction. The introductory chapter describes the scope, layout, and objectives of the handbook.

2.2 Writing. The chapter on writing provides guidelines and suggestions for the preparation and improvement of written material to be used in NWR broadcasts.

2.3 Broadcasting. The broadcasting chapter provides a discussion, guidelines, suggestions, and training material on the subjects of voice, diction, speech characteristics, and broadcasting techniques.

2.4 NWR Safety Messages. This part of the handbook provides the scripts of the NWR safety messages that are normally transmitted during watch and warning situations.

2.5 Console Operation. This chapter covers the equipment description and general operating instructions for the NWR manual and remote control consoles.

2.6 Operator Maintenance. As indicated by its title, this chapter describes in detail the type and frequency of the preventative maintenance procedures that are to be performed by NWR operators.

2.7 Operator Diagnostics. This chapter provides step-by-step emergency diagnostic procedures for NWR operators.

3. Handbook Binder. The binders for this handbook contain divider inserts for the listed chapters, WSOM C-64, ROML's, SDM material, as well as for an optional section on severe weather procedures which field stations may want to include. To provide additional flexibility, there are four blank inserts.

4. Operational Procedures. Procedures, guidance, and suggestions are based upon the premise that routine weather broadcasts are made in accordance with existing approved program formats. However, no set of uniform standards can cover all possible weather or natural disaster occurrences or all possible broadcasting and recording situations.

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Chapter II - Writing

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WRITING (II-1)

1. Writing. Written material is the basic foundation of the NWR broadcast. Writing of poor quality dooms the average announcer -- and the broadcast -- to instant mediocrity. All personnel must recognize the impact of writing quality on the NWR program and strive to prepare good material.

1.1 The Importance of Weather Information. Weather information is a valuable product. For many people, it is the first thing they tune in to in the morning and the last thing they check before going to bed at night. Because we weather people are at times the subject of more criticism than praise, we tend to lose sight of the value of our day-to-day services to the public. Rest assured, your community is eagerly waiting to put your latest word to use, whether it is to plow a field, take a trip, estimate power consumption, pour concrete, or play a baseball game. The diversity of a community's weather information needs makes the job of writing weather products all the more challenging and all the more important. Keeping this importance in mind will make it easier for you to maintain a positive image of yourself and your job which will, in turn, have a positive effect on the products you prepare for your public.

1.2 Understandability. The most important objective to strive for in the preparation of weather information material is understandability. If a listener cannot readily understand the message, the message is worthless. Bridging the gap between listener and communicator is not an easy task. However, by paying attention to the following areas you may be able to improve your understandability:

1.2.1 Audience Characteristics. You should know something about the people who will be listening to your weather information material. For example, the listener is:

- a. possibly in an environment with at least some distracting background noises and may be getting only fair radio reception.
- b. probably not paying full attention to the broadcast.
- c. probably in possession of only a limited understanding of weather and weather terminology.
- d. probably impatiently waiting for one specific piece of weather information.
- e. probably attuned to the quality of commercial broadcasters.

(NWR listeners are often people who have temporarily turned off their regular programs in order to hear our weather broadcast. If the contrast in broadcast quality is too great, the listener may find our program difficult to understand and reject us as a source of broadcast weather information.)

In simplest terms, we have to understand those we are serving before we can provide the best service. Since we don't have the benefit of fancy market surveys, we must rely on our contacts with the public, listener responses, and good common sense.

1.2.2 Decisiveness. Indecisiveness, especially in writing forecasts, can lead to a product that confuses the public. Being decisive is not always an easy task. There are times when you will have low confidence in the prediction. Even in such cases, you must not hedge, not be apologetic, but must clearly state the most likely possibility. In a related weather discussion or synopsis you may wish to discuss the uncertainty or the alternatives, but you will confuse the listener unless you finish with a clear unequivocal statement of what you expect.

1.2.3 Readability. The effort to achieve readability should include use of moderately short sentences, avoidance of tongue-twister word combinations, and placing thoughts in logical sequence. Although there are limitations due to the set-up of the teletypewriter keyboard, observing rules of punctuation is important. Proper punctuation allows a broadcaster to make natural pauses and catch his breath while broadcasting.

1.3 Message Composition. The NWR broadcast is composed of a variety of weather information products. It is important that the various messages be compatible with each other. Therefore, before preparing a piece of weather information material, the writer should know what has already been written and should coordinate with persons preparing other parts of the weather information package.

The following are some hints as to the preparation of various segments of the weather information package.

1.3.1 Forecasts. Forecasts should be clear, concise, and confidently written predictions of future weather events.

1.3.2 Weather Narratives. Narratives contain descriptions concerning a complex subject -- meteorology. Care should be taken to ensure that these descriptions are given in layman's terminology and in a conversational manner. Weather narratives normally should lead directly into the forecast, but are not a substitute for the forecast.

WRITING (II-1)

1.3.3 Tabular Data. Tabular data should be summarized where possible and presented in narrative fashion. Some of the more important cases are:

a. Local Observations. Where numerous local observations are available, it should suffice to give one full observation for the "prime" location and then to summarize the rest of the data.

b. Marine Observations. Try to summarize the most general condition and then include a few of the more important exceptions. Also, the data should be scrutinized to ensure that a lot of insignificant reports from sheltered inlets are not distorting your summary.

c. River Stages. It may be necessary to list a few key points. Also, during hydrologic emergencies the data should be presented in tabular form. At other times, a narrative description will suffice. For example: "Rivers are slightly below normal and rising slowly."

1.3.4 Radar Summaries. Radar summaries may, in fact, be the most challenging piece of weather information material that field office personnel are required to write. Aside from an occasional glimpse at a radarscope on a local TV show, the public is totally dependent upon broadcasts, whether commercial or NWR, for their radar information. This information constitutes one of the most important parts of the total information package disseminated from a field office. Writing an informative, easily understood radar summary is not an easy task.

The following are some suggestions that may help you in writing radar summaries:

a. Preparation. Good radar summaries require advance preparation. In addition to the standard radar overlays, each radar room should have a topographical map of the area, a county designator map, a highway map, or a map combining these features. If these maps are available in the same scale and projection as the radar overlay, so much the better. Major watersheds and significant potential flood zones should also be clearly identified on one of the maps. The "Geographical Area Designator Map" may prove useful in describing precipitation area location.

b. Describing the Radar Picture. Things to avoid when describing the radar picture are:

1. Using small towns or unfamiliar geographical points in locating precipitation areas.

2. Describing boundaries of very large areas containing precipitation. For example; "scattered showers are occurring

inside an area bounded by Rochester, New York; Harrisburg, Pennsylvania; Manasquan, New Jersey; New York City; and back to Rochester." This information is so general and confusing it does nothing to amplify the forecast which probably already calls for scattered showers.

3. There may be occasions when radar detects no precipitation, but local observations indicate that some light precipitation is falling within your area of responsibility. In these cases, be sure to mention this reported precipitation in your summary along with the fact that the radar is not detecting precipitation.

Things to do when describing the radar picture are:

1. Remember, your report will be history by the time it gets on the teletypewriter or on the air. Where the summary is prepared by the radar observer, it would be helpful to include some hint of what areas the echoes will be affecting during the next hour if present trends continue.

2. Use the descriptive terminology that predominates in your community. In some areas topographic features may be used as common reference points. In others, political boundaries may predominate. References based on large population centers are always a safe bet.

(a) Highlight the most significant echoes, or put them first in your summary. Remember, especially significant echoes should be accurately located using a direction and distance from a well-known point. Giving the movement of especially significant echoes is important too.

(b) After the lead or highlight comes the general description. Let the scale of the precipitation determine your frame of reference. A city may serve as reference point to smaller areas; a couple of cities may suffice for a line; portions of counties or local topography may be suitable for medium-sized areas; and for broadscale echo patterns make use of the NWS "Geographical Area Designator Map."

(c) After the general description, get down to the most important specifics that you have not already highlighted at the beginning of your summary.

4. Think summary! While you are making your radar observation and preparing your overlay, you should be thinking of what you want to say in your summary. By the time you finish these duties, you should have a good idea of just what you want to say. This may seem difficult at first, but once mastered, you will be able to save much valuable time. Remember, radar information is a very perishable product.

WRITING (II-1)

1.4 Editing. All weather information material should be edited prior to broadcast. This vital procedure is often overlooked, more often, abandoned in haste. Editing represents the last opportunity to make a good script better and to make a poor script readable. Some of the things to look for when editing are:

1.4.1 The Meaning of the Message. Do you understand it? If you don't, it is difficult for you to announce the material with authority.

1.4.2 Typographical Errors. Errors in typing can cause you to stumble while announcing. Garbled numbers all too often are the cause of long pauses in the middle of a broadcast.

1.4.3 Grammatical Errors. Even the best writer makes an occasional mistake in grammar. So, don't take anyone's writing for granted. Remember, any mistake will play over and over and over until corrected.

1.4.4 Punctuation. Weather teletypewriters have very limited punctuation capability. There may be commas missing from your copy that originates from the teletypewriter. Taking the time to put them in will lead to easier reading and better breath control. Don't let yourself be asphyxiated by a run-on sentence.

1.4.5 Emphasis Marks and Notations. Some of the material you will be required to broadcast may be written in a style more suited to the printed media than to broadcasting. Such material should be edited and annotated to make the style more conversational. Copy may also contain words that are difficult for you to pronounce. Red-line these words, and when you come to them, take your time and pronounce them correctly.

1.4.6 Tongue Twister Word Combinations. Even professional announcers have certain word combinations that cause them to stumble, stutter, stammer, and lose their pace and smoothness. When this happens to you, rearrange the sentence or substitute words of the same meaning for the tongue twister word combination. Be sure to notify your supervisor or the individual who wrote the material of the changes.

2. NWR Programming

2.1 Purpose. WSOM Chapter C-64 provides basic guidance on NWR programming. This section expands these guidelines in terms of the day-to-day operation of NWR stations.

2.2 Goals. The goal of NWR is to provide a continuous flow of timely, useful, and understandable public weather information to the largest possible percentage of the population and, when necessary, to expeditiously provide these listeners clear and concise warning messages.

To achieve this, we must present a quality product on a nationwide basis. Within the area of NWR programming, we can take a step toward our goal by ensuring that there is a reasonable level of product and format consistency from station to station.

2.3 Policy. As outlined in C-64, it is our policy to hold to a minimum the number of mandatory programming requirements. It is our intent, however, that every NWR service area be served in the best possible manner consistent with the staffing and technical capability of the station. Our intent is further defined in the paragraphs below.

2.3.1 Users Served. NWR is primarily a service to the general public and to the marine community, where applicable. NWR should also serve special user groups when such service will not significantly degrade programming for the primary users. NWR will not be routinely programmed just for the purpose of eliminating a small number of telephone calls. We would like each local NWR program to be responsive and consistently useful to as broad a segment of the local listening public as possible.

2.3.2 Broadcast Service Area. The broadcast service area is defined either by counties, portions of counties, significant political divisions, or highly recognized geographical features, where a reliable free space signal is available. Normally, this will be about 40 miles from the transmitter. This distance is variable and may be greater than 40 miles when the antenna is sited well above average terrain. The normal distance may be reduced because of low elevation in antenna siting, terrain features such as valleys and mountains, buildings, and by nulls created when the antenna is mounted on the side of a wide tower.

Where possible, the broadcast service area is determined by measurements of the transmitter signal strength. Other aids to help identify the broadcast service area include computer-generated field intensity plots, listener surveys, and qualitative evaluations using reasonably sensitive consumer grade radios while traveling around the transmitter coverage area. Every effort will be made to inform the public of the limits of a station's warning and broadcast service area coverage. Wherever possible, inexpensive handout maps defining the local broadcast service area should be prepared and made available to the local public (see Exhibit 2-1).

2.3.3 Team Effort. NWR broadcasts are not to be considered as a series of individual efforts by NWR operators alone. They are a continuing team effort by all members of the office. Remember, a NWR broadcast reflects upon the NWS as a whole. Likewise, when your station's performance is reviewed, the quality of its broadcast affects the station's overall rating. It is important that everyone pitch in and do their share. Some of the important subfunctions in the broadcast operation are:

WRITING (II-2)

WEATHER RADIO

KWO-39

CHICAGO BROADCAST AREA



A SERVICE TO THE PUBLIC

BY THE

NATIONAL WEATHER SERVICE

CHICAGO, ILLINOIS

BROADCASTING CONTINUOUS WEATHER INFORMATION

FREQUENCY 162.550 MHz

Exhibit 2-1



WEATHER RADIO KWO-39
A BROADCAST FACILITY OF THE NATIONAL WEATHER SERVICE
CHICAGO, ILLINOIS

The Weather Radio is a service of the National Weather Service, National Oceanic and Atmospheric Administration (NOAA), of the U.S. Department of Commerce. It provides continuous, around-the-clock broadcasts of the latest weather information directly from National Weather Service offices. Taped weather messages are repeated every four to six minutes and are routinely revised every two to three hours, or more frequently if needed. The broadcasts are tailored to weather information needs of people within the service range of the transmitting station.

KWO-39 is a very high frequency (VHF) FM station transmitting on a frequency of 162.55 MHz. Weather information is recorded on magnetic tapes by National Weather Service personnel near O'Hare International Airport in Rosemont, IL. The transmitting antenna is located atop Sears tower in downtown Chicago. The service area of the transmitter is only approximated by the map on the opposite page.

Routine, daily broadcasts contain information regarding recreation and travel within about a day's drive of Chicago, detailed weather forecasts for Northeast Illinois, extended outlooks, hourly weather observations, and radar summaries as appropriate. Special weather forecasts and advisories of interest to the agricultural industry are broadcast at selected times during the day and growing season. For marine interests, the open waters Great Lakes forecast, and weather observations are part of the basic program. During the recreational boating season, detailed near shore marine forecasts are broadcast routinely. A schedule of when various messages will be available along with other promotional announcements regarding the services is broadcast frequently throughout the day.

For certain critically important weather events, primarily severe weather watches and warnings, the KWO-39 transmitter will emit a distinctive audible tone signal for eight to ten seconds at a frequency at 1050 Hertz (cycle per second) just prior to the broadcast of any emergency messages. Compatible tone activated receivers would normally be left in a speaker "muted mode" with the volume control of the receiver present to the level required by the individual listener. The receiver would provide no output until the alerting tone is received from KWO-39. Upon receiving the 1050 Hertz signal, the speaker audio is turned on and all KWO-39 transmissions would become audible. Routine programming is reduced during these critical periods with most information broadcasts being related to the hazards. A test of the "warning alarm" tone is conducted each Wednesday between 11 AM and 12 Noon. If severe weather appears imminent, this test is cancelled until the next good weather, normal business day.

This special alert service has its greatest value to law enforcement and Civil Defense offices as well as to industrial plants, schools, hospitals, and other institutions where large numbers of people assemble. The warning alarm will normally be sounded for threatening weather related events for only the following Illinois counties: McHenry, Lake, Kane, DuPage, Cook, Kendall, Grundy, Will, and Kankakee, and only the Indiana Counties of Lake and Porter. An important consideration when planning the purchase of a receiver is remembering that the signal from the transmitting antenna to the receiver must be a direct line-of-sight for the best reception providing the receiver is within the range of the transmitter. It is recommended that the receiver be able to operate automatically on batteries in case the commercial power were to fail. Also, the alarm feature on the radio should be such that the speaker will come on and stay on by itself when the warning alarm tone is transmitted and requires the listener to physically reset the radio back to the muted mode. A receiver with a .5 to 1.0 microvolt sensitivity is also recommended. Most importantly, the purchaser of a receiver should try it at its place of intended use before making a final purchase. Prices of consumer grade radios range from \$10 to about \$80. Industrial quality radios range upward from \$125.

Commercial radio and TV stations are authorized to rebroadcast any material, especially watches and warnings, transmitted over KWO-39, subject only to minimal restrictions which are stated in FCC Public Notice 70-1108-52876.

Exhibit 2-1

II-9

WSFH #2 Feb. 1979

- a. Training and guidance
- b. Scheduling of sufficient time to perform duties
- c. Responding to listener feedback
- d. Providing up-to-date information
- e. Providing well-written information
- f. Judicious editing and good announcing
- g. Regular preventative maintenance
- h. Prompt and effective maintenance
- i. Thorough and responsive monitoring

2.4 Broadcast Priority. The NWR program is a highly visible activity at most offices. It should be assigned a priority consistent with its importance.

2.5 Style. The style we use in presenting our material should be one generally accepted by the public. The inverted pyramid approach, or news style, has the public acceptability we're looking for. By news style, we mean information within a program cycle should flow from the general to the specific with reference to areal coverage and time. Emphasis should begin with the general public-oriented material, then move on to more specialized or incidental information.

