

QC
851
.U6
T32
no.94-1

NOAA Techniques Development Laboratory
Computer Program NWS TDL CP 94-1



NOAA WEATHER RADIO HOURLY WEATHER ROUNDUP FORMATTER

Silver Spring, Md.
March 1994

**U.S. DEPARTMENT OF
COMMERCE**

**National Oceanic and
Atmospheric Administration**

**National Weather
Service**



PREFACE

ues Development Laboratory's (TDL's) computer program (CP) et of TDL's technical memorandum series. The CP series er programs written at TDL primarily for the Automation of and Services (AFOS) computers.

The format for the series follows that given in the AFOS Handbook 5, Reference Handbook, Volume 6: Applications Programs, Part 1: Policy and Procedures, published by the Office of Technical Services/AFOS Operations Division.

NOAA Techniques Development Laboratory Computer Program NWS TDL

- CP 83-1 Gross Sectional Analysis of Wind Speed and Richardson Number. Gilhousen, Kemper, and Vercelli, May 1983. (PB83-205062)
- CP 83-2 Simulation of Spilled Oil Behavior in Bays and Coastal Waters. Hess, October 1983. (PB84-122597)
- CP 83-3 AFOS-Era Forecast Verification. Heffernan, Newton, and Miller, October 1983. (PB84-129303)
- CP 83-4 AFOS Monitoring of Terminal Forecasts. Vercelli, December 1983. (PB84-145697LL)
- CP 83-5 Generalized Exponential Markov (GEM) Updating Procedure for AFOS. Herrmann, December 1983. (PB84-154822LL)
- CP 84-1 AFOS Display of MDR Data on Local Map Background. Newton, July 1984. (PB84-220797)
- CP 84-2 AFOS Surface Observation Decoding. Perrotti, September 1984. (PB85-137586)
- CP 84-3 AFOS-Era Forecast Verification. Miller, Heffernan, and Ruth, September 1984. (PB86-148319LL)
- CP 85-1 AFOS Monitoring of Terminal Forecasts. Vercelli and Norman, May 1985. (PB85-236388LL)
- CP 85-2 AFOS Terminal Forecast Decoding. Vercelli, Norman, and Heffernan, October 1985. (PB86-147360LL)
- CP 85-3 AFOS-Era Forecast Verification. Ruth, Miller, and Heffernan, October 1985. (PB86-148319LL)
- CP 87-1 AFOS Terminal Aerodrome Forecast Formatting. Wantz and Eggers, July 1987. (PB88-10449LL)
- CP 87-2 AFOS-Era Forecast Verification. Ruth and Alex, July 1987. (PB88-125570LL)
- CP 87-3 Forecast Review. Wolf, July 1987. (PB88-125588LL)
- CP 87-4 AFOS Monitoring of MDR Data Using Flash Flood Guidance. Norman and Newton, October 1987. (PB88-137450LL)
- CP 87-5 AFOS Terminal Forecast Quality Control. Vercelli and Leaphart, December 1987. (PB88-169925LL)
- CP 88-1 AFOS Terminal Forecast Decoding. Vercelli and Leaphart, August 1988. (PB89-101240LL)
- CP 89-1 Structure Flow Diagram Generator. Adams, March 1989. (PB89-195978AS)
- CP 89-2 String Search. Adams, March 1989. (PB89-195986AS)
- CP 89-3 Extended Memory Library for AFOS Applications. Leaphart, June 1989. (PB92-216290)

(Continued on inside back cover)

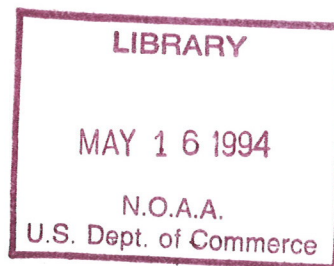
QC
851
UG
T32
no. 94-1

NOAA Techniques Development Laboratory
Computer Program NWS TDL CP 94-1

NOAA WEATHER RADIO HOURLY WEATHER ROUNDUP FORMATTER

Gary F. Battel, Gerry A. Kokolis, and James E. Calkins

Techniques Development Laboratory
Silver Spring, Md.
March 1994



UNITED STATES
Department of Commerce
Ronald H. Brown
Secretary

National Oceanic and
Atmospheric Administration
D. James Baker
Under Secretary

National Weather Service
Elbert W. Friday, Jr.
Assistant Administrator



TABLE OF CONTENTS

	Page
1. Introduction	1
2. Methodology and Software Structure	1
A. Data Flow	1
B. Software Description	2
3. Setup Procedures	4
A. Adding Products to the Data Key File	4
B. Downloading Software into the User Directory	4
C. Executing the Software	5
4. Tailoring the System	5
A. Description of the Product	5
B. Preparing to Execute SAODECII	6
C. Preparing to Execute SCPDEC	6
D. Preparing to Execute HWRNWR	7
E. Selecting Options Via Preformat cccMCPHWR	7
F. Selecting Options Via Command Line Switches	10
G. Setting Up HWRLIST.on File Entries	10
H. Understanding Summary Group Formats	14
I. Establishing Fixed Phrase Formats	16
J. Additional Considerations	23
K. Treatment of Missing Data	27
L. Changing the Runtime Macro	28
5. Cautions	28
6. References	30
7. Program Information and Procedures for Installation and Execution	31
Tables and Figures	36

NOAA WEATHER RADIO HOURLY WEATHER ROUNDUP FORMATTER

Gary F. Battel¹, Gerry A. Kokolis¹, and James E. Calkins¹

1. INTRODUCTION

The National Weather Service (NWS) is planning to replace the aging National Oceanic and Atmospheric Administration (NOAA) Weather Radio (NWR) as part of its modernization program. Modern, computerized Console Replacement Systems (CRS) will replace current manually-intensive console systems. The new consoles will be capable of accepting hydrometeorological text products and converting these text products to speech. These systems will ultimately be interfaced with the Advanced Weather Interactive Processing System (AWIPS), which will allow the forecaster to control and provide products to the CRS.

It is anticipated that the first of the new systems will be fielded before AWIPS. To take advantage of this deployment, the NWS is planning to interface the systems with the current Automation of Field Operations and Services (AFOS) system. The NWS plans to generate text products on AFOS, transmit them to the CRS, and have the CRS convert them to speech for broadcast. This will give the NWS experience with this process in preparation for AWIPS, and it will assist local offices in carrying out their missions during the transition to AWIPS.