In conjunction with the news style of presentation, our NWR broadcasters should make certain all ideas are clearly communicated in layman's terminology and that the public's "need to know" is satisfied (consistent, of course, with our ability to do so). For example, in regard to precipitation, emphasize "where it will occur," "when it will begin and end," and "how much will fall," i.e., light, moderate, heavy, without excess mention of cloudiness. Announcers should use a conversational delivery. The personality conveyed makes the program pleasant to listen to, while the announcer's voice directs listeners' attention to the most significant parts of the message. By all means, the broadcast must not be a talking weather wire. As much as possible, unify different tapes and products by using simple but appropriate transitions from product to product. This will create a smoothness of flow and an ease of listening.

2.6 Format. NWR programs will consist of three basic parts: the first is mandatory for all full-time stations and will be transmitted on a continuous basis except during short-fused convective warning situations; the second, which is highly desirable but dependent on staffing and product availability; and the third, is desirable but totally

optional. Some highly desirable or desirable items may be made mandatory by the Regional Director.

Each NWR office should have an up-to-date schedule of its program format on file at regional headquarters. Get the approval of your regional office before making any significant changes in program schedule or content. Make certain that your program fills the needs of people in your service area, but avoid trying to cram too much into the broadcast.

Real-time weather messages (not safety rules, promos etc.) should concentrate on the present and the future. The traditional Weather Summaries are a discussion of the past and provide little usable information. They are extremely time perishable and after a short period on the air make the entire program sound outdated. For these reasons, weather summaries should be stringently curtailed or eliminated.

2.6.1 Format Outline.

a. Station Identification (I.D.)

b. Basic Public Program (Mandatory). In accordance with WSOM Chapter C-64, the following items are to be part of each NWR broadcast. When warnings are in effect for the NWR service area, warnings take precedence. Reduce or eliminate messages unrelated to the warnings. The station I.D. may be abbreviated but never eliminated.

General:

Weather Synopsis

Detailed:

- Service Area Forecasts
- Marine Forecasts
- Warnings, Watches, and Related Statements
- Urgent Marine Information Broadcast
- Non-Weather Related Warnings

Most Detailed:

Hourly Weather Observations
Marine Weather Observations
Radar Summary

c. Other Program Products (Highly Desirable, Optional).

Nowcast
Motorists Forecast
Climate Data
Agricultural Forecasts and Advisories
Hydrological Forecasts and Data
Forestry Forecasts
Recreational Forecast

d. Other Program Products (Optional).

State or Regional Forecasts
Adjacent Area Weather Observations
Road Conditions Reports
Fire Danger Ratings
Tide Data
Special Events Forecasts
Air Quality Ratings

e. Educational/Promotional Messages. The priority ratings of the following products are variable.

Expanded I.D. - (Mandatory once a day)
Safety Messages - (Mandatory in abbreviated form during warnings)
Safe Boating Week Messages - (Optional)
Operational Messages - (As required)
Educational Messages - (Optional)
Promotional Messages - (Optional)

2.6.2 Product Grouping. Careful product grouping by tape deck is an important step in producing high quality programming. Program items which complement each other both in natural sequence and product life-span can be placed together on the same tape deck. The following example is a suggestion of how a typical programming schedule might appear.

Basic Public Program

- Deck 1 - Station I.D.
Weather Synopsis
State or Regional Forecast (Optional)
Motorists Forecast
- Deck 2 - Service Area Forecast
Extended Forecast
- Deck 3 - Hourly Weather Observation
Radar Summary
Nowcast
- Deck 4 - Marine Forecasts
Marine Observations
First Period Local Forecast (Optional. Suggested
for stations with long, i.e., 5 minute, cycle.)

Specialized Program

- Deck 5 - 5 a.m. - 7 a.m., Agricultural Forecast and
and Advisory and Expanded I.D.
 - 7 a.m. - 9 a.m., Climate Data
 - 9 a.m. - 11 a.m., River Stages, Forestry Forecast
 - 11 a.m. - 1 p.m., River Forecast, Recreational
Forecasts
 - 1 p.m. - 5 p.m., Recreational Forecast
 - 5 p.m. - 7 p.m., Agricultural Forecast
 - 7 p.m. - 9 p.m., Climate Data

Deck 6 - Optional Products.

2.7 Program Content. From a nationwide point of view, it is important that products of the same name be reasonably similar from station to station. From a local point of view, the information presented on NWR should satisfy the needs of people within the entire broadcast service area. However, avoid "local myopia" where information for the immediate vicinity of the station or a certain large urban area dominates the program. Likewise, when transmitting across state lines, try to serve all states within your service area equally. Highlighting of major national weather events such as hurricanes, winter storms, extended droughts or floods is permissible. Do not provide routine coverage of national weather.

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WRITING (II-2)

Program material should be presented in a manner that is easy to follow and easy to understand. A logical flow of thought is most important. The use of transition words at the beginning of a tape deck helps to improve smoothness of flow. So does combining certain products such as service area forecast and extended forecast; hourly weather summary, observations, and nowcast. Sudden "out-of-context" program segments such as a temporary shut-down notice, can catch listeners by surprise. Precede program segments of this type with an appropriate lead-in.

2.7.1 Basic Public Program (Mandatory).

a. Station Identification. We suggest several I.D.'s to provide for more effective use of air time.

(1) Station I.D. Must contain NOAA identification, call sign, frequency, office location, transmitter location, and any required credit lines to cooperating agencies. To comply with WSOM Chapter C-64, standard I.D. must be broadcast once an hour at a minimum. The standard I.D. from WSOM Chapter C-64 is as follows:

"This is NOAA Weather Radio Station KHB36, operating on a frequency of 162.55 MHz from the National Oceanic and Atmospheric Administration's Weather Service Forecast Office in Washington, D.C., and transmitting from an antenna located near Manassas, Virginia."

Other possibilities are:

"This is the National Weather Service operating over National Oceanic and Atmospheric Administration Weather Radio Station KHB36, Washington, D.C., transmitting from Manassas, Virginia, on 162.55 MHz in cooperation with the Virginia Public Television Commission. - - - (Brief pause to allow editing by commercial radio stations.)

or:

"This is National Oceanic and Atmospheric Administration Weather Radio Station KHB36, from the National Weather Service Office in Washington, D.C., transmitting on 162.55 MHz from Manassas, Virginia, in cooperation with the Virginia Public Television Commission." - - - (Brief pause.)

(2) Short I.D. Identifies the station and marks the beginning of the program cycle while consuming less air time than standard I.D. Where practical, it may be used in between standard I.D.'s. It is particularly appropriate during severe weather periods.

For example:

"This is NOAA Weather Radio Station KHB36,
Washington, D.C., operating in cooperation
with the Virginia Public Television Commission."
- - - - - (Brief pause.)

or:

"This is NOAA Weather Radio station KHB36 Washington,
D.C.,"- - - - - (Brief pause.)

or:

"This is KHB36, Washington, D.C."- - - -
(Brief pause.)

You may add: "Due to a weather emergency,
normal programming is suspended."

(3) International I.D. This form of I.D. is not used in the NWR system; however, it is the subject of discussion from time to time. The following description, therefore, is solely for information purposes:

International radiofrequency management agreements require announcing of station call sign preceded by the words "this is," at least once an hour and at sign-on, sign-off, or anytime the transmission is knowingly interrupted.

b. Weather Synopsis. Emphasize the weather systems that will affect the general geographic part of the country in which the NWR station is located. It should always be in laymen's terms. Never use terms such a frontogenesis, cyclogenesis, or vorticity advection. The

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system description, though reasonably brief, is in lieu of any other synopses for special users, e.g., agriculture and marine. By keeping emphasis on weather systems at a maximum and weather elements at a minimum, you can avoid redundancy in the program cycle. This approach gives listeners an explanation of why weather events are occurring or are expected to occur. This increases the credibility of the forecast and provides listeners with a firm base upon which they can make their own decisions.

c. Service Area Forecast/Extended Forecast. As far as NWR is concerned, the Service Area Forecast is a combined product containing elements of the local or zone forecast and the extended forecast. Blend various forecasts into one smooth-flowing product that is uniform in its areal coverage. It should not, for example, refer to a city and vicinity in one part and the entire state in the other. This is one of the "premier" items in your broadcast cycle and the product most likely to be taped and played back by commercial broadcasters.

To maintain product credibility, the first period of the Service Area forecast and the nowcast (see section f. below) should not conflict. This can occur when circumstances prevent an immediate update of the Forecast. The best solution is to temporarily omit the first period from the on-the-air forecast and let the nowcast describe the current and immediate future conditions.

To increase smoothness of flow and make the broadcast pleasant sounding, use various transitional words preceding the forecast. For example:

"...and for the (city) listening area, the forecast is..."

"...with that weather disturbance over Ohio dominating our local weather picture, the National Weather Service forecast for (city) is..."

"Coming up now, our forecast for (city)..."

"...and now for our (city) area listeners, here is the current forecast..."

d. Hourly Weather Observations (including optional adjacent area observations). To provide a good picture of current conditions throughout the service area, include a summary of the latest observational data while limiting tabular style information as much as possible. The local observation plus the temperature and any other significant parameter at three or four points scattered within your area should suffice. When longer tabulations are used, repeat the

local temperature at the end. Under routine circumstances, the hourly observations should be combined with the radar summary and nowcast in one smooth-flowing tape. There are cases where long delays are experienced in getting all the information needed to make this tape. When this occurs, and if staffing permits, place just the local observation on a tape at the top of the hour and substitute it for the now obsolete weather observations-radar summary-nowcast tape. As soon as all data are available, the new combined tape can be put on the air. This gets around the problem of commercial stations having the latest local observation on their programs while we are still reporting the previous hour's data. When significant weather is occurring in an adjacent area, you may wish to include a few observations from that area. The most logical time to do this is when the weather event in question is expected to affect your own service area later on.

e. Radar Summary. By its very nature, this product is mandatory only when the information is available. Network radar summaries or summaries from local use radars may be used. Information from radar summary charts can be incorporated into the generalized weather summary describing local conditions, but should not imply to listeners that they have their own local radar coverage.

During normal times, include the radar summary with the weather observations and nowcast. When severe weather threatens, place the radar information on a separate tape in case special updates are required or in case a severe weather statement is to be issued incorporating the radar data. In that case, the severe weather statement is transmitted in lieu of the radar summary.

Old radar information can be dangerously misleading, especially when broadcast without adequate time reference. It could, for example, make boaters believe there is ample time to get to safe harbor when they should be racing for their lives. All radar summaries should contain a time reference and a description of the location, type, intensity, and movement of precipitation echoes. Also, give listeners a general indication of the area to be affected within an hour's time. Remember, some people do not have a good sense of direction and cannot interpret a description of echo movement. The generalized reference to future positions of the precipitation pattern can be incorporated into the nowcast, e.g., "...during the next 1 to 2 hours there will be a good chance of showers in western sections of Hardesty and Meyers Counties...". Try to replace or delete summaries when more than 1 hour and 15 minutes old during rapidly moving convective situations. During warning periods for short-fused events, briefly update the hourly radar summary every half hour with the latest positions of the most dangerous echoes, where staffing permits.

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f. Nowcast. When listeners feel the Weather Service is keeping them fully informed about weather events as they occur or are about to occur, we gain their respect and the public gains confidence in making weather-related decisions. The nowcast performs an important role in the process of keeping listeners up-to-date and lends an air of credibility to our programs. During changing weather situations, the nowcast should reflect expected trends for the next few hours. In style it can begin as a natural extension of the observational data and evolve into a more detailed treatment of the first period of the forecast. The similarity between the nowcast and first period of the forecast under those conditions will show listeners that what we have forecast is, in fact, coming true; an excellent confidence builder. Should brief minor variations occur during the forecast period, e.g., the appearance of a passing band of dark clouds when "mostly sunny" is forecast or a short period of moderate rain when "occasional light rain" is forecast, the nowcast, handled properly, can be used to minimize listener uncertainty. Finally, when the forecast is falling apart, a good nowcast can hint that "new developments are taking place" or be used as a temporary replacement for the first period of the forecast while awaiting a new forecast issuance. Please note, the term "nowcast" is for internal use. For the listening public, use terms like, "the short-range forecast is - - -" or "for the next few hours - - -."

g. Marine Observations & Forecasts. During fair weather summarize the marine observation data with particular focus on information of interest to mariners, i.e., visibility, wave heights, water temperature, etc. When marine advisories or warnings are posted, sufficient tabular data should be presented to stress the seriousness of the particular weather event. As an optional feature, especially in areas of strong marine interest, a brief marine nowcast can be tagged on to the observations summary. For example, "Although visibilities are now running 1/2 to 1 mile over the bay, we expect them to increase to better than 2 miles by 10 a.m."

As for marine forecasts, many are written in a clipped style. When editing them for broadcast, add the words necessary to make them understandable to a listener.

As previously noted, the general weather synopsis should be comprehensive enough so no special marine weather synopsis is required.

h. Repeat of First Period of Forecast (Optional). When NWR program cycles reach the 5-minute limit suggested by WSOM C-64, waiting time to hear the service area forecast approaches an average of 2 1/2 minutes. The service area forecast, especially the first period, is one of NWR's most popular program products. To decrease waiting time,

we suggest attaching a repeat of the first period of the forecast to another tape.

2.7.2 Other Program Products. The following are selected comments on some of the other program products. Although some of these products are rated highly desirable, their inclusion in your local NWR program will be determined by your regional headquarters.

a. Motorists Forecast. The focus of the forecast should be on weather elements affecting driving conditions, e.g., rain, snow, fog, high winds, etc., within a day's drive or about 300 miles of the station. It's important to recognize that reports of weather conditions in a major urban area may not be reflective of en route weather conditions. Tabular data should be limited and used only where broadcast program length will permit. If weather conditions are generally similar in all directions except for minor temperature variations, simply indicate the range of the variation. If a marked difference is occurring or expected to occur within the driving area, make note of the exception so travelers will be prepared for it. Try to keep this product simple. The more complex you make it, the more difficult it is to keep current.

b. Climatic Data. The keys to a good climate data program segment are:

1. A logical presentation of information.

2. Limiting the number of data items presented so listeners are not overwhelmed by too many numbers in a short period of time. Dyed-in-the-wool weather buffs who want every conceivable piece of climate data can usually find it in their local newspaper.

3. Presenting the climate data in a form that requires a minimum amount of computation by the listener. For example, instead of giving the rainfall for yesterday, total for the month, total for the year, normal for the month, and normal for the year, try saying something like, "...rainfall Tuesday was 4/10 of an inch, rainfall for the month is 2 1/2 inches above normal, rainfall for the year is 28 inches, or 6 3/4 inches below normal...."

Applying this philosophy to the entire climate segment will lead to a cleaner sounding, smoother flowing product. Although fewer items are presented, the likelihood of listeners remembering what you have said will be greater.

c. Agricultural Forecasts. Emphasize information of special use to farmers, i.e., growing degree days, soil temperatures,

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soil moisture, dew formation, drying rates, etc., without rehashing all of the weather data contained in other products. Occasional supplementary narratives where information is available, will make this product more useful, e.g., "soil temperatures are in the 40-50 degree range and should lead to the germination and emergence of broadleaved weeds over the next few days," or "surplus soil moisture conditions continue in the listening area making it risky to enter some fields with heavy farm equipment." Your local county extension agent can provide you with this sort of information.

d. River Stages and Forecasts. During flood situations, this information is of very high priority and should be played with greater frequency at the expense of other specialized products. At other times, play this data in its regular time slot. As with other tabular information, summarize river data as much as possible followed by appropriate comments, e.g., "River levels are below normal and the Corps of Engineers advises that river channels should be navigated with caution."

e. State/Regional Forecast. This product should be considered for use when a station's area of responsibility greatly exceeds its service area coverage. Also, this forecast can be useful where strong climatological differences exist across the area of responsibility and are not reflected in the service area forecast. In this case, a separate forecast for the special climate zone is another possibility.

f. Forestry Forecast. Normally this will consist of fire danger ratings. Air this product only in heavily forested areas where major forest fires are possible.

g. Recreational Forecasts. These should be prepared to suit the recreational habits of residents of the listening area. Distance should not deter a station from reporting weather conditions at a recreation area if it is known to be highly utilized by your listeners. If, on the other hand, the most utilized recreation areas fall within the scope of another product such as a regional forecast, it can be integrated into that product so long as the geographical references to the recreational area are clearly identifiable and significant factors such as water temperatures for swimming are referred to.

h. Tide Data. This is normally included with other marine information.

i. Expanded I.D. WSOM Chapter C-64 requires the expanded I.D. to be transmitted at least once a day. This message includes all information in the standard I.D., plus a general description of all important operating procedures and areas to be serviced (see Chapter C-64). The major difficulty with a message of this type is that it contains so much information that listeners may have difficulty understanding it. This is a product you will have to work with and refine to make it useful. One hint though -- since this is a long product, there will be a tendency to rush through it. To be effective, quite the contrary should be true. Make tapes and play them back until you achieve just the right pace.

j. Road Conditions. This is weather-related road information only. It must be readily available on a routine basis and in a form suitable for broadcast. If used at all, it may be restricted to situations where poor road conditions exist. The source of this information should be identified in the announcement. As an option, give the phone number of the agency responsible for the information.

k. Operational Messages. Changes in NWR operating procedures may take place from time to time. Most common is the requirement to be off the air for routine maintenance. Stations have also had to change their operating frequency. The sudden announcement of this type of information in the midst of your weather programming often catches listeners by surprise. This can result in listener confusion. We suggest preceding this type of information with the notice, "The following is a NWR technical announcement." This can be followed by a clear statement of the operational changes to come. For example:

"The following is a NOAA Weather Radio technical announcement: Because of an adjustment in broadcast frequency patterns, our neighboring NWR station, KGX-99, broadcasting from Middletown on 162.55 MHz, will change to a frequency of 162.475 MHz on June 1. The station you are now listening to, KJI-88, Brookland, will not be affected by this change. This has been a NWR technical announcement."

l. Safety Messages. These are tapes that have been recorded in segments with each segment containing useful safety information. You can use the tapes sent to you or prepare your own. Many stations choose to prepare a shortened version of these tapes with pertinent information compressed into a shorter time-frame to be used during emergency situations. The standard safety message tapes make a good educational tool when played on a fair weather day during the appropriate season.

m. Educational/Promotional Material. Material in this category should help listeners to understand our programs and products, enhance their interest, and increase awareness of NWR. Both the expanded I.D. and the Safety Messages, when used in non-warning situations fall into this category even though they were mentioned in separate paragraphs. Other products in this category are:

1. Educational --

- Historical weather facts.
- Explanation of commonly used terminology such as warm front, cold front, etc.
- How to use a barometer. (Around Christmas.)
- How to operate a warning alarm weather radio.
- Explanation of certain phenomena when they occur, i.e., Northern Lights, lunar haloes or coronas, virga, etc.