The Office of Meteorology (OM) selected the Hourly Weather Roundup (HWR) to be among the first products for automatic NWR preparation. The HWR is one of the most frequently broadcast products reported on the NWR. The HWR is a station-by-station summary of the current weather observations for locations in and around the local area, including, in some instances, marine observations. An hourly weather roundup program which produces products for the Weather Wire Service (WWS) is currently run on AFOS (Sunkel 1987). This program produces a table which is not compatible with the CRS voice-synthesis capability. However, the program for the WWS performs many of the same functions as the program for the NWR, and formed the basis for the NWR program.

This document provides a description of the HWR NWR software (HWRNWR) and associated files, the setup procedures, methods for tailoring the system, and a description of the product.

2. METHODOLOGY AND SOFTWARE STRUCTURE

A. Data Flow

The HWRNWR program and data files associated with it are shown schematically in Fig. 1. The surface airways observation decoder, SAODECII, is run in conjunction with the HWRNWR program to decode most of the necessary observations. Since Automated Surface Observing System (ASOS) sites are only capable of observing clouds below 12,000 ft, ASOS cloud observations are supplemented

¹General Sciences Corporation, under contract to the Techniques Development Laboratory, Office of Systems Development, National Weather Service.

with satellite observations decoded by program SCPDEC. Many of the options of HWRNWR can be selected via an AFOS preformat screen. Other options are selected with global or local command line switches, and still other options are controlled by the user's selections in the HWRLIST.On and associated BRDCAST.nx files. The SAO decoder SAODECII, the satellite cloud product decoder SCPDEC, and the hourly weather roundup formatter HWRNWR can be executed individually, or more conveniently by means of the macro HWR.MC. Executing the macro generates a text product that is displayable on the Alphanumeric Display Module (ADM), and prior to the deployment of the CRS, the text product may be printed and broadcast by reading over the NWR. These applications can be run from either the ADM or Dasher terminal by typing an execution statement via a command line. Command line switches can be set to select some options.

The text product produced by HWRNWR also includes instructions for the future CRS. When the CRS is operational, in case of an error, forecasters will be able to change the text product by transmitting the file to a PC for editing and spell-checking, and back to the AFOS database. Spell-checking is essential to ensure that the CRS correctly pronounces the text that it receives. It is not envisioned that editing will be needed very frequently, however.

B. Software Description

The definitions of the important files and programs are presented below.

cccMCPHWR Preformat

The HWRNWR program requires information, such as time zone, threshold values, summary phrase controls, and some CRS instructions, from a database product (ccchWRxxx) created from user selections from preformat screen cccMCPHWR (Fig. 2). The "ccc" represents the local AFOS node identifier, and the "xxx" represents the local AFOS station identifier. The user can define this information by editing the preformat. The resulting database product (ccchWRxxx) helps to define the output to be created by the HWRNWR program.

CCCLIST.xx and SCPKEYLIST.xx Files

The CCCLIST.xx file consists of the user-selected stations to be decoded by program SAODECII, where the "xx" represents any 2-character identifier selected by the user to represent the station list, including marine observation collectives, for the weather radio version of the HWR. The station list comprehensively includes the stations for all of the transmitters. See Fig. 3 for an example of this file.

Similarly, the SCPKEYLIST.xx file consists of the user-selected AFOS products (Fig. 4) to be decoded by program SCPDEC. Each product is a collective of stations, which must further be defined in file SCPSTNLIST.xx.

SCPSTNLIST.xx File

The SCPSTNLIST.xx file (Fig. 5) specifies the stations within the collectives listed in the SCPKEYLIST.xx file to be decoded. This list is important because it limits the decoding, and consequently, the execution time of the SCPDEC decoder.

SAODECII and SCPDEC Programs

The SAODECII program decodes hourly weather data and marine observations, which are stored into the AFOS database. SAODECII uses input file CCCLIST.xx, and switches in a command line to create output file SAODATASUP, containing hourly weather data (see Beasley 1993a).

Similarly, the SCPDEC program (Beasley 1993b) decodes the satellite-derived cloud cover database collective products. SCPDEC reads the SCPKEYLIST.xx and SCPSTNLIST.xx files to determine which database products and which stations within the product to decode. The output is stored in the SCPDATA file.

HWRLIST.On Files

HWRNWR can create different products for different transmitters, a feature that is useful when the field office is responsible for multiple transmitters. There is one HWRLIST.On file for each HWR broadcast transmitter, where "n" represents the transmitter number from "0" to "9." Each entry in these files contains the station to be broadcast, a symbol to indicate how to treat missing data, and the station name. Upon encountering missing data from any station, the application will either create a missing data statement; ignore the station; or substitute another station's data, depending on the missing data symbol. Introductory comment lines can also be included. See Fig. 6 for an example of this file.

BRDCAST.nx Files

To provide variety in the broadcast from hour to hour, the users may create as many as 10 BRDCAST.nx files for each HWRLIST.On file. The "n" in the BRDCAST and HWRLIST files represents the transmitter number and the "x" in the BRDCAST files represents the 10 files, denoted by the letters "A" through "J." The BRDCAST files contain user-created "fixed" formats for stations that require broadcasting a large set of weather and marine elements, or for those stations with which the user does not wish to group and summarize the weather conditions with other stations (see Fig. 7). The BRDCAST files contain symbolic instructions and the exact expression to be broadcast, including symbolic words for which the application substitutes the appropriate weather element.

HWRNWR Program

The hourly weather roundup formatter HWRNWR performs required calculations on hourly weather data, converts numerical values to ASCII text, builds phrases, and stores the resultant ASCII files into the AFOS database.

HWRNWR reads and uses values stored in the SAODATASUP, SCPDATA, HWRLIST.On, and BRDCAST.nx files; options from a command line; and selections from the database product ccCHWRxxx, which contains information from the preformat screen. HWRNWR also reads, if available, a file with pressure readings (ALTIM.DT), created from a previous HWRNWR program execution, and creates a text product for the NWR, where "ccc" represents the local AFOS node identifier, and "n" represents the transmitter number from "0" to "9."

3. SETUP PROCEDURES

These setup instructions are designed to guide the user through the initial orientation period. After becoming familiar with the software, the user should refer to Section 4 (Tailoring the System).

A. Adding Product Identifiers to the Data Key File

Before products can be stored in the database, the data key files which point to the locations of the products in the database must be edited to allow the product storage to occur. There are two methods to accomplish this task:

- Run the program PILEEDIT and EDITMERGE to permanently update the database, or
- Use the AFOS command "WISH:ADD."

In either case, the incoming surface airways observations (SAO), marine observations, and satellite-derived cloud cover products (cccSCPxRn) for the stations of interest must be stored in the database before the SAO and SCP decoders are executed. (The stations of interest during this initial setup period are the stations listed in the HWRLIST.01 file.) It is highly probable that each field office is already storing this information for other uses. Although only one hour of data is needed, plan to save at least four versions for any station that needs to be broadcast, because the decoder needs to retrieve and discard any versions which contain special reports.

Similarly, the output products must be added to the database. These products are in the form "ccchWRNwn," where "ccc" is the local AFOS node identifier, and "n" represents up to ten transmitter numbers, from "1" to "9," and "0" which represents "10."

Finally, add the preformat products (cccMCPHWR and ccchWRxxxx), where "ccc" is the local AFOS node identifier, and "xxx" is the local station identifier.

B. Downloading Software into the User Directory

The software on diskette must be downloaded into the appropriate directories, with links established from the main directory (e.g., SYSZ) to the user directories. The diskette contains two dump files (i.e., files created by the RDOS "DUMP" command, each of which contains one or more files), and two additional files which belong in the database.

The HWR1 dump file contains most of the required software. Using the RDOS "LOAD" command with the "/R" and "/V" switches, load the files from HWR1 into your user directory. The "/R" switch will replace any previous version of these overlay files, and the "/V" switch will verify that the loading process has successfully completed. The HWR2 dump file contains the latest version of the SAODECII program and related file SAODATASUP. If you do not wish to destroy your current version of SAODATASUP, we suggest that you save this file by renaming it, and after the HWR software is finished executing, renaming it back, being careful also not to destroy the new SAODATASUP file. The HWR.MC macro can be altered to do the renaming before and after the HWR software system is executed. Carefully load, verify, and replace the files from HWR2 into your user directory.

Two files need to be stored into the database. Store and rename TDLMCPHWR to cccMCPHWR, and TDLHWRTDL to ccchWRxxx, where "ccc" is the local AFOS node identifier, and "xxx" is the local station identifier.

From the master directory, the following files must be linked to the appropriate directory, unless they reside in the master directory: SAODECII.OL, SAODECII.SV, HWRNWR.OL, HWRNWR.SV, HWR.MC, CCCLIST.RU, SCPDATA, SAODATASUP, ALTIM.DT, HWRLIST.01, SCPKEYLIST.xx, SCPSTNLIST.xx, and BRDCAST.1A.

C. Executing the Software

The diskettes contain files in which options have already been pre-selected. The macro HWR.MC contains commands to run the SAO decoder, using stations in CCCLIST.RU; the SCP decoder, using products specified in SCPKEYLIST.xx, and sites listed in SCPSTNLIST.xx; and the HWRNWR program, using stations identified in HWRLIST.xx. It should be scheduled to run at your office each hour, using the automatic scheduler WATCHDOG. After executing the programs within this macro, the output file ccchWRNW1 will be created and may be displayed on the ADM by typing the last six characters "HWRNW1." If everything works acceptably, then you will be ready to tailor the system to your needs.

4. TAILORING THE SYSTEM

This section is designed for users who have become familiar with HWR software and are ready to tailor the system to meet their specific requirements.

A. Description of the Product

Fig. 8 is a sample of the HWR product. A stream of non-text characters representing instructions for the CRS precedes the text. The text normally begins with an introductory comment which is controlled by the user creating the HWRLIST.0n file. Within the introductory comment may be a phrase, such as "TEN A M EASTERN DAYLIGHT TIME," which the program substituted for a symbolic word placed by the user into the comment line.

Following the comment phrase are two classes of stations, summary groups and fixed phrase stations, which may be placed in any order by the user. The stations to be grouped for summarizing are delimited by the "/" delimiter in the HWRLIST.0n file. The marine observations, although they are actually fixed phrase stations, are delimited by the "***" delimiter to inform the program to search for longer station identifiers than those that denote land stations.

The phrases for the weather elements for the fixed phrase stations are defined in one or more BRDCAST.nx files. Any of the weather and marine elements listed in Section 4.1 may be selected for the broadcast. Some of the phrases will be broadcast only if threshold criteria for selected weather elements are met, and these phrases and controlling weather elements are set apart by parentheses in the BRDCAST.nx file. Because the sky/weather condition phrases are so complex, the user must establish four formats for each sky/weather phrase for each station, and the program selects the correct format, based on the current sky/weather condition. The user may set up the

HWRLIST.On file, so that a particular station is broadcast only as a substitute for a particular missing station.

Summary group stations will broadcast only sky/weather conditions and temperature, and either or both of these conditions will be summarized for each group when the weather is uniform throughout the region.

Finally, a non-text character string (octal 15542) which indicates the end of message to the CRS is placed at the end of the message.

B. Preparing to Execute SAODECII

The SAODECII program requires an input file specifying the stations to be decoded. You must create this CCCLIST.xx file (Fig. 3) which may contain as many as 50 stations that you wish to broadcast. The "xx" may be any two characters of your choice. The local "/C" switch (i.e., "xx/C") tells the SAODECII program which CCCLIST file you wish to use. The SAODECII program should also be executed with the global "/N" switch ("SAODECII/N xx/C"), which tells the program not to run the program PLTGEN. If you wish to generate reports before the nominal hour (e.g., if you run this program at 9:58, with the intention of generating the 10:00 report), use the local "/R" switch in the following manner to tell the SAODECII program that you want to decode all observations within 60 minutes after 9:00: SAODECII/N xx/C 00000060/R. Then the HWRNWR program will ignore all observations before 9:50, and will generate a report for the 10:00 observations. Without this switch, the SAODECII program will decode only the 9:00 and not the 10:00 observations.