2. Promotional --

- Station program information tapes with short segments describing services provided and our products, including times when they are broadcast. Also, recognition of cooperating states and agencies. When played during the day, listeners who have not heard the expanded I.D. can get information on the services we provide.
- The value of a NWR as a gift including information on the size and extent of coverage of the NWR network.
- The value of owning a weather receiver.
- Requests for listener comment on the service provided and the signal received.
- Description of a new service or product when it is introduced or an announcement of the resumption of seasonal products such as agriculture forecasts or recreational forecasts.
- Offer of assistance in establishing and training severe weather spotter groups.
- Notice of office tours and special office hours.
- Availability of guest speakers.

n. Air quality information. This information must be available to you on a routine basis before you even consider broadcasting it. However, we suggest restricting its use to episodes of poor air quality rather than on a daily basis. As with road conditions, the originating local or state agency should be identified.

2.7.3 Watches, Warnings, and Related Statements.

a. Long Lead-Time Watches and Warnings. Watches and

warnings with longer lead-times are carried as part of the service area forecast. They are normally transmitted as "headlines" or incomplete sentences on the weather wire, but should be broadcast over weather radio as "leads" or complete sentences. Make reasonably frequent special weather statements or use edited portions of the National Storm Summary. Hurricane warnings are a special case. See Section 2.7.3.d.

Broadcast appropriate safety rule tapes during watch and warning situations. Use the weather synopsis or motorists' forecast to inform listeners of similar conditions in places beyond your NWR service area.

b. Short Lead-Time Watches. Listeners may be confused by the technical description of the watch area. Rewrite this information using understandable geographic references. In the case of severe thunderstorm and tornado watches, the redefining statement should be adequate for this purpose.

Broadcast the appropriate safety rule tape during these watches.

c. Convective Warnings. In general, reduce programming during tornado, severe thunderstorm, and flash flood warnings. For example:

- brief station I.D.
- abbreviated safety rules
- warning(s)
- severe weather statement/radar summary
- watch/forecast

Available staff must be dedicated to keeping the NWR broadcast up to date, so keep programming at a minimum. However, in the case of a very localized flash flood event, programming may be reduced by a lesser amount than described above if it will not interfere with the prompt issuance and updating of warning-related messages.

During a warning situation, it is more important than ever that messages on NWR not conflict. Message conflict can be a major source of listener confusion. Therefore, message management must be done with care. Check the content of the entire warnings program cycle with each message update. Here are suggestions to improve message management:

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1. Until a warning is issued, place all statements and radar summaries on the same tape. This will encourage simultaneous updating of all messages related to the weather situation. It also provides for automatic review of message content.

2. When a warning is issued, place all information concerning the warning into the text of the warning message broadcast over NWR.

3. When the procedure indicated in item number 2, above, is used, all follow-up statements about the warning would be programmed on NWR by updating the warning tape. This can be done by taking the original warning form and re-recording the basic warning, but use the follow-up statement as text for the section called "Basis for Warning." This method prevents the broadcast of conflicting statements.

d. Hurricane Warnings. Treat hurricane warnings with the same urgency as convective warnings. The storm may not be forecast to strike for many hours, but immediate action will be required by the public to protect life and property.

Reduce regular programming during hurricane warnings. However, you must broadcast local statements, evacuation messages, or locations of storm shelters.

e. Count-Down for Broadcasters. It is recommended that all messages transmitted with the warning alarm contain a count-down of sufficient length to allow the broadcast media to set up for simulcasting or recording. After the warning alarm has ended, SUFFICIENT WARNING INFORMATION MUST BE BROADCAST PRIOR TO COUNTDOWN so that listeners in immediate danger have time to protect themselves. When counting down to the beginning of the full text message for the broadcast media, leave them a few seconds of pure silence for in-studio operations.

2.8 Program Length. To provide greatest listener satisfaction, the program cycle should repeat as often as possible. WSOM Chapter C-64 recommends that NWR program cycles be restricted to 5 minutes or less. Our operating experience indicates 3 minutes is generally ideal. Longer cycle lengths are occasionally unavoidable due to complex weather situations and the programming demands at certain peak listening hours. However, by following the guidelines on editing, summarizing of tabular data and selective programming of specialized weather products, these time constraints can usually be achieved. When these efforts alone do not produce the desired results, other steps must be taken. For example:

a. Time Programmable Feature. Where available, make use

of the time programmable feature to control the broadcasting of some non-mandatory data, especially time-consuming tabular data. The exact program feature to be time-programmed must be determined by local priorities and common sense.

b. Skip-Cycling. You can try skip-cycling the entire non-mandatory program package. As a result, you will have one cycle containing only the basic program material plus a longer one containing all materials. Although the long cycle may still be over 5 minutes, the average time of all cycles combined will be reduced and there will be more repetitions-per-hour of the basic program material.

c. Product Pairing. A measure less drastic than skip-cycling of the entire non-mandatory package is the pairing of non-mandatory products. In this case, two or more products are placed on one tape separated by the appropriate end and stop cues. One of the products would play on each cycle and the others would be eliminated reducing cycle playback time. Again, local priorities would determine products paired.

d. Product Deletion. Eliminating program products is a drastic but effective way of reducing program cycle length. In cases where programs are too long to be corrected by other means, deletion of products is appropriate.

2.9 Timeliness. The transmission of outdated information degrades the quality and effectiveness of the NWR broadcast, erodes public confidence, and can, in fact, be seriously misleading. Although listener response to NWR broadcasts has been highly favorable, the most frequent criticism has concerned product timeliness. Achieving timeliness depends on manpower available, priority attached to making NWR broadcasts, cooperation and teamwork among office staffs and between WSFO's and their dependent WSO's. Writing skills often determine how rapidly updated forecasts and radar summaries become available for broadcast. Timely broadcasts should not be considered just a problem for NWR operators to solve on their own.

Special note regarding hurricanes: Many listeners are confused about the frequency of issuance of hurricane advisories. There is also some misunderstanding concerning the gap between the time of issuance of an advisory compared to the time it is actually broadcast over NWR.

Tell listeners how frequently advisories are issued and at what time they will be able to hear them over NWR. For example:

"The National Hurricane Center will begin transmitting a new advisory at 2:00 p.m.

The 2:00 p.m. advisory will be received and recorded by this office after 2:15 p.m."

2.10 NWR Programming Checklist. One key to good NWR programming is to listen to the broadcast. From time to time, place yourself in the position of listener and review the program at length. The following checklist will help you in critiquing the broadcast:

a. Does the program seem too long? Are you so overwhelmed with information that you can't remember anything you've heard? Do you "wait forever" just to get a local forecast?

Possible solutions:

1. Material may be too wordy. Judicious editing needed.
2. Some material should be deleted and broadcast only at selected times.
3. Some material should be double cued to play less frequently.
4. Insert an abbreviated version of the local forecast into the cycle.
5. Instead of playing the 5-day forecast as a separate product, paraphrase the extended outlook and tag it onto your service area forecast or summary.
6. Announcing pace may be too slow.

b. Does the programming seem too short? Is the information presented so skimpy that you feel: "the weatherman is goofing off"? Are you left with an urge to call the station to ask for more details?

Possible solutions:

1. Narrative material may be too sketchy and need more amplification.
2. Check the needs of your service area. Be sure they're being met.
3. Reading pace may be too fast.

c. Does the program contain too many items that seem alike?

Possible solutions:

1. Program material may be redundant.
2. Coordination between writers of program materials probably needed.
3. Scope and range of various products may need better definition.
4. When this situation arises, some products can probably be combined.

d. When you listen in, do you fail to get a feeling that the NWS is really on top of the weather situation?

Possible solutions:

1. Your weather information probably is not being kept up to date.
2. Check your taping schedule; it may need revising.
3. Your broadcasters may not have sufficient time in their work schedules to cut new tapes at the proper time. (This is one problem which may not be solvable.)
4. Withholding of new products while waiting for more information to put on the same tape may be the problem.
5. Radar summaries that don't contain at least a hint of what echoes will be doing in the near future quickly become outdated.
6. Withholding of necessary revisions because a scheduled product release is coming up is a common cause of outdated material being on the air.

e. Is there something vaguely annoying about the broadcast?

Possible solutions:

1. There could be too much tabular data. Try summarizing more.

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2. The sequence of your program may need rearranging. Try starting with the more general items and work towards the specific ones.

3. It could be voice quality problems. Check section on broadcasting.

4. It could be dirty tape heads. Check on preventative maintenance.

f. As a listener, do you think you would know when to tune in for specialized information?

Possible solutions:

1. You may need to advertise your schedule of broadcast products more frequently.

2. Encourage the printed media to publish your program schedule. Be sure to include warning alarm test information as well.

NATIONAL WEATHER SERVICE
Forecasting Handbook Number 2

Chapter III - Broadcasting

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BROADCASTING (III-1)

1. Introduction. Broadcasting is in essence a two-party experience, involving both the speaker and the listener. The listener reacts to our broadcast in a very personal manner. However, unlike face-to-face conversation or television, the radio broadcaster does not have the advantage of facial expression, eye contact, or hand movement to assist him in conveying his message. The public's reception of information and general impression as to the attitude and competence of the broadcaster are determined to a significant degree by the broadcaster's voice.
2. Desired Characteristics. Although the majority of NWR broadcasters will not achieve the professional broadcaster's level of competence, much can be learned by observing the professional radio and TV people. One advantage NWR broadcasters have is the repetitiveness of the material. This affords everyone who makes frequent NWR broadcasts the opportunity to become reasonably proficient in announcing weather copy.

The following are some desirable broadcast characteristics:

Clarity - That combination of speech and wording that results in easy listening with complete understanding.

Knowledgeability - Projecting yourself as an authority without sounding stuffy or snobbish.

Warmth - That slight touch of concern in your voice that says "you really care." The great thing about this is, it works both ways. If your audience believes that you care, they will feel warmly toward you.

Friendliness - A feeling best conveyed when you think of the public in positive terms. If you "feel" friendly as you broadcast, your voice will automatically project that quality with little or no other effort on your part.

Sincerity - A voice quality that suggests to your listeners that you are being completely honest with them. On a day-to-day basis this also requires writing that is free of hedging and obfuscation.

Competence - Conveying to the audience the feeling that you did it right yesterday, you are doing it right today, and you will do it right tomorrow.

Self-Confidence - Conveying to the audience that you are self-assured, an authority on meteorology, and the type of person they can depend on when the going gets rough.

Calmness - A companion to self-confidence and a quality that indicates things are under control. You do not tend to overalarm your listeners.

Enjoyment of Work - A very important quality to project on a routine day-to-day basis. In simplest terms, it makes listening a pleasure for your audience rather than a chore.

3. Undesirable Characteristics. The purpose of speech is to convey intelligence. When speech fails to perform this function it is flawed and in need of correction.

Flaws in broadcast speech can originate from several sources, i.e., physical impediments, strong accents, sloppy speech habits, lack of knowledge of proper enunciation techniques, lack of comprehension, haste, tiredness, irritability, nervousness, improper breath control, or ill health. These factors can lead to some of the following undesirable announcing characteristics:

Mumbling - The act of speaking lowly and indistinctly. Some of the causes of mumbling are:

- a. Clenched teeth.
- b. Inflexible upper lip.
- c. Failure to open mouth wide enough.
- d. Failure to vocalize sufficiently with vocal cords.
- e. Poor posture while broadcasting.
- f. Poor breath control.
- g. Laziness.
- h. Poor diction.

Stammering - To speak or utter haltingly with involuntary repetitions or prolongations of sound. A temporary condition. Some of the causes of stammering other than poor or unreadable copy are:

- a. Nervousness
- b. Embarrassment
- c. Stress
- d. Anger
- e. Fatigue
- f. Haste

Stuttering - To utter or speak with spasmodic repetition, blocking and/or prolongation of sounds and syllables, especially those in the initial position in a word. Stuttering is a physiological or psychoneurotic dysfunction and requires professional therapy.

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Lisp - Speech defect or affectation in which the sibilants "S" and "Z" are articulated with the tongue tip between the teeth so that the sounds produced are like TH in thank and this.

In non-medical cases lisping is a product of improper use of the tongue and muscles of the face and mouth.

Lost Voice - The inability to generate continuous articulate sound or loss of sound. Loss of voice can be caused by the following:

- a. Sore or swollen throat. (The most common cause.)
- b. Dysphonia. Physical defect in voice apparatus.
- c. Aponia. Extreme fright or hysterical loss of voice.

Sloppy Speech - The failure to enunciate consonants. This usually involves consonants in the latter part of a word. For example; demand is pronounced demann. Some causes of sloppy speech are:

- a. Lack of awareness by the speaker.
- b. Lazy or weak articulation muscles.
- c. Lack of knowledge concerning correct articulation.
- d. Ethnic or Regional influences.

Mispronounced Vowels - The failure to create correct vowel sounds. Some causes are:

- a. Regional or ethnic influences.
- b. Incorrect mouth shaping when forming vowel sounds.
- c. Limited reading skills.
- d. Lack of awareness that errors are being made.

Nasalizing - To produce nasal or orinasal sounds instead of oral ones. (Talking through the nose.) Note! M, N, and NG are the only nasal sounds in English. Some causes of nasalizing are:

- a. Habit.
- b. Affectation.
- c. Regional or ethnic influences.
- d. Lack of awareness.
- e. Hard palate-sinus structure resonance.

False Deepness - The forming of sound in the throat cavity instead of within the mouth. This can cause muffled words and throat strain. Some causes are:

- a. Trying to sound more masculine (Macho).
- b. Trying to imitate some of the naturally deep-voiced professional announcers.
- c. Stuffy nose or a cold.

Excessive Speed - Speaking at a pace that is either greater than one's ability to articulate properly and/or to maintain breath control or a faster pace than most listeners can comprehend. Some causes are:

- a. Nervousness.
- b. Cultural influences.
- c. Unnecessary haste.
- d. Insufficient time to perform broadcast duties.

Poor Breath Control - The necessity for numerous untimely and disconcerting pauses for breath while announcing, often marked by gasps and wheezes. Some causes are:

- a. Haste.
- b. Nervousness.
- c. Stuffiness, a cold, or other nasal passage restriction.
- d. Consumption of alcoholic beverages.
- e. Tight fitting clothing, especially at waist and collar.
- f. Beginning broadcast "out of breath."
- g. Overeating or gasiness.

Disconcerting Slowness - An irritating quality to most listeners. Some causes are:

- a. Tiredness.
- b. Sleepiness.
- c. Laziness.
- d. Indifference.
- e. Poor reading comprehension.
- f. Garbled script.
- g. Poor eyesight.
- h. Cultural or regional speech habit.

Insufficient Volume - Differs from mumbling in that articulation may be excellent. Often leads to very low signal to noise ratio on recorded tapes. Some causes are: (Also see Mumbling)

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- a. Inherited voice characteristics.
- b. An affectation or habit.