If you are generating a broadcast which includes marine observations, and it is acceptable to broadcast observations which may have been stored in the database more than one hour previously, change the "/R" switch, such as in this example: "01200000/R." The numeric value associated with this switch now specifies the time window for SAODECII to be 120 minutes before the nominal hour. For example, if you run this program at 8:05, this switch tells the program SAODECII to decode all observations since 6:00. If the "TWO HOUR WINDOW FOR MARINE OBS" field has been set, the HWRNWR program accepts marine observations stored after 6:00. However, all non-marine observations before 7:50 will be discarded.

Change the "/R" switch in this manner when SAODECII is executed within 10 minutes before the hour, and marine observations are in the broadcast cycle: "01200060/R." For example, if you run this program at 10:57, this switch tells SAODECII to decode all observations since 8:00, including the 11:00 observations (often taken as early as 10:50). The HWRNWR program accepts marine observations stored after 8:00, but will discard non-marine observations before 10:50.

C. Preparing to Execute SCPDEC

Program SCPDEC requires two input files. The first file (SCPKEYLIST.xx) contains the AFOS products of interest, each of which contains a collective of stations (see Fig. 4). Ensure that the product you choose contains one or more of the ASOS stations that you wish to broadcast. The "xx" may be any two characters of your choice, including the same characters that you used for the CCCLIST.xx file. The local "/K" switch tells the SCPDEC program which SCPKEYLIST file you wish to use.

The second file (SCPSTNLIST.xx) contains the three-character station identifiers (e.g., AMA for Amarillo) for the stations of interest (see Fig. 5). The "xx" may be any two characters of your choice. The local "/N" switch tells SCPDEC which SCPSTNLIST file to use.

The HWRNWR program will accept the most recent of any cloud observations within 2 hours of the current time. This is necessary because the hourly surface reports do not coincide very well with the satellite reports, and the HWR is normally generated between the receipt of the surface and cloud observations.

D. Preparing to Execute HWRNWR

The HWRNWR program requires a file with preformat options (cccHWRxxx); a file listing information for each station (HWRLIST.On); an SAODATASUP file with decoded hourly observations; an SCPDATA file with decoded hourly middle and high level cloud information, if ASOS stations are included in the broadcast message; and one or more files for stations requiring fixed formats (BRDCAST.nx). Each time you change or add an HWRLIST.On file, it is recommended that you delete the old ALTIM.DT file, which contains the previous hour's barometric pressure readings for the stations in HWRLIST.On (DELETE/V ALTIM.DT).

The program also reads command line switches, although only two of them are functional before the CRS is operational. The global "/H" switch is used in the manual mode, usually in the pre-CRS era, or in the CRS backup mode. It prepares the output in a format which is easier for forecasters to read. The local "/A" switch will change the address of the output, so that the output can be routed to other locations on the State (SDC) or Regional Distribution Circuits (RDC).

In some instances the options overlap, but in general, options which appear in the preformat are choices which control the output for all of the roundup reports, and are choices which will not vary with each software execution. For example, these options set threshold values, establish time windows for transmission, set the listening area codes, and control the format of the output text. Command line switches may override the normal default settings, and will only be used under special circumstances, such as saving the broadcast message after it expires, or changing the normal starting and ending broadcast times. HWRLIST.On and BRDCAST.nx file selections allow the user to vary the information broadcast for each station within the report, such as establishing the station name, and the weather and marine elements.

E. Selecting Options Via Preformat cccMCPHWR

The preformat entries supply to the HWRNWR program most of the information needed to define the output. Each of the fields in the preformat is discussed below, and also shown in Fig. 2. The user may override the default options, shown in parentheses in Fig. 2, for each field which appears in the preformat screen.

Review Before Transmission Field

The option "REVIEW BEFORE TRANSMISSION" will be used when the CRS is operational, to allow the user to transmit the output text to a PC for editing

and subsequent spell checking, and returned to the AFOS database. It is not expected that there will be a need for editing the text under normal circumstances, but since the HWRNWR program does not check for valid observations, and will often run before a needed SAO correction is issued, an incorrect value may need to be changed. The output text is currently displayable on the ADM. The default setting of "N" is currently the only valid selection.

Two Hour Window for Marine Observations Field

By default, if observations are more than 1 hour old, they are not used in the roundup. However, since C-MAN, buoy, and ship observations are received 1 to 2 hours after the observation was taken, an option to use these observations was included in the preformat. By placing a "Y" in the "TWO HOUR WINDOW FOR MARINE OBS" field, marine observations up to 2 hours old will be considered valid.

Standard Time Year Round Field

The next option is "STANDARD TIME YEAR ROUND," which allows the user, with a "Y" selection, to instruct the program to always convert the system time (UTC) to local standard time. The default of "N," shown in parentheses, used in conjunction with the "TIME ZONE" field, converts to standard time in the winter half of the year and to daylight savings time in the summer half.

Time Zone Field

The "TIME ZONE" field must receive an entry, or else UTC will be used. Allowable time zone entries are: "A" for Atlantic, "E" for Eastern, "C" for Central, "M" for Mountain, "P" for Pacific, "H" for Hawaii/Alaska, and "B" for Bering.

Listening Area Field

There is a one to one correspondence between the "LISTENING AREA" fields and the transmitters. Thus, the codes placed into the fourth "LISTENING AREA" field, for example, are placed into the output record for the CRS to decipher for the fourth NWR transmitter. Because we don't currently have a CRS, no changes to this field are required. In the future, we will define what needs to be placed into this field.

Minutes After Nominal Hour for Expiration Time Field

When the CRS is operational, the expiration time of the output message will be 60 minutes after the nominal hour unless specified otherwise in the "MINUTES AFTER NOMINAL HOUR FOR EXPIRATION TIME" field. We define the nominal hour as beginning at 10 minutes before the hour and ending at 49 minutes after the hour, since the hourly observations are usually generated around 50 minutes after the hour (e.g., the broadcast product, by default, will expire at 11:00, if the program is run either at 9:58 or 10:35).

Threshold Fields

The threshold fields described next are used in conjunction with the BRDCAST files described in the BRDCAST.nx File Entries section below.