Yelling - The act of shouting into the microphone. May cause modulation problems if not corrected by the automatic gain control. This can lead to annoying volume changes and sound distortion in home receivers. Some causes are:

- a. High background noise level.
- b. Poor hearing.
- c. Habit.
- d. Anger.
- e. Lack of awareness.

Unpleasant Overtones - The act of conveying with your voice the particular mood of the moment, specifically, negative ones such as irritation, anger, and disinterest. Some causes are:

- a. Immaturity.
- b. Improper training and counseling.
- c. On-the-job problems.
- d. Personal problems.
- e. Poor attitude.

Monotone Drone - Non-inflective, boringly cadenced speech. Some causes are:

- a. Shyness or introversion.
- b. Lack of motivation.
- c. Lack of interest.
- d. Tiredness.
- e. Sleepiness.
- f. Influence of alcohol.
- g. Lack of awareness.

End-of-Shift-I'm-on-My-Way-Home-Voice - A hasty, rather sloppy and indifferent broadcast given with an "I-couldn't-care-less" attitude. Some causes are:

- a. Poor scheduling.
- b. Improper monitoring and counseling.
- c. Poor attitude.

4. Mispronounced Words. Mispronouncing of words results from a variety of reasons such as: limited vocabulary, poor reading ability, unfamiliar terms (e.g., geographical locations), and bad speech. Whatever the origins of mispronunciations, the important thing is that they be minimized as they are irritating to the listener and reflect poorly on our image.

4.1 Examples of Mispronounced Words. The following are a few examples of commonly mispronounced words:

<u>Errors</u>	<u>Actual Words</u>
baromet ah	barometer
cole	cold
foh, foe	four
fir, fer	for
fo cass	forecast
Guff, Golf	Gulf
(in the GuffaMexico)	(in the Gulf of Mexico)
lay tess	latest
fishul	official
(Laytessfishulfocass)	(latest official forecast)
Murlan	Maryland
mile	mild
who mid	humid
wahm	warm
mow-slee	mostly
(mow-slee sunnywahm n whomid)	(mostly sunny, warm, and humid)
precip per tayshun	
precip tayshun	
percip tayshun	precipitation
small craff	small craft
tempi-ter	
temp-shirr	temperature
twenny	twenty
winnee	windy
ver-bil	variable

4.2 Local Geographical Pronunciation Guides. Field offices are encouraged to compile their own lists including difficult or frequently mispronounced geographical locations. These lists should be displayed in a highly visible location and contain the phonetic version of the correct pronunciation.

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4.3 Personal Lists. Individuals should maintain their own personal notes on pronunciation errors they make.

4.4 Quality Control. Supervisors should review both office and personal lists periodically to make sure that they are up to date and that progress is being made toward eliminating the pronunciation errors.

5. Training and Improvement.

5.1 General. All employees should be fully cognizant of the increasing importance of verbal communications to the mission of the National Weather Service. Broadcasting is a work assignment to be looked upon as a highly effective means of serving the public. The NWS is providing commercial grade broadcast equipment backed up by modern radars and the finest computerized operational forecasting equipment, and is making an effort to ensure that written material is vastly improved. It is incumbent upon the broadcaster to complete this chain of improved services with the best possible broadcast effort.

5.2 Acceptable Speakers. Most NWR broadcasters will fall into this category. Training requirements will usually consist of improvements in the following areas.

a. Concentration. Most NWR broadcasters interrupt other assignments to cut new tapes. Under this environment it is often difficult to take one's mind off other assignments and concentrate on making a good tape. But just as distracting background noises can precipitate minor errors in presentation, so can a general lack of concentration. When cutting a tape give full time and attention to the job.

b. Controlling Voice Pitch. One of the more common errors is broadcasting with a voice pitch that is too high and strained or too low and muffled. By listening to your tapes, find a pitch level that is comfortable yet allows you to speak clearly and pleasantly.

c. Voice Modulation. Keep your voice "alive" while announcing. Changes in overtones and undertones make your voice easier to listen to. Avoid the monotone drone; it's a sign to you that you are not concentrating and is an indication of indifference to your audience.

d. Attitude Projection. Remember, your image is riding on your voice. If you sound like a grouch or a snob or a slob, as far as the public is concerned, that is what you are. When you are in front of the microphone think positively; it helps. Also, try talking with a smile on your face; it adds a pleasant quality to your voice.

e. Pace. Pace is to your speech cadence as modulation is to your vocalization. A humdrum pace is as boring as monotone drone. Use pace to control emphasis instead of volume. Read important points of your message a little slower accompanied by some voice modulation. This will attract the listener's attention and help in getting your point across.

f. Breath Control. Learn to take advantage of grammatical and natural pause points in your message to keep your breathing under control. When encountering extremely long passages without punctuation, make your own pauses. If you ever find it necessary to take an extremely deep breath, turn your head from the microphone or cover the mike with your hand. Gasping over the air is disconcerting to the listener.

g. Pronunciation. Very few people are perfect at pronouncing every word. There are just too many pitfalls in the English Language due to the variety of national and cultural inputs. Keep a list of the words that give you trouble and work on them. Whenever possible, simply avoid them. When you listen to your tapes check not only for totally mispronounced words, but for missed consonants such as T and D at the end of words.

5.3 Speakers with Minor Defects. Minor speech defects are those speech characteristics which are severe enough to cause broadcasts to become at least occasionally unintelligible, but consisting of speech problems that are correctible on station with a month or two of extensive counseling and considerable effort by the person involved. In this category are the environment-related speech problems such as strong regional and ethnic accents. Persons in this category will normally respond to the tape-critique method. For this purpose, it is suggested that the person undergoing speech correction be permitted to tape a variety of materials as the vocabulary content of weather information material may be too limited. In this category also is the problem of frequently dropped consonants. In taking corrective action on this problem, counselors should make certain that the subject is aware of the correct methods of articulating the consonants in question. This information is available in speech training textbooks. The following section contains some very basic information on speech.

5.4 Speech Training Guide.

5.4.1 Elements of Speech.

a. Sound. Human sound is generated in the vocal membranes located in the larynx or voice box, which contains the vocal cords and upper respiratory tract, including pharynx, mouth, and nose.

b. Voice Box. The human voice box is the cavity in which sound is strengthened and amplified by resonance and sound wave reflection. The voice box is made up of the adjustable oral cavity and the non-adjustable area in the nose and sinus cavities. The adjustable portion allows you to vary the sound by varying the size and shape of the mouth. The non-adjustable portion gives your voice its own particular character.

c. Speech. Speech is produced by the articulation of sound waves which is achieved by a combined and coordinated action of the tongue, lips, and teeth.

d. Voice Quality. You control the quality of your voice to the extent that you vary the size and shape of the oral cavity within your mouth. The basic secret of good voice quality is relaxation of the muscles controlling the size of the voice box. When you speak, those muscles needed to reshape the voice box should be brought actively into play while keeping the others in a relaxed state. What results is a shaping of the mouth, while at the same time, maintaining a full-sized oral cavity. This permits the development of a full, rich sound.

e. Tongue. The tongue is the prime organ for the articulation of sound into speech. It cannot function fully in a crowded or cramped environment. This is the importance of maintaining a large oral cavity during speech. The next requirement is that the tongue be in a lively state. Like any other muscle it sometimes requires a little warming up. For example: Have you ever taken note of your speech when you first arise in the morning; your tongue may feel rather inflexible and your face muscles stiff. An hour later when your facial muscles are more relaxed and your tongue more agile, the quality of your speech should be noticeably better. Finally, for good articulation the tongue must be positioned correctly for each sound.

f. Lips. The lips are another portion of your sound articulation system that should be relaxed but lively. In fact, a stiff upper lip is the enemy of good speech.

g. Vowel Sounds. The vowel sounds are totally vocal in nature. A full voice box is necessary for good vowel sound development. The tongue is used only to make minor adjustments to the size and shape of the voice box. The sounds are articulated by the lips and facial muscles. If they are relaxed and fluid in their movements, the sound of your vowels will be likewise. Failure to shape the mouth and lips properly will lead to confusion between similar sounding words. You can practice on the following list:

Read Across

ooz	ode	odd	add
boon	bone	born	barn
booed	bowed	bad	barn
boot	boat	bought	bout
cool	cola	call	cowl
doom	dome	dorm	down
mule	mole	maul	moll
moon	moan	mourn	Marne
root	wrote	wrought	rout
tine	tone	town	tan

h. Consonants. Consonants convey the meaning of speech, in other words, they make the spoken word intelligible. They accomplish this by providing contrasts and variations to the single, sustained note of the vowels.

There are two types of consonants, voiced and unvoiced. Among these are paired consonants, one voiced the other unvoiced. These are known as cognates. If you have trouble with one you probably will have trouble with the other.

5.4.2 Consonant Chart.

Voiced

These consonants are made with vocal cord vibration and cannot be whispered.

Unvoiced

These consonants are made without vocal cord vibration and cannot be voiced.

Cognates

as in babe	B	P	as in Pope
as in dead	D	T	as in tight
as in grog	G	K	as in kook
as in verve	V	F	as in fife
as in zones	Z	S	as in safes
as in breathe	TH	TH	as in breath
as in pleasure	ZH	SH	as in wish
as in judge	DG	CH	as in Church
as in intends	DZ	TS	as in physicists

Non-Cognates

as in noon	N	H	as in high
as in mime	M		
as in sing	NG		
as in aisle	L		
as in window	W		
as in beyond	Y		
as in rewrite	R		

5.4.3 Difficult Consonants. The following is a pronunciation guide to some of the more commonly mispronounced consonants. For more detailed information consult a speech textbook.

a. Single Consonants.

N- Nasal consonant made with tongue blade to upper gum ridge and resonated through nose. Vibration should be felt in nose bone.

Common error - Insufficient nasalization. When properly done, pinching nostrils closed will completely cut off the N sound.

M- Nasal consonant made with lips together and resonated through nose.

Common error - Insufficient nasalization.

V- Voiced consonant made with upper teeth to lower lip. When done correctly, vibration should be felt in the lip.

Common error - Insufficient vocalization and failure to generate lip vibration.

F- Unvoiced consonant made with upper teeth to lower lip.

Common error - Poor lip teeth contact and insufficient air flow. Failure to execute at end of a word.

Z- Voiced sibilant consonant made with tongue tip to gum ridge, side teeth lightly touching.

Common error - Made with tongue on teeth, losing dental resonance and making it difficult to execute a following consonant. Also, insufficient vocalization.

S- Unvoiced sibilant consonant made with tongue on gum ridge.

Common error - Tongue on teeth. Also, with cramped voice box, tongue pressure on gum ridge may be excessive, causing harsh S sound and inhibiting tongue from executing a following consonant such as the T in fast resulting in the pronunciation fass.

B- Voiced plosive (as in explosive) consonant made with lips lightly pressed together then sprung apart with a momentary vocal resonance.

Common error - Lips pressed too firmly together causing a forced B. This inhibits the mouth from properly executing the next consonant such as in grabbed.

P- Unvoiced plosive consonant made with lips lightly pressed together, then sprung apart without vocalizing.

Common error - Same as for B. Example trapped.

D- Voiced plosive consonant made with tongue front on upper gum ridge.

Common error - Dental D made with upper and lower teeth or with tongue on teeth. Also dropped D.

T- Unvoiced plosive consonant made with tongue front on upper gum ridge.

Common error - Same as D.

G- Voiced plosive consonant made with rear of tongue against soft palate.

Common error - Insufficient vocalization resulting in a weak 'G' sound.

K- Unvoiced plosive consonant made with rear of tongue against soft palate.

Common error - Failure to fully execute when K sound occurs at the end of a word. For example, MASK is pronounced MASK, or MASS when sound is completely dropped. Also substitution of X sound as in FAX IMI LEE instead of FAK SIMILIE.

b. Double Consonants. PT, KT, BD, GD. These consonants require a double execution. A common characteristic of sloppy speech is the frequent dropping of one or both of these double consonants when they

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appear in a word. To execute these consonants, the oral cavity must be sufficiently expanded to let the tongue move swiftly and freely.

Practice the following double consonant words, slowly at first so that you can both feel and hear each consonant as it is executed.

PT -	APT	WEPT	ACCEPT	CONCEPT	ADAPT
KT -	ACT	EFFECT	OBSTRUCT	ENACTMENT	
BD-	STABBED	ROBBED	BRIBED	SOBBED	
GD-	FLOGGED	RIGGED	LAGGED	TUGGED	WAGGED

NG - Voiced nasal consonant made with rear of tongue in contact with soft palate while the tip touches gently inside the front teeth. When done correctly the NG sound is almost musical with a nasal twang and is cut off when nostrils are pinched closed.

Common error - Substitution of a non-nasal voiced IN for NG as in SOMETHIN instead of SOMETHING. Also, the addition of a G sound by allowing the rear of the tongue to strike the soft palate as in HANG-GA or SING-GING.

5.4.4 Other Broadcasting Tips. Warm drinks are better than cold ones for wetting your whistle prior to broadcasting. Warm drinks relax your vocal cords.

Peanuts and other rough substances eaten just before broadcasting can affect voice quality, and a stomach-filling meal can affect breath control.

Alcoholic beverages can cause slurred speech and so can some medications.

Tight collars can make speech difficult by constricting throat muscles.

Tight-waisted clothing as well as tight collars can affect your breath control.

Exercise prior to broadcasting can improve voice quality, make you more alert, and improve breath control. For example:

Take several deep breaths followed by slow exhales.

Stretching while taking deep breaths.

Bend over at the waist, allowing arms to hang limp; then, shake-it-all-out along with deep breathing. A great mid-shift waker-upper.

Relax neck, then rotate to the left and then to the right.

A good tension reliever.

Trilling the tongue a few times prior to speaking helps to loosen it up and make it more lively. Helps in articulation of T's and D's.

Fluttering the lips by relaxing them and blowing air through them likewise helps to loosen them and help with articulation of P's and B's.

5.5 Problem Solving. Correcting speech problems involves both proper counseling and a concerted effort by the affected person. It should come as no surprise if progress is slow. Bad speech habits are no easier to correct than a faulty golf swing or poor swimming stroke. The key to a successful program of speech improvement is problem identification. People with speaking difficulties should be critiqued, not criticized. Just knowing that "something is wrong" is not enough to motivate a person toward self-improvement. Without problem identification an affected person will be left with a vague sense of uneasiness and perhaps a feeling of antagonism or resentment.

To assist those assigned the task of serving as speech counsellor we have developed a check-off list (Exhibit 06-1) which should be of help in critiquing the voice characteristics of NWR broadcasters. Once the problems are identified, use the other sections of this chapter to search for a possible cause; they should lead you toward a solution.

5.6 Quality Control Program. The NWR quality control program is described in WSOM Chapter C-64. The program is nationwide in scope and involves all levels of the Weather Service from WSH to regional headquarters to the field stations. In general, WSH (W112) will provide overall management of the quality control program; regional headquarters, with the assistance of the WSFO's and WSO's, will handle the day-to-day operation of the quality control program. At the field station level, quality control should generally consist of the following within the constraints of available staffing and resources:

- a. designating a local NWR program leader.
- b. monitoring broadcasts.
- c. critiquing individuals on their broadcasts.
- d. assisting individuals in practice sessions and providing them with guidance material and external sources of help where necessary.
- e. maintaining NWR logs.
- f. aside from monitoring, the following may be the most effective quality control tool:

SPEECH CHECKLIST

Voice Char.	Very Good	Acceptable	Marg.	Poor	Remarks
Concentration					
Volume					
Pitch					
Modulation					
Attitude Project.					
Breath Control					
Pronunciation					
Vowels					
Consonants					
B,P					
D,T					
G,K					
V,F					
Z,S					
TH					
ZH, SH					
DG, CH					
DZ, TS					
N, M, NG					
L, W, Y, R					

Exhibit 06-1: Speech Checklist (page 1 of 2)

(Speech Checklist, cont.)

Voice Char.	Very Good	Acceptable	Marg.	Poor	Remarks
PT, BD					
KT, GD					
Mumbling					
Stammering					
Stuttering					
Lisp					
Nasalizing					
Monotone Drone					

Exhibit 06-1: Speech Checklist (page 2 of 2)

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The do it again rule:

If a tape recording is incorrect for any major noticeable reason, it should IMMEDIATELY be done over. Time permitting, tapes should be done over until they are good. Nothing stimulates the desire to do a job right the first time more than the absolute knowledge that it must be done over if it's done wrong. Try it! You'll see it works.

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NATIONAL WEATHER SERVICE
Forecasting Handbook Number 2

Chapter IV - NWR Safety Messages

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NWR SAFETY MESSAGES (IV-1)

1. Script for Flood Tape. When a flood warning is issued by the National Weather Service, here are some of the basic safety precautions that will help you to survive the rigors of the flood.

Find out how vulnerable your home is to the predicted crest of the flood. Have your own plan of action.

If it is necessary to leave, move to a safe area before your route is cut off by flood waters.