In the "WIND SPEED THRESHOLD" field, the user may indicate a value above which a user-selected phrase involving the wind direction and speed will be generated. The default is 0 mph, which means that the wind phrase will always be generated.

Similarly, in the "WIND GUST THRESHOLD" field, a wind phrase involving the wind gusts will be generated, if the gusts meet the threshold criterion. This default has also been set to 0 mph, which means that the wind gust phrase will be generated whenever a wind gust is reported.

In the "VIS THRESHOLD" (visibility threshold) field, the user indicates a threshold whole number value, which the program divides by four to allow the user to choose quarter-mile increments. In other words, if the user places a "3" in this field, the program interprets the threshold to be 3/4 mi. The default of "4" indicates a 1-mi threshold. Visibility will be broadcast only if it is less than or equal to the selected threshold value.

The user may specify a "HEAT INDEX THRESHOLD" value. Calculated heat index values which do not meet or exceed this threshold, which is 96° by default, will not be broadcast. If you wish to skip this field entirely, a very large value such as "150" will prevent this weather element from ever being calculated.

Similarly, three thresholds must be met in order to report the wind chill index: the temperature selected in the "MAX TEMP" field (35° by default), the wind speed chosen for the "MIN SPEED" threshold (4 mph by default), and the calculated wind chill chosen in the "MAX WCI" field (30° by default). In other words, if the temperature is too high, or the wind speed too low, the wind chill index will not be calculated and will therefore not be broadcast. Moreover, even if the temperature and wind speed criteria are met, the calculated wind chill index threshold must be met, or else the index will not be broadcast.

The next option is used in conjunction with the group and summary feature of this application discussed in the HWRLIST.On File Entries section below. The user has the option to override the default value of a 5° temperature range to determine whether or not a summary phrase can be generated for temperature. To accomplish this task, the user must enter a value in the "TEMPERATURE RANGE SUMMARY PHRASE" field. By default, a temperature range greater than 5° among the stations prevents a temperature summary phrase from being generated.

The final option is concerned with the expression of the sky conditions for ASOS sites only. If the low-level (below 12,000 ft) ASOS observations are clear or scattered and the higher level observations from the satellite cloud product are missing, the sky conditions are considered missing by default. However, a "Y" in the "EXPRESS SKY CONDITIONS AS FAIR WHEN SCP MISSING" field will change the observation to "FAIR." If the ASOS observation shows an overcast, the sky conditions will be reported as "CLOUDY" regardless of the presence of the satellite product. Similarly, if the ASOS observation shows a broken sky, the broadcast will be reported as "MOSTLY CLOUDY" or "PARTLY SUNNY" depending on the time of day, unless the satellite product reports "CLOUDY," in which case "CLOUDY" is broadcast.

F. Selecting Options Via Command Line Switches

The purpose of command line switches is to give the user the ability to select options which cannot be scheduled. Currently, none of the switches, except the global `/H` and the local `/A` switches, can be used until the CRS is operational. HWRNWR reads these command line switches, which instruct the program to override default information needed by the CRS:

The global `/H` switch is used in manual mode, when the output is not being sent directly to the CRS. It is designed to make the output more readable for humans. Each line contains a maximum of 72 characters. There is no hyphenation, numbers appear as numeric characters rather than words, and the printout is double-spaced.

The global `/S` and `/I` switches are currently meaningless without a CRS. However, each is designed to place an indicator in the output product. The `/S` switch tells the CRS not to delete the message after it expires but rather to save the message in inactive storage. The `/I` switch tells the CRS not to broadcast the incoming message, but merely to save the message in inactive storage. Even in the CRS era, both of these switches are expected to be rarely used and so are not included in the preformat screen.

The local `/E` and `/X` switches change the effective time (i.e., the earliest allowable broadcast time) from the current time to some future time, and expiration time of the product from an hour after the nominal hour to the specified future time. The effective time has no counterpart in the preformat screen, since any reason that might induce the user to change the effective time from the current time most likely can't be scheduled in advance using the preformat. However, the default expiration time of 60 minutes can be changed in either the preformat or on the command line. The preformat screen should be used to change the expiration time when the expiration of the products is always different than 60 minutes after the nominal hour, and the command line switch should be used for special situations. The command line switch replaces the corresponding preformat selection. The `/E` and `/X` switches are also meaningless without a CRS.

The `/A` switch can be used to send the output to the local CRS or another addressee, perhaps a backup office during a CRS failure. On the other hand, a satellite office which supports the forecast office may generate the product, and send it to the main office. For example, if WSO Trenton generates the HWR product for WSFO Philadelphia, the user in Trenton would first execute SAODECII, and then execute the HWRNWR program by typing on the ADM:
"RUN:HWRNWR PHL/A."

G. Setting Up HWRLIST.On File Entries

In addition to selecting preformat options, you must create an HWRLIST.On file using the RDOS editor for each transmitter. Depending on your choice of output format, you may also need one or more BRDCAST.nx files for each HWRLIST.On file. Remember to delete the old ALTIM.DT file when you begin this step, so that an incorrect pressure tendency is not created.

HWRNWR reads information from the HWRLIST.On files and, depending on user selections, either groups and attempts to summarize the temperature and sky/weather conditions for a list of stations, or retrieves user-established

phrases from BRDCAST.nx files for each desired weather element for each remaining station. An example of a final product with both types of stations is shown in Fig. 8. Each HWRLIST.0n file also contains percentages indicating the number of associated BRDCAST.nx files and the frequency with which each is to be accessed. For example, the HWRLIST.01 file may contain an entry indicating that BRDCAST.1A will be accessed 30% of the time that the program is executed, BRDCAST.1B will be accessed 40% of the time, and BRDCAST.1C will be accessed 30% of the time. The use of the HWRLIST and BRDCAST files allows the user to change the contents of the broadcast message on a station by station basis. The contents and format of the HWRLIST.0n file are described in the instructions below and illustrated in Fig. 6. The contents of the BRDCAST file are discussed in Section 4.1.

Station Identifiers, Missing Data Symbols, and Station Names

Create an HWRLIST with an entry for each station listed in broadcast order, one station per line, and with all nine characters of the AFOS product identifier (e.g., CRWSAOMRB). If you decode collectives via SAODECII, you must list the individual stations within the collective in this file. There are no default stations.

Place a "+" symbol in the position following the AFOS product identifier to indicate that the corresponding station will always be broadcast, even if the weather and marine elements are missing (e.g., "THE REPORT FROM MISSOULA IS NOT AVAILABLE"). Place a "-" symbol to indicate that the station will be dropped from the broadcast, if all weather or marine elements are missing.

Use as many as 30 characters for the station name, which follows the missing station flag. For example:

```
WBCSAODCA+NATIONAL AIRPORT  
WBCSAOADW-ANDREWS AIR FORCE BASE
```

Station Substitution

You may allow one station to substitute for another, which means that station 2 will be broadcast only if station 1 is missing. If both stations are missing, only station 1 will be broadcast according to the missing data broadcast symbol. An asterisk is always placed after the first station identifier, a semicolon between the stations, and either a "+" or "-" after the second station identifier. A "+" after the second station tells the program to broadcast station 1 as missing, only if data from both stations are missing. A "-" after the second station tells the program to ignore this entry, only if both stations are missing. In the example below, National Airport will normally be broadcast. If National Airport's data are missing, Andrews Air Force Base will be broadcast. If both stations are missing, the broadcast will state that the report from National Airport is not available:

```
WBCSAODCA*NATIONAL AIRPORT;WBCSAOADW+ANDREWS AIR FORCE BASE
```

Station Summary Groups

Decide which stations you wish to group for summarizing the sky/weather and temperature when conditions permit. Stations which are grouped and summarized in the HWR report are listed contiguously in the file. At least three, and no

more than 10, stations may be grouped together. However, there may be more than one group of three to 10 stations.

A "/" delimiter is placed before the first station and after the last station in any group. Groups should be organized geographically (e.g., northern Indiana and vicinity; or the Piedmont; or the valleys of the Central Appalachians; or stations outside the metropolitan area). In the example below, there are two groups, one with seven entries, and the other with three.

```
WBCSAODCA*NATIONAL AIRPORT;WBCSAOADW+ANDREWS AIR FORCE BASE
WBCSAOBWI+BALTIMORE WASHINGTON AIRPORT
WBCSAOIAD+DULLES AIRPORT
//
WBCSAOHGR+HAGERSTOWN
CRWSAOMRB+MARTINSBURG
WBCSAOSBY+SALISBURY
WBCSAODOV+DOVER
WBCSAOCHO+CHARLOTTESVILLE
WBCSAOILG-WILMINGTON
WBCSAORIC+RICHMOND
//
//
PHLSAOPHL+PHILADELPHIA
PHLSAOACY+ATLANTIC CITY
PHLSAOMIV+MILLVILLE
//
```

Marine Observations

Add marine observations, if required. Marine observations need to be separated with "***" delimiters from the land observations, because to be compatible with the SAO decoder, the marine observations are referenced with the last four characters of their ID. For example:

```
WBCSAODCA*NATIONAL AIRPORT;WBCSAOADW+ANDREWS AIR FORCE BASE
WBCSAOBWI+BALTIMORE WASHINGTON AIRPORT
WBCSAOIAD+DULLES AIRPORT
//
WBCSAOHGR+HAGERSTOWN
CRWSAOMRB+MARTINSBURG
WBCSAOSBY+SALISBURY
WBCSAODOV+DOVER
WBCSAOCHO+CHARLOTTESVILLE
WBCSAOILG-WILMINGTON
WBCSAORIC+RICHMOND
//
//
PHLSAOPHL+PHILADELPHIA
PHLSAOACY+ATLANTIC CITY
PHLSAOMIV+MILLVILLE
//
```

**
PSN7+MIDDLE NOMAD BUOY
VD01+SHIP DISCOVERY
**

Comment Lines and Summary Phrases

Using symbolic words which the HWRNWR program converts according to the list discussed below, add comment lines to introduce each of the groups (see also Table 1). The program interprets any line in the file which begins with an ellipsis (...) as information which will appear verbatim in the broadcast message.

- %DATE is converted to the current date (e.g., AUGUST SIXTH).
- %DAY is converted to the current day of the week (e.g., THURSDAY).
- %TIME is converted to the current hour (e.g., NINE A M).
- %TIMEZ is converted is converted to the current hour and time zone (e.g., NINE A M MOUNTAIN STANDARD TIME).

For each summary group, you may define a phrase which will be broadcast only when similarities in weather conditions allow that group to be summarized. Some examples of these phrases are "ACROSS THE REGION," "ALONG THE COAST," and "IN THE PIEDMONT." These phrases are not a necessity, but are often helpful. These summary group comments are denoted by placing an ellipsis at the beginning of the line, immediately followed by the phrase with which you want to summarize the group. This line should appear just before the first station in the summary group. Some examples of comment lines and summary phrases follow:

```
...HERE ARE THE %TIME OBSERVATIONS FOR THE CAPITOL AREA. [comment line]
WBCSAODCA*NATIONAL AIRPORT;WBCSAOADW+ANDREWS AIR FORCE BASE
WBCSAOBWI+BALTIMORE WASHINGTON AIRPORT
WBCSAOIAD+DULLES AIRPORT
...NOW FOR SOME OBSERVATIONS IN THE SURROUNDING AREAS. [comment line]
//
...ACROSS THE REGION, [summary phrase]
WBCSAOHGR+HAGERSTOWN
CRWSAOMRB+MARTINSBURG
WBCSAOSBY+SALISBURY
WBCSAODOV+DOVER
WBCSAOCHO+CHARLOTTESVILLE
WBCSAOILG-WILMINGTON
WBCSAORIC+RICHMOND
//
...THESE ARE THE OBSERVATIONS FOR PHILADELPHIA AND VICINITY. [comment line]
// [no summary phrase for this group]
PHLSAOPHL+PHILADELPHIA
PHLSAOACY+ATLANTIC CITY
PHLSAOMIV+MILLVILLE
//
...THESE ARE THE MARINE OBSERVATIONS. [comment line]
**
PSN7+MIDDLE NOMAD BUOY
VD01+SHIP DISCOVERY
**
```

Note that the first summary group contains a comment line outside and a summary phrase within the group. The phrase outside the group is always broadcast, whereas the phrase inside the group is broadcast only when similarities of weather conditions force the creation of a summary phrase. Section 4.H discusses the summary groups more thoroughly, giving examples of comment lines and summary phrases.