If you plan to stay in your home, stock up on non-perishable foods that need little cooking and no refrigeration. Store drinking water in containers or even in a bathtub. Water service may be disrupted or your water supply contaminated. Lay in a supply of fuel for emergency cooking facilities and batteries for flash lights and portable radios. Keep first aid and necessary medical supplies stocked and ready. Keep your car's gas tank full and listen to this frequency for vital information on flood conditions.

If a flood occurs and you live in a flood-prone area, the National Weather Service urges you to follow these safety rules for your protection.

If you decide to leave your home or shelter, make this decision early before the route to safety becomes impassable.

Keep your radio or television turned on so that you will hear the latest Weather Service bulletins and information on escape routes open to you.

Avoid any area where exits may be flooded.

If you are on foot, be most careful in attempting to cross flowing streams. If the water is above your knees, you can easily be swept off your feet or be knocked down by debris carried by flood waters.

If you must drive over a flooded road, be extremely cautious, especially at night when visibility is poor. Remember, the road bed may be slippery, filled with debris, or washed out completely, and you can easily be stranded or trapped. If your car stalls, don't panic, leave the car immediately and go to higher ground.

If you are in a safe shelter and circumstances do not require you to move, stay put, and let outside help come to you.

After the flood waters have subsided there still remain many dangerous threats to health and safety. So, the National Weather Service reminds you of these post-flood protective measures.

Do not use fresh food that has come in contact with flood waters.

Don't drink water unless you are sure of its purity. Follow instructions of local health officials.

Wells should be pumped out and the water tested before drinking.

Do not turn on electrical power until it's checked for short circuits.

Do not handle live electrical equipment in wet areas.

Use flashlights to examine buildings after a flood. Flammables may be inside and open flames or lanterns may touch them off.

Report broken gas mains, water mains, and fallen wires to the proper authorities.

Drive with extreme care. An apparently safe road surface can be slippery or dangerously undermined by flood waters.

Keep your radio or television set turned on. Information from civil emergency forces, local officials, or the National Weather Service can be vital to your welfare.

River forecasts and flood warnings issued by your local National Weather Service office are based on accurate knowledge of the behavior of individual rivers under certain weather conditions. The Weather Service issues flood warnings far enough in advance to give threatened communities time to act to meet the rising waters. Use this time for personal preparations; for evacuation of low lying areas; the moving of machinery, merchandise, and livestock to higher ground; sandbagging buildings; reinforcing levees; the closing of flood gates; and the mobilizing of manpower and resources to meet other flood problems.

Should a flood threaten this area, this frequency will bring you the latest official advisories and warnings from the National Weather Service. Follow these broadcasts closely; they will give you important information on how to save lives and property in the event of a flood emergency.

----- END FLOOD TAPE -----

NWR SAFETY MESSAGE (IV-2)

2. Script for Winter Weather Tape. The cold is more intense in winter when the wind is blowing. Strong winds cause a pronounced increase in the chilling effect of low temperatures. In a 20 mph wind, a temperature of 20 degrees above zero becomes the equivalent of a bitter 9 degrees below zero. Increase those winds to 35 mph and the effect would be equal to a frigid minus 20 degrees. Protection against frost-bite is necessary in this type of wind-driven cold, and face and hands should be kept covered. For maximum insulation against the cold, wear several layers of tightly woven light clothing.

If you find it necessary to travel during the winter months, the National Weather Service offers this advice for your driving safety.

Be sure that your car is winterized and that brakes, lights, battery, exhaust and heater connections, defroster, and windshield wipers are all in good working order.

Make certain your gasoline tank is full before crossing open country.

If you're in doubt about road conditions, try, when possible, to travel in convoy with other vehicles. Always let someone know about your travel plans.

It's also an excellent idea to have a winter storm kit in your car trunk. This should include tire chains, booster cables, a shovel, sand, flashlight, matches, a first aid kit, emergency high-calorie rations, and certainly, extra clothing and blankets.

Keep your car radio tuned for the latest winter storm information.

The National Weather Service issues warnings for freezing rainstorms whenever surface temperatures are slightly below freezing and rain falls in liquid form to freeze on impact. If a substantial amount of ice accumulates, the condition is known as an ice storm. These storms make driving or walking extremely hazardous. The danger is even greater if strong winds accompany the storm causing tree limbs and wires to fall and imperil traffic. During these weather conditions, avoid travel if at all possible.

A severe winter storm can cut off your supply of food, fuel, and electrical power. When the National Weather Service forecasts bad weather in the winter, be sure your food stocks and fuel supply are ample to last out the storm. Also, lay in a supply of batteries for flashlights and radios. Be extremely careful in using oil stoves, grills, and fireplaces for emergency heating and cooking. Make certain they are well ventilated while in use and take precautions against fire hazards.

If a blizzard should trap you on the highway, the National Weather Service advises that you take the following measures for your safety.

Don't panic if your car stalls in deep snow. Keep your radiator and exhaust pipe free of snow, but don't try to shovel or push your car out. Over-exertion in a blizzard's bitter winds will exhaust you, lower your resistance to cold, and can endanger your life.

Trying to walk out of the storm is even more foolhardy. You can lose your sense of direction quickly and be entirely at the mercy of the storm.

Stay in the shelter of your car. Run the motor and heater sparingly with sufficient ventilation to prevent carbon monoxide accumulation. Make sure that ice doesn't seal the car windows and cut off fresh air.

Exercise arms and legs to maintain blood circulation.

To help rescuers locate your car in daylight, tie a colored cloth to the radio antenna. At night, turn the dome light on frequently and be sure that someone is always awake and alert to spot help or possible trouble.

----- END WINTER WEATHER TAPE -----

3. Script for Lightning Tape. Your National Weather Service urges you to take these safety precautions if you are caught outdoors in an electrical storm.

Stay away from high ground, high trees, or metal structures.

Get off small boats or out of the water if you are swimming.

Don't touch metal objects like clothes lines, golf clubs, fishing rods, and wires.

NWR SAFETY MESSAGES (IV-3)

Don't stand near other people. Spread out, then crouch down or kneel, but do not lie down or hide in a ditch. Try to get to safe shelter in a car or building before the storm strikes.

When a lightning bolt strikes the ground, the soil acts as a conductor and the current continues in the ground. Ditches and other depressions may attract and concentrate this ground current.

Your National Weather Service warns, if you are in the open and feel the electrical charge, that is, your hair stands on end or your skin tingles, lightning may be about to strike. Crouch down immediately, making as small a target as possible, but do not lie down on the ground.

If you are on the road during an electrical storm, your National Weather Service advises you to stay in your car. A closed automobile offers excellent protection against lightning. If you continue driving, slow down to a very low speed; a nearby lightning bolt could shock you momentarily, causing you to lose control of your car. If your model is an open or convertible type, pull over, stop, and get out of your car while the storm lasts. Open cars, tractors, or motorcycles provide no protection against lightning.

The safety of your home during electrical storm can be greatly enhanced by following this advice from your National Weather Service.

Don't use your phone while a storm is in progress.

Turn off your TV set and don't use plug-in electrical equipment such as mixers, dryers, razors, and so on until the storm is over.

Don't stand near open doors or windows, radiators, stoves, or metal pipes when lightning is near your home. Keep your family indoors until the storm has safely passed.

Medical authorities say that a person apparently killed by lightning can often be revived by prompt mouth-to-mouth resuscitation, heart massage, and prolonged artificial respiration. In a group struck by lightning, those who appear dead should be treated first. Those who show signs of life will probably recover spontaneously, but may require treatment

for burns or other injuries. Your National Weather Service advises that lightning victims carry no electrical charge and can be handled safely.

----- END LIGHTNING TAPE -----

4. Script for Hurricane Tape. When a hurricane watch is in effect in your area, be sure to check your supply of medicines, tools, boards, batteries, non-perishable foods, water storage facilities, and other emergency equipment. Replenish your needs before supplies are exhausted. Ignore rumors and stay tuned to this frequency for the latest accurate information on the storm from the National Weather Service.

Do you know the difference between a hurricane watch and a hurricane warning? When the National Weather Service issues either a hurricane watch or a hurricane warning for this area, your reaction can be very important and, perhaps, life saving. If a hurricane poses a possible threat to this area, a hurricane watch is issued. This means that a hurricane is close enough so that everyone should listen for further reports and be ready to take precautionary action in case warnings are necessary.

When a hurricane is definitely expected to strike this area, a hurricane warning is issued. This means you should carry out all necessary preparedness plans immediately. As long as the hurricane warning is in effect, every precaution should be taken to guard your home and yourself from the destructive wind and water brought by the storm.

When your area receives a hurricane warning, protect your windows with boards, storm shutters, or tape against wind-driven debris. Secure outdoor objects that might be blown away, moor your boat securely, store drinking water against possible loss of your water supply, fill the gas tank of your car, stay indoors, and listen for the latest information from the National Weather Service. Act quickly when authorities order evacuation.

The hurricane has been called the greatest storm on earth. These extremely dangerous storms cause violent winds, heavy rain, and abnormally high storm tides and waves wherever they touch our coastline. The area of destructive winds along the hurricane's path may be several hundred miles wide and wind speed near the center of the storm often exceeds 100 miles per hour. However, the greatest death toll in a hurricane is caused by drowning. This is the result of rapidly rising storm tides which are generated by the piling up of wind-driven water in coastal areas

NWR SAFETY MESSAGES (IV-4)

and flooding caused by torrential rains. For your own protection, be aware of these dangers. If a hurricane threatens this area, respond promptly to evacuation orders of local authorities. Keep tuned to this frequency for the latest reports on the storm from the National Weather Service.

Low lying areas, islands, or places near a body of water are particularly dangerous when a hurricane strikes. Such places can be swept by high waves or storm tides which can cut off escape to higher ground. Keep tuned to this frequency for information on areas of danger from the National Weather Service. If your home is threatened, be prepared to evacuate your family to a safe place when the warning is given.

Hurricane winds are both frightening and dangerous, but wind is not the greatest killer. The heaviest death toll is caused by drowning. As the hurricane approaches land, huge waves and above normal tides may completely cut off low lying beaches and islands many hours before the storm winds reach maximum velocity. The ocean level may rise several feet or more in less than an hour. Giant waves will pound and smash bridges, roads, and buildings and may wash away manmade or natural protective barriers. It may be necessary for you to move quickly to high ground before rising water cuts off all routes of escape. For your own protection, be sure you keep advised on the progress of the storm by listening to this frequency for the latest reports from the National Weather Service.

Tornadoes spawned by hurricanes are among the storm's worst killers. When a hurricane approaches, listen for tornado watches and warnings from the National Weather Service over this frequency. A tornado watch means that tornadoes are expected to develop. A tornado warning means a tornado has been sighted. If your area receives a tornado warning, take shelter immediately.

Many people have lost their lives during a hurricane because they didn't know about the so-called "eye" or center of the storm. Remember, the storm tides and high winds that destroy property occur many hours before and after the arrival of the center or "eye" of the hurricane. The hurricane eye is a relatively quiet area at the pressure center of the storm. If the eye passes directly over you, there will be a sudden lull in the storm. The winds will drop, seas will abate, the rain may stop, and the sun may even come out for a time. It may take a

few minutes or even a half hour or more for the eye to pass and then the violent weather will return suddenly and sometimes with even more destructive force than before. Be sure the storm is over before venturing outdoors. Keep tuned to this station for the latest information from the National Weather Service.

- - - - - END HURRICANE TAPE - - - - -

5. Script for Flash Flood Tape. When a locality subject to flash flooding is threatened by very heavy rains, the National Weather Service issues a flash flood watch to alert the residents to the possibility of a flood emergency. During the watch, residents should exercise great caution, listen for bulletins, watch for signs of rising water, and be prepared to flee to high ground on a moment's notice. There may be no time for further warning.

- - - - -

A flash flood warning is issued by the National Weather Service when a flash flood is occurring or is imminent on certain streams or in certain localities. When the warning is given, get out of the danger zone and to higher ground immediately. Don't waste time trying to save personal property. Be extremely cautious in crossing rain-swollen streams; rapidly rising water may sweep you off your feet. If your car stalls, abandon it immediately and run to higher ground. Act quickly! Your margin of safety may be counted in seconds.

- - - - -

A flash flood can be triggered by intense thunderstorm rainfall concentrated over certain types of terrain. This sudden burden of rain can produce large flood crests which move rapidly downstream tearing out everything in their path. The National Weather Service cautions you; the approach of a flash flood calls for instant life-saving action, abandoning all personal property and fleeing to higher ground before the flood strikes. A second's delay can be the difference between life and death.

- - - - -

Flash floods that strike after darkness falls can be extremely dangerous. Communities may be asleep and signs of flash flooding may be obscured by darkness. The National Weather Service urges you to plan in advance what to do and where to go when a nighttime flash flood strikes. Abnormally heavy rains, persistent lightning in upstream areas, and rapidly rising streams are clues of possible danger. If a flash flood strikes, get to higher ground fast.

- - - - - END FLASH FLOOD TAPE - - - - -

6. Script for Tornado Tape. To be ready for tornado emergencies, schools, office buildings, and factories should have a well-rehearsed plan of action. Your National Weather Service recommends taking shelter in interior hallways, restrooms, or closets on the lowest floor available. Auditoriums and areas with windows should be avoided. In last-minute situations, a desk may serve for cover. If there is a radio available, keep it turned on. Remember, advance planning can save lives.

If you're caught in the open in a tornado, try to hide in a depression like a ditch or culvert. Lie flat and make as small a target as possible. If you can, wrap a covering around exposed portions of your body. Even small ground debris can cause serious injury when driven by tornado-strength winds. Your National Weather Service advises you to memorize basic tornado safety rules; your life may depend on knowing them.

The season of peak tornado occurrence extends from March through September, but the National Weather Service warns you that tornadoes can occur at any time anywhere. Your safety depends on your being constantly alert to the possibility of them forming near you. Careful lookout should be kept during any period of severe thunderstorm activity for the possible appearance of the typical funnel-like tornado shape or the loud roaring noise associated with them. Keep tuned to this frequency for the latest National Weather Service information.

Tornadoes are the most erratic, most unpredictable, and most violent of storms. They can happen any time, anywhere, but are most common in the Mid-Western, Central, and Southern United States, from March through September. The rapidly spinning black or grey tornado funnel may range from a few yards to nearly a mile in width. It may move slowly or as fast as 60 miles per hour. It may skip along or even make a U-turn. It may travel along the ground a few hundred feet or several hundred miles. It may appear singly or in groups of twisters. For your own protection, be familiar with tornado safety rules and have a pre-arranged plan to get to safe shelter when these deadly storms threaten. The National Weather Service will broadcast tornado watches and warnings affecting this area over this frequency.

Be sure you understand the difference between a tornado watch and a tornado warning. The National Weather Service issues a tornado watch to give you advance notice that tornadoes are possible in your locality. This gives you the time to make preliminary plans for moving to a safe

shelter quickly if a tornado is sighted. The tornado warning is an urgent announcement that a tornado has been reported and warns you to take immediate safety precautions. When a warning is issued, move quickly; seconds save lives.

If you live in a mobile home, be sure you have a plan of safe action should the weather become threatening. The size and construction of mobile homes make them particularly vulnerable to overturning and rolling in high winds. Some protection may be provided against this hazard by securing them with cables anchored in concrete footings. But, for safety's sake, when high winds are imminent mobile homes should be evacuated. If a tornado warning is issued for your area, don't take chances. Your National Weather Service advises that you leave your mobile home and move immediately to a sturdy, permanent shelter. If no such shelter is available, lie flat in a ditch or depression in the ground. Act quickly! Your life may depend on it.

In the home, your best haven from tornado winds is a basement below ground level. If possible get under a sturdy table or work bench. If no cellar is available, your National Weather Service advises you to take cover in an interior closet, hallway, or bathroom on lowest floor of the house. Some have found that an empty bath tub with a mattress or blanket for a cover makes a good emergency refuge. Be sure to stay clear of any threat of flying glass and get to a place of safety before the tornado strikes.

----- END TORNADO TAPE -----

7. Script for Heat Wave Tape. The heat of summer puts a great stress on any warm-blooded creature and the human body is no exception. Yet, in our eagerness to enjoy ourselves in the summer sun, we often overexert or overexpose ourselves to the point of danger. The National Weather Service asks you to keep this hot weather advice in mind.

Your body will tell you when you've had enough. If you are experiencing heavy sweating, a high pulse rate, or shallow breathing; if you have a headache or tire easily, have cramps in fingers, legs, or abdominal muscles, have a poor appetite or can't sleep, you have the symptoms of heat weakness and its time to call a halt and relax. Find a cool shady spot to rest, drink plenty of fluids but eat lightly. If you ignore these warning signals your body sends out and continue to over-exert, you're heading for trouble, the kind of trouble that could prove

NWR SAFETY MESSAGES (IV-7)

fatal. Remember, to survive in the summer, you should frequently exchange a lawn mower in the sun for a lawn chair in the shade.