Weather Elements for Summary Groups

Finally, place the weather elements that you wish to broadcast at the beginning of the group. The only possible choices are SW (sky/weather), TF (temperature in Fahrenheit), and TC (temperature in Celsius). The default case is SW and TF only. For example:

```
...HERE ARE THE *TIME OBSERVATIONS FOR THE CAPITOL AREA.
WBCSAODCA*NATIONAL AIRPORT;WBCSAOADW+ANDREWS AIR FORCE BASE
WBCSAOBWI+BALTIMORE WASHINGTON AIRPORT
WBCSAOIAD+DULLES AIRPORT
...NOW FOR SOME OBSERVATIONS IN THE SURROUNDING AREAS.
//[SW,TF]
...ACROSS THE REGION,
WBCSAOHGR+HAGERSTOWN
CRWSAOMRB+MARTINSBURG
WBCSAOSBY+SALISBURY
WBCSAODOV+DOVER
WBCSAOCHO+CHARLOTTESVILLE
WBCSAOILG+WILMINGTON
WBCSAORIC+RICHMOND
//
...THESE ARE THE OBSERVATIONS FOR PHILADELPHIA AND VICINITY.
//[SW,TF,TC]
PHLSAOPHL+PHILADELPHIA
PHLSAOACY+ATLANTIC CITY
PHLSAOMIV+MILLVILLE
//
...THESE ARE THE MARINE OBSERVATIONS.
**
PSN7+MIDDLE NOMAD BUOY
VD01+SHIP DISCOVERY
**
```

H. Understanding Summary Group Formats

As mentioned in the previous section, the output from HWRNWR will be produced in one of two formats--summary group or fixed phrase formats. The choice is established by the user who creates the HWRLIST files. The example HWRLIST at the end of the previous section will be used in this section to demonstrate the possible styles of output resulting from the HWRLIST entries and the current weather conditions. Since the only elements eligible for grouping and summarizing are sky/weather and temperature, there are four possible outcomes:

- 1) If the sky/weather conditions are uniform (sky conditions do not differ by more than one category) across the region but not the temperatures, the output will read like this:

NOW FOR SOME OBSERVATIONS IN THE SURROUNDING AREA. *[comment phrase]* ACROSS THE REGION, SKIES RANGED FROM SUNNY TO MOSTLY SUNNY. IT WAS FORTY FIVE DEGREES IN HAGERSTOWN, FIFTY EIGHT IN MARTINSBURG, FORTY NINE IN SALISBURY, AND FIFTY THREE IN DOVER. *[computer arranges only three to five stations into a sentence]* CHARLOTTESVILLE REPORTED FIFTY ONE DEGREES, ANDREWS AIR FORCE BASE FIFTY SEVEN, AND RICHMOND FORTY NINE.

THESE ARE THE OBSERVATIONS FOR PHILADELPHIA AND VICINITY. *[comment phrase, no summary phrase]* SKIES WERE SUNNY. IT WAS FORTY EIGHT DEGREES FAHRENHEIT OR NINE CELSIUS IN PHILADELPHIA, FIFTY SEVEN FAHRENHEIT OR FOURTEEN CELSIUS IN ATLANTIC CITY, AND FORTY SIX FAHRENHEIT OR EIGHT CELSIUS IN MILLVILLE.

- 2) If the temperatures are uniform (within a range specified in the preformat screen) but not the sky/weather conditions, the output will read like this:

NOW FOR SOME OBSERVATIONS IN THE SURROUNDING AREAS. ACROSS THE REGION, TEMPERATURES WERE BETWEEN EIGHTY FOUR AND EIGHTY EIGHT DEGREES. IT WAS SUNNY AT HAGERSTOWN, SALISBURY, AND ANDREWS AIR FORCE BASE. IT WAS MOSTLY SUNNY AT MARTINSBURG AND RICHMOND. AT DOVER, IT WAS PARTLY SUNNY. AT CHARLOTTESVILLE, IT WAS CLOUDY.

THESE ARE THE OBSERVATIONS FOR PHILADELPHIA AND VICINITY. TEMPERATURES WERE BETWEEN EIGHTY TWO FAHRENHEIT OR TWENTY EIGHT CELSIUS AND EIGHTY SIX DEGREES FAHRENHEIT OR THIRTY DEGREES CELSIUS. IT WAS MOSTLY SUNNY AT PHILADELPHIA AND MILLVILLE. IT WAS CLOUDY AT ATLANTIC CITY.

- 3) If both temperatures and sky/conditions are uniform, the output will read like this:

NOW FOR SOME OBSERVATIONS IN THE SURROUNDING AREAS. ACROSS THE REGION, SKIES RANGED FROM CLOUDY TO MOSTLY CLOUDY, AND TEMPERATURES WERE BETWEEN THIRTY THREE AND THIRTY EIGHT DEGREES.

THESE ARE THE OBSERVATIONS FOR PHILADELPHIA AND VICINITY. SKIES RANGED FROM PARTLY SUNNY TO MOSTLY SUNNY, AND TEMPERATURES WERE BETWEEN TWENTY EIGHT FAHRENHEIT OR MINUS TWO CELSIUS AND THIRTY TWO DEGREES FAHRENHEIT OR ZERO DEGREES CELSIUS.

- 4) If neither temperatures nor sky conditions are uniform, the output will read like this:

NOW FOR SOME OBSERVATIONS IN THE SURROUNDING AREAS. *[summary phrase is not broadcast, because weather conditions do not permit a summary]*. IT WAS SUNNY, WITH A TEMPERATURE OF THIRTY FOUR AT HAGERSTOWN, TWENTY EIGHT AT DOVER, AND TWENTY SIX AT RICHMOND. UNDER MOSTLY SUNNY SKIES, MARTINSBURG REPORTED TWENTY TWO DEGREES, AND CHARLOTTESVILLE THIRTY FIVE. AT SALISBURY, IT WAS PARTLY SUNNY, WITH A TEMPERATURE OF THIRTY SIX. AT ANDREWS AIR FORCE BASE, IT WAS CLOUDY WITH A TEMPERATURE OF THIRTY FOUR.