The human body has a remarkable cooling mechanism. The radiator is the skin and the motor is the heart. As air temperature increases, both must work harder to keep body temperature normal. If humidity rises with the temperature, the whole system quickly becomes overworked and eventually breaks down. The severity of the breakdown depends on the age and condition of the heart. The National Weather Service urges the aged and infirm to exercise special care when exposed to the combined effects of heat and humidity.

The effects of excessive heat and humidity on the body occur in several stages of severity. Even without exertion, a hot humid environment can cause heat weakness characterized by physical and mental inefficiencies. Strenuous work or play under such circumstances stimulates heavy sweating which reduces the body's supply of fluids and salts and can result in painful heat cramps in fingers, legs, and abdominal muscles. If physical exertion is continued during a prolonged hot spell, heat exhaustion may occur, a condition which should be treated by a physician. The final step in the body's breakdown under the combined assaults of heat and humidity is heat stroke, a severe medical emergency where a delay in treatment can be fatal. Your National Weather Service urges you to know these symptoms of the various stages of heat sickness and first aid for them. Heat can be deadly. When in doubt, summon medical help immediately.

The impact of a heat wave is generally accentuated in large cities. Lawns, trees, and open spaces of the suburbs tend to reduce the stifling quality of the atmosphere. The brick and asphalt canyons of urban areas capture and reflect the heat creating an airless feeling which continues after nightfall. When temperature and humidity mount in a heat wave, the National Weather Service urges city dwellers to take advantage of air conditioning as often as possible and reduce their exposure to the city's heat.

----- END HEAT WAVE TAPE -----

8. Script for Thunderstorm Tape. When a severe thunderstorm watch is issued for your area, it means severe thunderstorms are possible. When the National Weather Service issues a severe thunderstorm warning, it means severe thunderstorms are imminent or occurring in your area.

During a severe thunderstorm watch, keep in touch with the latest weather reports from the National Weather Service over NOAA Weather Radio or by listening to your local radio or television station. Be prepared to move to a safe location should a severe thunderstorm warning be issued.

A thunderstorm is described as severe when it contains either wind gusts of 60 miles per hour or higher or hail at least 3/4 of an inch in diameter. A severe thunderstorm may contain a combination of the two elements as well as heavy downpours of rain and frequent lightning. Remember, these storms can develop rapidly so there may be occasions when advance warning is not possible. Keep your eyes and ears tuned to the signs of approaching thunderstorms. The rapid approach of dark turbulent-looking clouds, often accompanied by increasing wind gusts, lightning, and thunder could mean the storms are headed your way.

The National Weather Service wants you to know that tornadoes can develop suddenly and without warning during severe thunderstorm activity. The approach of a funnel cloud during the day or of a loud roaring sound at night calls for immediate action to insure your safety. In a school, factory, or hospital, move to an interior corridor on the lowest level and avoid large open rooms such as gymnasiums. At home, go to the basement or a completely enclosed room on the lowest level of your house.

When the National Weather Service issues a severe thunderstorm warning over NOAA Weather Radio, the message is preceded by a warning alarm tone signal that can activate special warning alarm type weather receivers. The warning alarm tone signal triggers either an audible alarm on some models or causes the volume of the receiver to automatically turn on to a present level of loudness so that the warning message can be heard. Severe thunderstorm warnings from the National Weather Service are also broadcast by your local radio and television stations.

The strong wind gusts of a severe thunderstorm can damage buildings, knock down trees, and create a hazard due to wind-blown debris similar to a small tornado. If you are out in the open and exposed to wind-blown debris,

seek shelter but avoid trees as these are targets for lightning. If heavy rains are occurring at the same time, use ditches and culverts with caution as rising flood waters may create an additional hazard. Indoors stay away from windows and go to the safest location on the lowest level of your house. Mobile homes are particularly vulnerable to high winds. If severe thunderstorms approach, you should leave an untied-down mobile home and seek nearby safe shelter. When boating, always stay tuned to the latest weather reports and return to safe harbor before strong winds arrive.

The National Weather Service wants you to know that the intense rainfall often associated with severe thunderstorms can trigger flash floods. Flash floods are produced by rapid runoff of water during and after heavy downpours. These floodwaters move rapidly down rivers, streams, ravines, culverts, ditches, underpasses, and other drainage areas causing sudden destruction in their path. Pedestrians can be swept away by the current, and vehicles can be quickly submerged by rising water. Avoid campsites in dry creek beds as they are dangerously prone to flash flooding. The approach of a flash flood calls for instant action to save lives. Abandon property and personal belongings and flee to higher ground immediately.

Lightning activity associated with severe thunderstorms causes numerous deaths and injuries every year. If you are caught outdoors in an electrical storm, avoid high ground, tall trees, and metal structures. Get off small boats or, if swimming, get out of the water. Get out of open fields and off of farm or other heavy equipment. Don't touch metal objects like clotheslines, golf clubs, fences, pipes, or wires. Don't stand near other people. Spread out and crouch down making as small a target as possible, but do not lie down or hide in a ditch where ground currents from lightning strikes tend to concentrate. Try to get to shelter before the storm gets too close. The enclosed cab of a car or truck provides excellent protection against lightning. Indoors, do not talk on the telephone during an electrical storm except for emergencies and avoid using plug-in electrical appliances. Stay away from open doors or windows and keep hands off radiators, stoves, and metal pipes. Remain indoors until the storm has moved away.

Mobile homes are especially vulnerable to the high winds of a thunderstorm and are subject to overturning and rolling if not properly anchored to the ground. Professional advice should be obtained from a reputable mobile home contractor. As a minimum, though, the frame should be secured to the ground with heavy steel straps. Heavy straps should also go over the top of the home with both frame and over-the-top ties secured in concrete footings. Mobile homes, however, provide no shelter in a tornado regardless of how well tied and should be abandoned for a storm shelter.

----- END THUNDERSTORM TAPE -----

NATIONAL WEATHER SERVICE
Forecasting Handbook Number 2

Chapter V - Console Operation

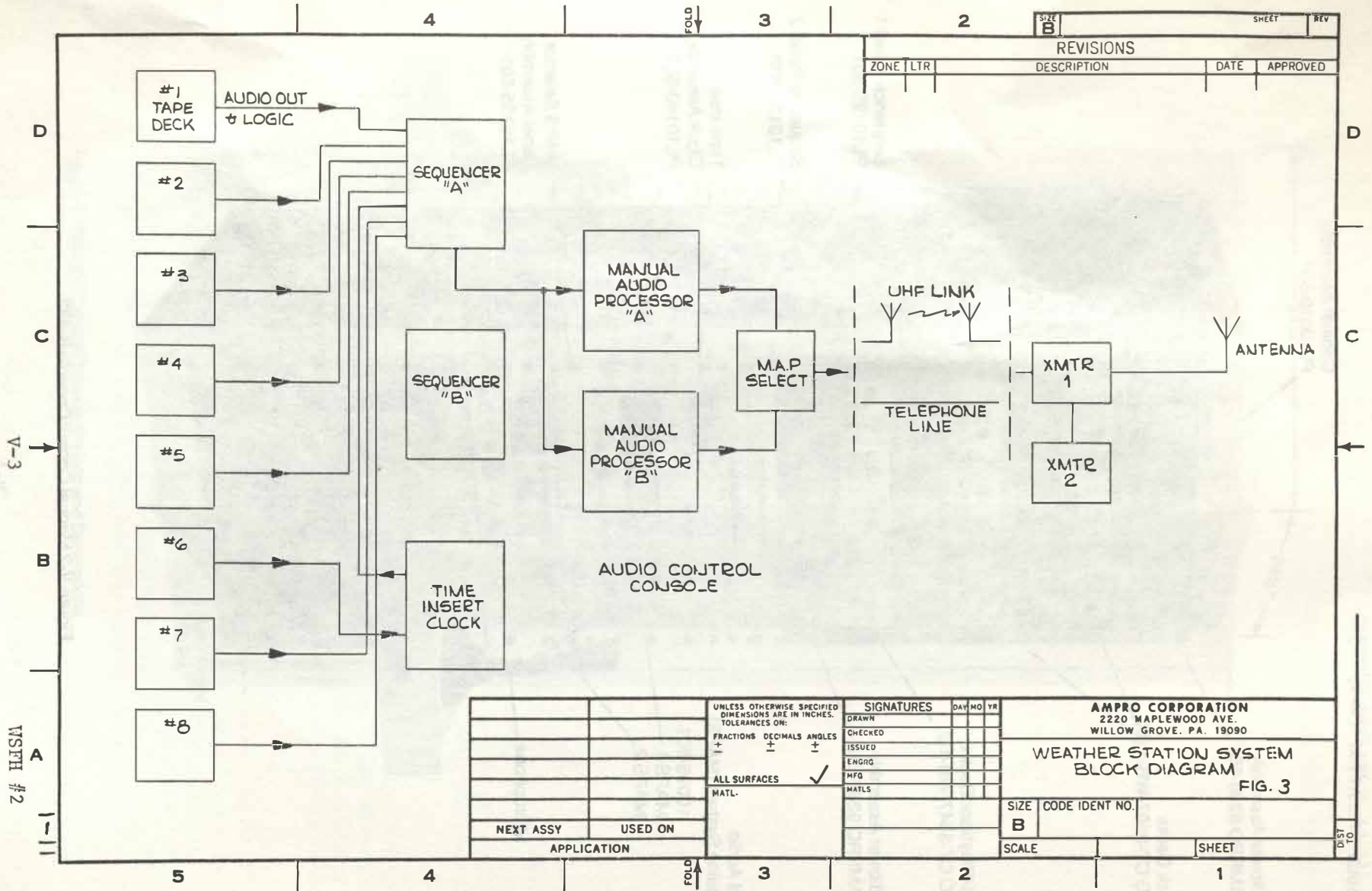
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CONSOLE OPERATION (V-1)

1. Purpose. This chapter provides a description of the NOAA Weather Radio (NWR) system and operating instructions for the Ampro B-422 NOAA Weather Radio Control Console. Most or all NWR offices will eventually be equipped with the B-422 equipment. This equipment is described as the Automatic Audio System (AAS) in some literature.
2. Safety Precautions. Once the NWR broadcast equipment is connected to a source of electrical power, dangerous voltages are present in the internal circuitry. For this reason, THIS EQUIPMENT SHOULD BE SERVICED BY AUTHORIZED PERSONNEL ONLY.
3. NWR Equipment System. The total NWR system consists of the following components (see Figure V-1).
 - Ampro B-422 Manual NWR Control Console
 - Microphone
 - Tape Cartridges
 - Audio link
 - SRS Transmitters
 - Phelps Dodge vertical antennas
 - Accessories
4. Control Console Description (See Figure V-2). The Ampro Corporation NWR Console, Manual System (Type B-422) (see Figure V-2), consists of six cartridge tape playback decks (AMPRO CT-2507 WB-1), two cartridge tape record/playback decks (AMPRO CT-3547 WB-1), two Manual Audio Processor Systems (MAPS) (AMPRO 10095), two Sequence Panels (AMPRO 10125), two Blower Assemblies (AMPRO 9269-501, 9269-502), and a Time Insert Panel (AMPRO 10140), all installed in a cabinet assembly (AMPRO 10010-501) with the required interconnecting cables. The cabinet assembly is equipped with a pull-out writing shelf for placement of microphone and broadcast script. (Figure V-3 gives the B-422 dimensions and weight.)
 - 4.1 Blower Assembly. The NWR console generates a considerable amount of heat while operating. Cooling is achieved by two Blower Assemblies. One is located at the top of the console, the second beneath the Record/Playback decks. For effective cooling, ambient temperatures at the console location should be 70°F or less. The recording tape in the cartridges has a tendency to stretch at temperatures over 80°F.
 - 4.2 Cartridge Tape Decks. The cartridge tape decks contain professional quality tape players and recorders designed for full compliance with the latest National Association of Broadcasters (NAB) standards. The tape equipment is monaural and comes with full cue features, i.e., stop cue, end cue, trip cue, and a fast forward mode. The cues are recorded on a separate track of the tape and are used to perform the



SIZE B		SHEET		REV	
ZONE		DESCRIPTION		DATE	APPROVED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON:		SIGNATURES		DAY	MO	YR	AMPRO CORPORATION 2220 MAPLEWOOD AVE WILLOW GROVE, PA. 19090 WEATHER STATION SYSTEM BLOCK DIAGRAM FIG. 3	
FRACTIONS	DECIMALS	ANGLES	DRAWN					
±	±	±	CHECKED					
			ISSUED					
			ENGRG					
ALL SURFACES	✓		MFG				SIZE	CODE IDENT NO.
MATL.			MATLS				SCALE	SHEET
NEXT ASSY	USED ON							
APPLICATION								

Figure V-1

CONSOLE OPERATION (V-4)

V-3

WSFH #2

150

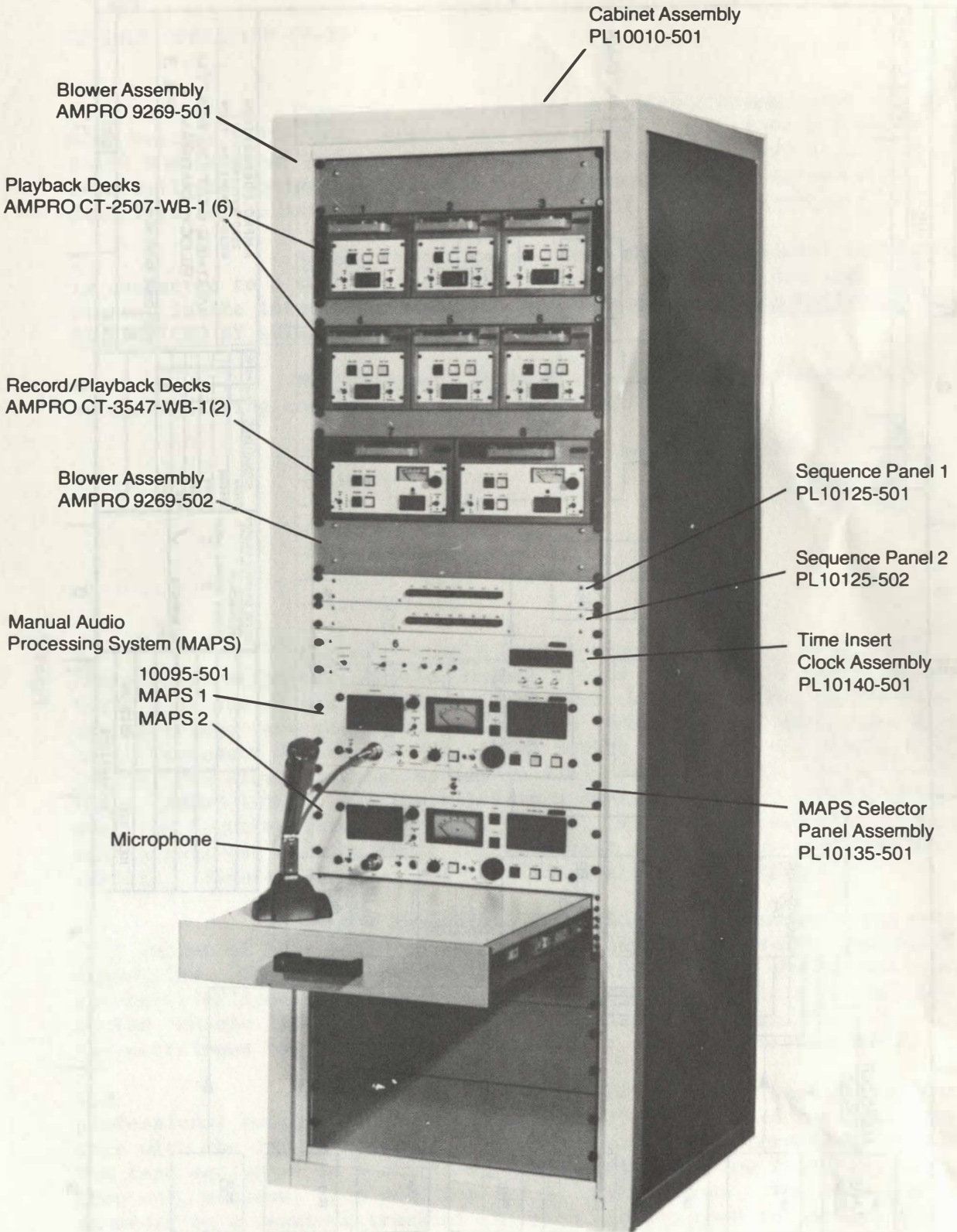


Figure V-2 Manual Control Console B-422

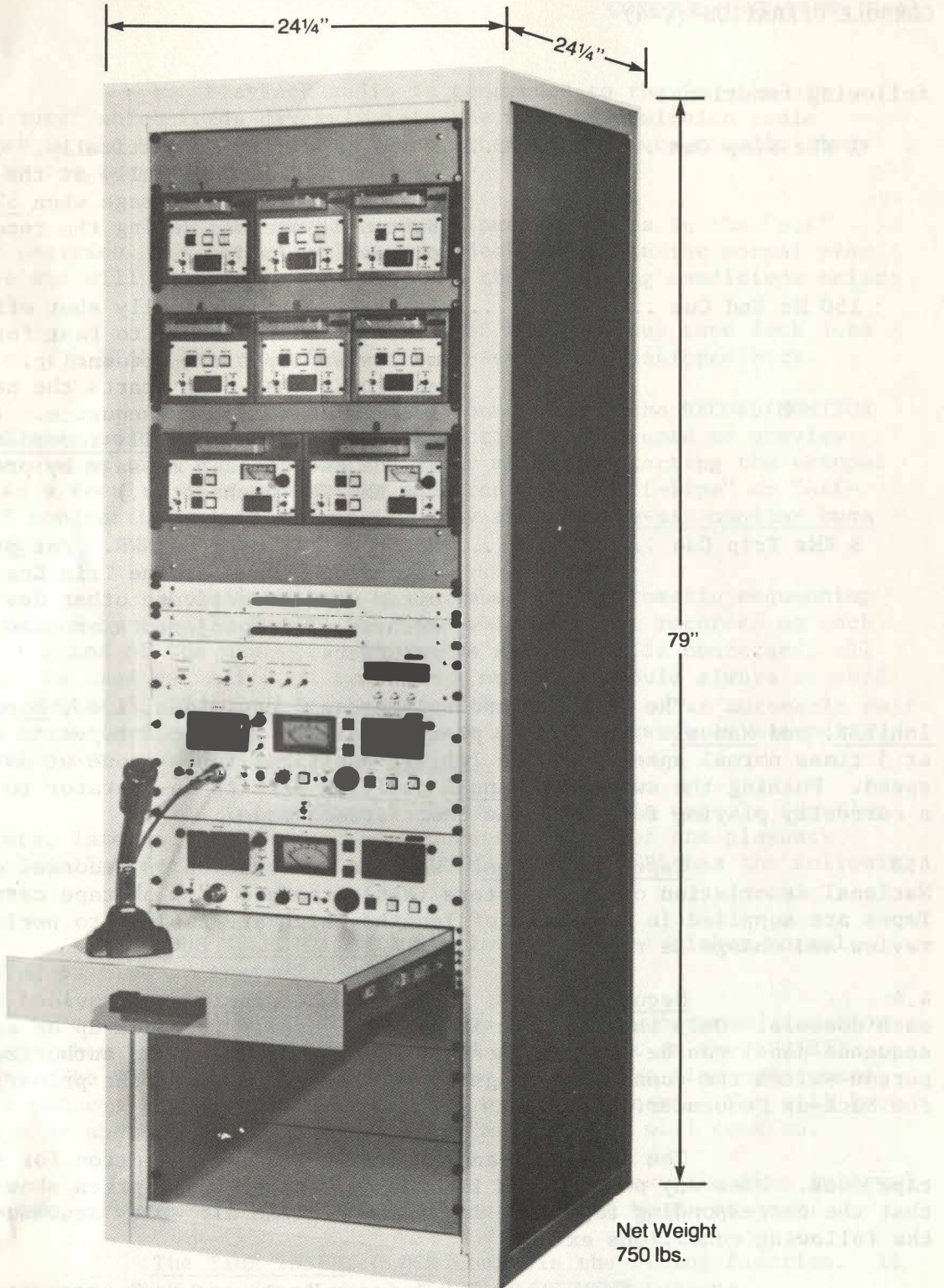


Figure V-3 Radio Control Console Weight and Dimensions

CONSOLE OPERATION (V-4)

following functions:

- 1 KHz Stop Cue Stops tape unit automatically. Cue is recorded automatically at the beginning of each message when START button is pressed during the recording process.

- 150 Hz End Cue Is used to automatically shut off audio and switch deck to fast forward mode when tapes are sequencing. The end cue signal also starts the next deck in the playback sequence. (The end cue must be manually recorded at the end of each message by pressing the END CUE pushbutton.)

- 8 KHz Trip Cue Not normally used on NWR. For other recording purposes, the Trip Cue is often used to activate other devices such as slide projectors or tape recorders.

The Fast Forward switch has 3 positions, i.e., Normal, Inhibit, and Manual. The Normal position allows completed tapes to recue at 3 times normal speed. In the Inhibit position, tapes recue at normal speed. Pushing the switch to Manual position permits an operator to place a currently playing tape into the fast forward mode.

4.3 Tape Cartridges. Weather information is recorded on National Association of Broadcasters (NAB) standard 4" x 5" tape cartridges. Tapes are supplied in a variety of lengths which are subject to periodic review and change as required.

4.4 Sequence Panel. Two sequence panels are provided for each console. Only the top unit is normally used. The back-up or second sequence panel can be put into service quickly by having an authorized person switch the connecting plugs on the rear panel from the primary to the back-up Sequencer.

The sequence panel has a separate push-button for each tape deck. When any push button is pressed "in" it turns green showing that the corresponding tape deck is in the "on the air" play sequence and the following conditions exist:

- a. The unit is tied to an "end cue buss" from which the end cue signal is routed to the Start input of the next deck in sequence.

b. Playback audio is connected to the "on-the-air program buss" which feeds directly into the main transmission audio amplifier in the Manual Audio Processor, then to the output audio lines and on to the transmitter.

When any SEQUENCE PANEL pushbutton is in the "out" or SKIP position, the corresponding tape deck is not in the normal play sequence and will be skipped over because the following conditions exist:

a. The END CUE signal of the previous tape deck does not reach the START control of the out-of-sequence or skipped back.

b. Playback audio is connected to the RECORD/MONITOR input of the audio processor. This connection may be used to preview tapes before putting them on the air after manually starting the skipped deck. As a result, this process is referred to as "off-line" or "off-the air" monitoring and is accomplished by the off-the-air monitor buss connector.

It is important to remember that automatic sequencing is controlled by the 150 Hz END CUE tone which must be recorded on each tape at the end of the message. As far as sequencing is concerned, all decks may be used or as few as two. Deck number 1 should always be used and deck number 5, if possible, because they are part of an automatic self-start feature (see section 8.32.a). Decks always sequence in ascending numerical order.

4.5 Time Insert Panel. In order for this console function to operate, internal cables must be connected to one of the playback decks. Usually, deck #6 is used. The TIME INSERT PANEL has the following controls:

MODE SELECTOR SWITCH allows choice of either normal sequencing or time-programmed operation.

TIME INSERT SWITCH allows the time-programmed function to operate when in the NORMAL position and prevents it in the INHIBIT position. The RESET position allows you to by-pass the time-programmed deck for one cycle at the time it is cued up to play next. You will know when this is about to happen because the "NEXT" light will come on.

The TIME SELECTOR allows you to choose the time interval for the time-programmed deck, i.e., 15 minutes, half hour, or hour.

The TIME INSERT CLOCK controls the timing function. It can be adjusted with the front panel CLOCK ADJUSTMENT buttons.

CONSOLE OPERATION (V-4)

When a cartridge is set to play in the time programmed deck, normal sequence operations will continue until the "NEXT" light of the TIME INSERT PANEL comes on. At that time, relays are activated in the SEQUENCE PANEL which connects the time-programmed deck to the end cue buss connector and removes all other units, thus causing the time-programmed deck to play next in sequence. These relays are deactivated by the end cue signal at the end of the message and a return to routine cycling results.

4.6 Manual Audio Processor System (MAPS). Generally, the basic function of the MAPS includes:

- a. Microphone preamplification necessary to make recordings and/or transmit live.
- b. Program amplification and Automatic Gain Control (AGC) control sufficient to drive the transmitter modulator.
- c. Visual monitoring of the output audio by means of a VU meter.
- d. Generation of dual tone bursts to switch transmitters.
- e. Generation of single tone bursts, i.e., 1050 Hz, 1200 Hz, 1350 Hz, 1500 Hz, 1650 Hz. The 1050 Hz tone is the Warning Alarm used to activate warning alarm type weather receivers.
- f. Transmitter selection (dual system).
- g. A monitor amplifier used to listen to the output to the transmitter or for off-line monitoring of recorded tapes through the speaker marked "MONITOR."
- h. A silence sensing alarm which activates when audio to the transmitter has been lost for an adjustable period of time. The activation time can be altered by your authorized service person, if necessary.
- i. A digital clock which is used to time recording length. The clock resets to zero and begins counting when either recorder is started in the RECORD mode.

4.6.1 MAPS Selector Panel. Contains the MAPS Selector Switch which controls selection of MAPS #1 or MAPS #2 as operating MAPS unit.

4.7 Microphone. Electro-Voice (EV) 620 microphone is standard

equipment in the NWR system. Some substitutions are in use locally due to varying noise cancellation requirements.

5. Audio Link. The console usually is locked to the transmitter by means of approved telephone line (voice grade) or a combination of telephone lines and UHF links.

6. Transmitters. Normal transmission facilities consist of a single or dual Scientific Radio Systems (SRS) transmitters connected to a Phelps-Dodge vertically polarized antenna. In the dual system, one transmitter is "Live" and the other is in "Cold Standby." The secondary transmitter may be activated by the operator at the control console by moving the Transmitter Selector Switch on the MAPS panel to its alternate position. Operating this switch generates a dual-tone, 10-second pulse (high then low or low then high) which, when decoded at the transmitter turns on either the primary or back-up transmitter.

7. Operational Accessories. Each new NWR station is supplied with and should have on hand the following accessory equipment:

- bulk tape eraser
- head demagnetizer
- cartridge holder
- head cleaning fluid
- cartridge labels
- microphone stand
- preventative maintenance kit
- lamp removal tool

8. Control Console Operating Instructions.

8.1 Console Start Up Procedure. Connect the microphone to the MIC INPUT jack on the front of the manual audio processing system (MAPS). Connect dummy shorting MIC plug to other MAPS MIC INPUT.

After clearance from electronic technician that all rear audio cable and line cords are correctly plugged in, apply AC power to the system.

Turn on AC power switches of all cartridge tape decks and the Manual Audio Processing System. Make sure blower is running.

8.2 Recording Procedure.

a. Select a tape cartridge about 10 seconds longer than the message length. This is done to limit the amount of unused tape that will remain after the recording of a message. It also helps to minimize

CONSOLE OPERATION (V-8)

recuing time which can be important when running a short sequence of tapes such as during a weather emergency. Keep in mind that the unused portion of the tape will recycle at fast forward or 3 times normal speed which generates more wear than does normal speed. It is also important to use a fresh tape cartridge for each new recording. Constant use of a tape exposes it to prolonged high temperatures which can lead to excessive wear, tape breakage, extra deposits of oxides on the tape heads and drive mechanism and possible equipment damage.

b. The next step is to thoroughly degauss the selected tape with a bulk eraser. Insert the erased cartridge in either deck 7 or 8.

c. Put the SEQUENCE pushbutton of the selected recording deck into the SKIP mode. (NOTE: SEQUENCE buttons are green when ON-LINE, black when in SKIP.)

d. To avoid feedback into the microphone while recording, turn the playback volume control or MONITOR LEVEL of the standby MAPS counter-clockwise to the OFF position. Press microphones' push-to-talk switch. Microphone is now ready to record.

e. Depress the RECORD switch on appropriate recorder (deck 7 or 8). The red RECORD INDICATOR LIGHT should come on.

f. Adjust LEVEL CONTROL on the record deck until VU meter indicates voice peaks of 0 VU units on bottom scale or 100 units on upper reference scale while talking into microphone at a normal voice level. It is all right for occasional voice peaks to go into the red on the VU meter, but normal range should be 40 to 100 on the upper scale. When using EV620 microphone, it should be 1/4 inch from the lips for maximum background noise cancellation. Other microphones may require different lip-to-mike distances.

g. Start the clock counting. It will automatically reset to zero and continue counting to time your message when the tape is started with either one of the record decks in the RECORD mode.

h. To record your message, press the START button to start the recording deck, pause about 1/2 second and begin speaking into the microphone.

When you hit the START button, a 1000 Hz STOP CUE tone is placed on the cue track. The reason for the pause is, it takes the console a fraction of a second between sensing the STOP CUE and actually stopping the tape. If you begin speaking almost simultaneously with pressing the START button, your audio track may be overlapped when the

tape recycles. This will in effect cut off the beginning of your message. To avoid running out of tape, time your message with the console clock. If you run over, you will be erasing and recording over the beginning of your message.

i. When the entire message has been recorded, immediately press the END CUE button. This records a 150 Hz end of message tone signal on the cue track. It is the END CUE which will trigger the next deck in sequence. Failure to record the END CUE right away will lead to excess silent time in the program sequence and could lead to a triggering of the Silence Alarm.

j. After the END CUE has been recorded, allow the tape deck to run until it stops automatically. Since the recorder is in the "Record" mode during this process, the degaussing function is operating which helps to insure a clean tape. Once the STOP signal is reached, the record deck is switched to the "Ready" mode. The cartridge is now cued to the beginning of the recorded segment and you can monitor the newly recorded tape. If a deck is ever placed in the record mode and a tape is not recorded, you must press the STOP switch to deactivate the record function.

8.3 Playback Function. The audio outputs of all decks are switched to the MAPS speaker only for monitoring and checking purposes when their SEQUENCE buttons are in the SKIP mode. Returning these buttons to the ON-LINE position will route their audio outputs to the transmitter for on-the-air broadcast.

8.3.1 Tape Monitoring. A recorded tape may be monitored in the non-broadcast or "off-line" mode by the following process:

- a. Insert recorded cartridge into any deck.
- b. Place corresponding SEQUENCE pushbutton into SKIP position.
- c. Place monitor selector switch to RECORD position.
- d. Rotate playback volume control clockwise to increase speaker volume.
- e. Press START switch on deck to be monitored.
- f. Adjust playback volume control to a comfortable level.

8.3.2 Transmitting Recorded Messages. The continuous feeding of recorded messages to the remote transmitter is provided by running any combination of playback and record/playback decks in an automatic sequencing mode controlled by the SEQUENCE PANEL.

Recorded messages may be transmitted by the following process:

CONSOLE OPERATION (V-8)

- a. Insert recorded and cued cartridges in the desired order of play into the cartridge decks in ascending numerical order beginning with deck #1. *Deck #1 must be in the sequence because it is connected to an automatic restart mechanism that is activated by an audio failure within the console. Deck #5 should also be used if possible because it too is connected to the restart mechanism.*
- b. The SEQUENCE PANEL has a separate push-button for each cartridge deck. Place all unused decks into the SKIP mode.
- c. During a program cycle the sequencer mechanism switches from deck #1 progressively to deck #8, skipping any deck placed in the SKIP mode. Automatic switching from deck to deck is controlled by the 150 Hz end cue tone which must be recorded on each cartridge tape at the end of the recorded message.
- d. To ensure continuous cycling, allowance must be made during the recording process so that the total length of tape remaining after the end cue on any cartridge in the sequence is less than the total length of all other recorded messages in that sequence. If this restriction is not observed, a cartridge which has already played will not be cued up to play again when next called upon by the 150 Hz end cue tone of the preceding tape in the sequence. Keep in mind that unused tape is cued up at three times normal speed (Fast Forward). (Note: Where recuing time has been kept at a minimum on each tape and the program cycle is reasonably long, you should consider recuing tapes with the deck in the Fast Forward Inhibit mode. In this mode, tapes recycle at normal speed which procudes less wear and tear on the tape and tape heads.
- e. Once started, the cycling of tapes will continue unless interrupted by the operator by removing the next cartridge to play or by placing all of the decks in SKIP.
- f. The transmitter keys on the audio from the console thus, continuous voice messages will keep the transmitter carrier on the air. If an audio message is not present, the transmitter will unkey, i.e., end transmission of modulator on the carrier. The TRANSMITTER #1 or TRANSMITTER #2 carrier control switch selects the transmitter to be used.

8.4 Live Voice Message Transmitting. Live voice messages may be sent to the remote transmitter using the microphone and Manual Audio Processing System as follows:

Method I:

- a. Place microphone switch in locked-in position.

b. Interrupt playback sequence by depressing the FAST FORWARD switch on the front panel of the currently playing deck and remove the next tape in sequence. (Note: you must begin speaking within a few seconds. A delay will trigger the AUTOMATIC SELF-START LOGIC which will cue Deck #1.) As an alternative, take all decks out of sequence by placing them in SKIP mode.

c. Depress and hold MIC CONTROL switch in the TRANSMIT position.

d. Speak at a normal voice level.

e. When a message is complete, release MIC CONTROL switch, turn microphone off, and start the recorded message cycle.

Method II:

This method is designed to facilitate simultaneous live broadcast and recording of emergency messages. (Recording procedures are in parenthesis.)

a. Squelch SILENCE ALARM. (Turn MAPS MONITOR LEVEL controls to off position to avoid feedback.)

b. Place selected emergency message cartridges in console decks, i.e., preliminary warning message and Safety Message Tape. (Place erased cartridge in one of the record decks.)

c. Take all decks out of sequence, i.e., place in SKIP mode.

d. Put microphone switch in locked-on position. (Press RECORD switch on appropriate recording deck. Red RECORD INDICATOR LIGHT should come on.)

e. Depress and hold MIC CONTROL switch in the TRANSMIT/RECORD position. (Press START button on record deck.)

f. Speak into microphone at a normal voice level and deliver your emergency message.

g. When message is complete, (hit END CUE button), release MIC CONTROL switch, and turn microphone off.

h. Put selected emergency messages ON-LINE and start them cycling.

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i. Reset SILENCE ALARM.

g. When recorded warning message tape has cued up, place it ON-LINE and remove preliminary warning message. Monitor emergency message to ensure that it is functioning properly.

8.5 Warning Alarm Function. Five preset tone signals are available for warning alarm or other alerting functions. They are: 1050 Hz, position A; 1200 Hz, position B; 1350 Hz, position D; 1650 Hz, position E. Position A will activate commercial warning alarm type receivers. It is suggested that to avoid accidental triggering of the warning alarm, you should use only the upper MAPS panel (MAPS #1) as the primary MAPS unit and keep the WARNING ALARM SELECTOR SWITCH on the lower MAPS (MAPS #2) on position E. The lower MAPS unit is subject to accidental bumping by objects on the pull-out shelf.

To use the alarm prior to the transmission of a message, select the desired tone signal, A through E, press the warning alarm push-button which will generate a 10-second tone signal. Follow the tone with your live voice or recorded message. (Note: Currently only 1050 Hz is authorized for use in watch/warning situations. The 1650 Hz tone requires regional approval prior to use in non-warning applications. The other tones are not to be used.

8.6 Time Inserted Messages. Before attempting to transmit time-inserted messages, be certain that the internal cable linkages controlling use of the time-programmable feature are connected. Once a deck (normally deck #6) is in the time-programmable mode, you can take the following steps to place time inserted messages into your broadcast:

- a. Adjust the TIME INSERT CLOCK to the correct time using the front panel clock buttons.
- b. Place a prepared tape into the time-programmable deck.
- c. Using the TIME SELECTOR SWITCH, select the appropriate time interval, i.e., 15 minutes, half hour, or hour.
- d. Put the TIME INSERT switch into the NORMAL position.
- e. Put the time-programmed deck ON-LINE on the SEQUENCE PANEL. The time-insert feature is now part of your programming.
- f. When the selected time interval is reached, the time-programmed deck will be connected to the end cue of the currently playing tape. The end cue of the currently playing tape will trigger the time-

programmed deck to play. You will know when this condition exists because the "NEXT" light on the TIME INSERT PANEL will come on.

g. Should you not want the time-programmed deck to play on a particular cycle, place the TIME INSERT SWITCH into the RESET position. The time-programmed deck will be bypassed for the current cycle only.

h. Should you wish to withhold the time-programmed deck for a period of time, you can place the TIME INSERT SWITCH into the INHIBIT position or simply take the deck out of sequence.

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Chapter VI - Preventative Maintenance

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PREVENTATIVE MAINTENANCE (VI-1)

1. Purpose. This chapter describes the preventative maintenance procedures to be performed by NWR Operators.
2. Obligations. Performance of the described procedures is required in order to maintain the NWR Control Console in proper working condition and to help minimize repair costs and "down time."
3. Limitations. Operators are not required to enter the rear of the NWR Control Console where hazardous electrical power may be present. With the exception of replacement of console light bulbs, operators are not required to replace or repair console components.
4. Preventative Maintenance Outline. The following steps should, as a minimum, be performed as scheduled. They must be done more frequently if local operating conditions make it necessary. For all cleaning procedures, use head cleaning fluid or isopropyl alcohol along with cotton swabs.

Weekly Maintenance

<u>Step</u>	<u>Procedure</u>	<u>Remarks</u>
1. Clean Tape Heads	Place deck in SKIP. Remove tape cartridges. Slide unit forward to obtain access to tape heads. Do not pull out farther than required. Swab face of heads until clean.	
2. Clean Tape Guides	Same as above. Clean only surface exposed to tapes.	Caution: Do not let fluid run into motor bearings.
3. Clean Motor Capstan	Same as above. Note: Capstan will be rotating.	Caution: Same as above.
4. Clean Rubber Pinch Roller	Actuate solenoid by depressing cart tape switch or use cart tape switch tool. Then press Start button.	Avoid wetting the bearing area of the pinch roller. If a heavy fluid spill onto pinch roller occurs, lubricate

PREVENTATIVE MAINTENANCE (VI-4)

<u>Step</u>	<u>Procedure</u>	<u>Remarks</u>
	Pinch roller will swing up and engage motor capstan. While pinch roller is rotating, <u>clean only surface</u> which engages the tape.	bearing. (See step #9 in biannual maintenance.)

Biweekly Maintenance

<u>Step</u>	<u>Procedure</u>	<u>Remarks</u>
5. Replace tape cartridges	Inspect and replace old or worn tapes. Date mark new tapes being placed in service.	Check Safety Message Tapes, also.

Monthly Maintenance

<u>Step</u>	<u>Procedure</u>	<u>Remarks</u>
6. Clean Solenoid Plunger	Put deck in SKIP and slide forward to obtain access. <u>Turn deck power OFF.</u> Remove solenoid plunger. Clean plunger and bore.	
7. Clean Panels and Deck Plates	Wipe with soft cloth dampened with mild detergent solution.	
8. Degauss all heads, capstan, and tape guides.	Slide deck forward. <u>Turn power OFF.</u> Remove head shield using Phillips screwdriver. Carefully degauss tape heads, tape guides, and capstan shaft. <u>Do not let degaussing tool touch components.</u> Move degaussing tool away from components before turning OFF.	Take care not to lose small headshield screws.

PREVENTATIVE MAINTENANCE (VI-4)

Semi-Annual Maintenance

<u>Step</u>	<u>Procedure</u>	<u>Remarks</u>
9. Lubrication of Pinch Roller. (This step may be performed by contractor during semi-annual maintenance visit.)	Slide deck forward. Press tape cart switch or use cart tape switch tool then Start button. Pinch roller will swing up. Drop one or two drops of light oil into bearings.	Caution: Over oiling can cause dust accumulation. Resulting grit can produce excessive wear. Excess oil can run onto pinch roller surface and cause playing tapes to bind.

Miscellaneous Maintenance

<u>Step</u>	<u>Procedure</u>	<u>Remarks</u>
10. Degauss tape cartridges.	Degauss tapes manually with bulk eraser as used.	
11. Replace console pushbutton light-bulbs.	Remove plastic push-button over defective light by inserting flat-bladed screw driver into slots on the side of the button or use a button-puller. With the clear plastic end of a lamp replacement tool, remove defective bulb. Using hard plastic end of tool, insert new bulb, align prongs of bulb with socket and insert new bulb. Twist lightly to remove tool. Replace plastic push-button.	Take care not to break bulbs or plastic pushbutton.

5. Preventative Maintenance Equipment. The following is a list of the items you will need for routine preventative maintenance on the NWR Control Console:

- cotton swabs
- isopropyl alcohol or Ampro head cleaning fluid

PREVENTATIVE MAINTENANCE (VI-5)

- head cleaning tool
- pushbutton puller
- lamp removal tool
- flat-bladed screwdriver
- phillips screwdriver
- cart tape switch tool
- light oil (sewing machine grade)
- mild detergent
- soft cloth

NOTE: Head cleaning tool, cart tape switch tool, and pushbutton puller are available in a preventative maintenance kit from CLSC. Lamp removal tool also available from CLSC.

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Chapter VII - Operator Diagnostics

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OPERATOR DIAGNOSTICS (VII-1)

1. Purpose. NWR operators are responsible for notifying the appropriate maintenance people when equipment or technical malfunctions occur. The purpose of this chapter is to help operators identify and report problems connected with malfunctioning equipment.
2. Console Maintenance. NWS electronic maintenance personnel will provide emergency maintenance as necessary when system outages occur. A system outage is defined as the loss of the ability to provide high quality audio output from the Automatic Audio System (NWR Control Console) or the non-availability of at least one record/playback and one playback deck.
3. Transmitter Contract Maintenance. Transmitters are maintained under a variety of agreements, i.e., contractor, State, cooperator. In general, emergency maintenance is required when one unit of a single transmitter or both units of a dual transmitter are malfunctioning. Routine maintenance procedures are called for when one of the transmitters in a dual system malfunctions.
4. Logging Outages. *All equipment malfunctions should be logged on Form H-10 as soon as they occur.* Information derived from the H-10 form can lead to necessary modifications or changes in the NWR system. Such changes are not possible without proof that a problem exists. Logging outages or malfunctions is an extremely important operator function.
5. NWR-Caused Interference. Interference caused by a NWR transmission is a National Weather Service responsibility. Log any complaints that you receive on Form H-10 and report it to your MIC, Electronic Technician, and/or NWR Program Leader.
6. Outside Interference on NWR. Log observed or reported cases of outside interference with the NWR broadcast on Form H-10. Persistent problems should be reported through regional headquarters to the NWR Program Manager (W53) at WSH. The following are some of the typical interference problems:
 - a. Persistent co-channel interference caused by overlapping same-channel NWR stations.
 - b. Intermittent co-channel interference caused by atmospheric conditions permitting long range transmission of a same-channel NWR station which then interferes with the local station.
 - c. Persistent off-frequency or overpowering local transmission producing area wide interference.

d. Isolated cases of local interference with listener reception may be caused by an NWR receiver with poor selectivity or extreme proximity to the interfering transmitter.

If possible, try to obtain some identification of the external interference source, i.e., exact location of station being interfered with, type of receiver being used, and exact nature of the interference.

7. Using Console Back-Up Components. The NWR broadcast equipment provides redundant components for many of its subsystems to help ensure continuous transmission of the audio signal. Malfunction of a redundant component is normally classified as a routine outage. Log such outages on Form H-10. Figure V-1, Chapter V, shows the basic subsystems of the NWR Control Console in simplified form.

7.1 Tape Decks. A malfunctioning tape deck is removed from on the air sequence by placing it in SKIP mode. Log nature of malfunction on Form H-10.

7.2 Time Insert Panel. Redundance is not provided for the Time Insert Panel. In case of malfunction, place deck it is connected to into SKIP mode. This is classified as a routine outage.

7.3 Sequence Panel. A backup Sequence Panel is provided; however, if it is necessary to switch from Sequence Panel A to Sequence Panel B, console must be shut down. If the primary sequence panel is totally inoperative or at least one record/playback deck and one playback deck are not operative, emergency maintenance is required. Prior to shutting down the console, notify your audience of the outage using NWR if possible. Also put an outage notice on NWS or local loop and NWS-leased telephone recording (see WSOM Chapter C-64).

7.4 Manual Audio Processor System. A malfunctioning MAPS unit is interchanged by throwing the MAPS Selector Switch on the MAPS Selector Panel to its alternate position.

7.5 Blower Motors. Malfunction of one or both blower motors is classified as a routine outage. However, loss of cooling power can lead to heat damage to console components if operation is continued without both fans. Report blower motor failure immediately. If possible, temporary shutdown should be considered until maintenance can be performed. If shutdown is not possible, try to lower broadcast room air temperature.

8. Loss of On-Air Signal. When On-Air signal is lost, it is necessary to determine whether the problem is:

OPERATOR DIAGNOSTICS (VII-8)

- a. at the NWR console
- b. with the audio link
- c. at the transmitter.

Use the following steps to locate the signal loss. NOTE: When ON AIR signal is lost, a loud continuous tone (2500 Hz) will come from SR-401A monitor receiver.

8.1 Silence Alarm Check. Note whether the Silence Alarm has been activated. If it has been activated, audio has been lost within the console. Proceed to Section 12. If Silence Alarm has not been activated, continue with the following steps.

8.2 MAPS VU Meter Check. The MAPS VU Meter receives its signal from a connection just ahead of the final telephone line output. Observe the VU meter and proceed as follows:

- a. If signal is not present on VU Meter, switch to MAPS #2. If this corrects malfunction, log and report an outage in MAPS #1.
- b. If signal is not present on VU Meter and switching to MAPS #2 does not lead to restoration of ON AIR signal, console is inoperative. Log and outage and call for emergency repairs.
- c. When a signal is present on VU Meter, there is a very high probability that the signal is leaving the console and that the problem is located in the communications link or at the transmitter. It is possible that the signal passing through the VU Meter is not reaching the output terminal on the rear of the console cabinet or that the console telephone line connection is faulty. However, these problems can only be checked by a qualified maintenance person. NWR operators should proceed to look for malfunctions in the communications link or at the transmitter site.

9. Single Transmitter Check. If previous tests indicate signal is or probably is leaving the control console, try to determine if a power failure has occurred at the transmitter site. If there is no power failure or power failure is improbable, trouble is either in transmitter or communications link. Have communications link checked and repaired as necessary. If communications link is working (or if you were unable to have the communications link checked), report the outage to the transmitter maintenance people for emergency repairs.

10. Dual Transmitter Checks. With the control console cleared as source of ON AIR signal loss take the following steps:

1. To determine if primary transmitter has failed, key on back up transmitter by moving the Transmitter Selector Switch on the active MAPS to the back up transmitter position.

If ON AIR signal is returned, primary transmitter requires maintenance. NOTE: When back up transmitter comes on the air it initially operates at a reduced power level. It will require 90 seconds to 45 minutes to come on at full rated power. This reduced power interval depends on how long the transmitter has been off because NWR back up transmitters are kept in a cold stand by mode. While the transmitter is operating at reduced power, a low level audio beep tone (425 Hz) will be transmitted.

2. If ON AIR signal is not restored by keying on back up transmitter, switch to MAPS #2 and attempt to key back up transmitter again. If back up cannot be put on the air, check for a transmitter site power failure. If transmitter is put on air, have Transmitter Selector Switch on MAPS #1 repaired.

3. If no transmitter site power failure exists, trouble is in:

- a. communications link
- b. transmitter
- c. antenna
- d. MAPS units Transmitter Selector Switch

Have the communications link checked. If it is normal, call for emergency transmitter repair. If back up transmitter is found to be normal, both Transmitter Selector Switches will require maintenance.

11. Antenna Check. There is always the outside possibility that loss of ON AIR signal is due to antenna damage or, in special cases, ice-loading. With a damaged or ice-loaded antenna, a very weak signal may be present which can be detected by a receiver close to the antenna site. If damage or ice-loading is suspected, have someone close to the antenna site monitor the frequency. If you have a dual transmitter, key on the back up equipment. Ice-loading or damage can cause the transmitter's power amplifier to cut off. If a single transmitter emits a very weak signal along with a 425 Hz beep tone, or a dual does the same and its backup will not come up to full rated power after a 45 minute warm up, antenna damage or ice-loading may be the problem.

12. Weak ON AIR Signal. Generally caused by power amplifier failure. A 425 Hz beep tone will be heard. To correct this, switch to back up transmitter and notify transmitter maintenance people. If back up transmitter fails to come up to full rated power after 45 minutes,

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problem may be high line voltage or antenna damage (See Section 11).

13. Lost Audio in NWR Console.

13.1 Self-Start Feature. If audio is lost anywhere within the control console ahead of the final line driver input, the Silence Alarm will activate. Sequencing will automatically start again with deck #1 due to the emergency Self-Start Logic in the MAPS alarm circuits. If no audio reaches the line driver circuits within 5 seconds, sequencing will be attempted again with deck #5. If there is still no audio reaching the line driver, the Self-Start Logic will alternate every 5 seconds between decks #1 and #5 in an attempt to restore audio. As soon as audio is restored the logic will cease to search but the Silence Alarm will continue to function until it is reset.

If audio is not restored by the Self-Start Logic, go to Section 13.3. If audio is restored, make the tape cartridge and tape deck check.

13.2 Tape Deck and Cartridge Check. If audio is at least temporarily restored by the Self-Start Logic, either the last deck playing when the alarm is activated or the tape cartridge contained in the deck is defective. It will be necessary to watch the sequence to determine the suspect deck. Place the suspect deck in SKIP.

To check the suspect deck's performance, select a tape known to be good and monitor the deck OFF LINE. If audio is heard, original tape was defective and should be replaced.

If no audio is heard, deck is defective or its audio path through the Sequence Panel is faulty and requires maintenance.

13.3 Audio NOT Restored. If the Self Start Logic failed to restore any audio in the console, problem may be between Sequence Panel and MAPS. Switch to back up MAPS. If audio is restored by switching to back MAPS, primary MAPS or its connection to Sequence Panel is defective.

If audio is not restored by switching to MAPS #2, Sequence Panel is defective and emergency maintenance is required.