THESE ARE THE OBSERVATIONS FOR PHILADELPHIA AND VICINITY. IT WAS SUNNY WITH A TEMPERATURE OF THIRTY TWO FAHRENHEIT OR ZERO CELSIUS AT PHILADELPHIA AND TWENTY TWO FAHRENHEIT OR MINUS SIX CELSIUS AT MILLVILLE. UNDER PARTLY SUNNY SKIES, ATLANTIC CITY REPORTED THIRTY ONE DEGREES FAHRENHEIT OR MINUS ONE DEGREE CELSIUS.

I. Establishing Fixed Phrase Formats

Any stations which are not part of a station summary group, such as the first three stations in the list above and the marine sites, require a fixed phrase broadcast format. When the HWRNWR program encounters a station in the HWRLIST.On file that is not part of a summary group, it searches for that station in the BRDCAST.nx file to obtain the fixed expression for the broadcast. The users must create a fixed phrase for each station. Thus, variety between stations is allowed. Moreover, the user must select a different expression for different categories of sky/weather conditions, and several phrases may be set to broadcast only if the controlling weather elements meet threshold values. Multiple BRDCAST.nx files may be created, each containing different fixed phrases for each station. In this manner, when the program selects different BRDCAST files from hour to hour, there will be broadcast variation for the same station. An example of a BRDCAST.nx file is shown in Fig. 7. Creating broadcast files requires many steps, and the following approach is recommended to simplify this process, and to avoid leaving out any essential steps.

Create a Sample Hourly Weather Roundup

- 1) Write out a sample of an hourly weather roundup station report for all stations which receive a fixed format. With the land observations, start with the assumption that rain was observed, and no thresholds were met. (Note that sentences don't need to be entirely grammatically correct, since they may be somewhat abbreviated in the normal broadcast fashion. However, commas must be inserted where a pause is required). For example:

AT NATIONAL AIRPORT, RAIN WAS FALLING. THE TEMPERATURE WAS 57 DEGREES, THE DEW POINT 56, AND THE RELATIVE HUMIDITY 97 PERCENT. THE PRESSURE 29.92 INCHES AND FALLING.

THE TEMPERATURE WAS 56 DEGREES WITH RAIN AT BALTIMORE WASHINGTON AIRPORT. THE DEW POINT 55, AND THE RELATIVE HUMIDITY 97 PERCENT. THE PRESSURE 29.97 INCHES AND FALLING.

RAIN WAS OBSERVED AT DULLES AIRPORT. THE TEMPERATURE 56 DEGREES, THE DEW POINT 56, AND THE RELATIVE HUMIDITY 100 PERCENT. THE PRESSURE 29.89 INCHES AND STEADY.

MIDDLE NOMAD BUOY LOCATED 60 MILES SOUTHEAST OF NORFOLK RECORDED A SOUTH WIND 22 KNOTS, SWELLS 6 FEET, AIR TEMPERATURE 71 DEGREES, AND WATER TEMPERATURE 77 DEGREES.

SHIP DISCOVERY LOCATED AT THIRTY EIGHT DEGREES NORTH LATITUDE AND SEVENTY THREE DEGREES WEST LONGITUDE RECORDED SOUTHEAST WINDS AT 15 KNOTS, AIR TEMPERATURE 59 DEGREES, WATER TEMPERATURE 63 DEGREES, WITH FIVE FOOT WAVES.

Substitute Other Sky/Weather Conditions

- 2) Substitute, in turn, each of the following weather conditions in place of rain in the above examples, ensuring that the sentences still sound acceptable: sleet, snow, drizzle, light snow, light rain, heavy snow,

and heavy rain. If necessary, change any phrase so that all of these weather conditions, including rain, sound correct.

- 3) Place brackets around the phrases with rain in the above examples. Inside the brackets, place a semicolon after the phrase with rain, followed by a phrase for the weather, assuming fog was observed instead of rain. For example:

AT NATIONAL AIRPORT, {RAIN WAS FALLING; FOG WAS REPORTED}. THE TEMPERATURE WAS 57 DEGREES, THE DEW POINT 56, AND THE RELATIVE HUMIDITY 97 PERCENT. THE PRESSURE 29.92 INCHES AND FALLING.

THE TEMPERATURE WAS 56 DEGREES {WITH RAIN; WITH FOG} AT BALTIMORE WASHINGTON AIRPORT. THE DEW POINT 55, AND THE RELATIVE HUMIDITY 97 PERCENT. THE PRESSURE 29.97 INCHES AND FALLING.

{RAIN WAS OBSERVED; FOG WAS OBSERVED} AT DULLES AIRPORT. THE TEMPERATURE 56 DEGREES, THE DEW POINT 56, AND THE RELATIVE HUMIDITY 100 PERCENT. THE PRESSURE 29.89 INCHES AND STEADY.

MIDDLE NOMAD BUOY LOCATED 60 MILES SOUTHEAST OF NORFOLK RECORDED A SOUTH WIND 22 KNOTS, SWELLS 6 FEET, AIR TEMPERATURE 71 DEGREES, AND WATER TEMPERATURE 77 DEGREES.

SHIP DISCOVERY LOCATED AT THIRTY EIGHT DEGREES NORTH LATITUDE AND SEVENTY FOUR DEGREES WEST LONGITUDE RECORDED SOUTHEAST WINDS AT 15 KNOTS, AIR TEMPERATURE 59 DEGREES, WATER TEMPERATURE 63 DEGREES, WITH FIVE FOOT WAVES.

- 4) Substitute, in turn, each of the following weather conditions in place of fog in the above examples, ensuring that the sentences still sound acceptable: thunder, haze, smoke, hail, a thunderstorm, a thunder-shower, freezing rain, freezing drizzle, blowing snow, blowing dust, and dust. If necessary, change any phrase so that all of these weather conditions, including fog, sound correct. In the above example, when substituting thunder for fog, you might not like the phrase, "THUNDER WAS OBSERVED" for the Dulles report. If so, change the phrase to something acceptable for all the weather elements in this category, such as "THUNDER WAS REPORTED."
- 5) Place another semicolon after the phrase with fog. Create a phrase for sunny sky conditions. (Note that the Console Replacement System pauses for both periods and commas, and the incomplete sentence in the following example will probably sound correct, because it connects well with the phrase that follows it). For example:

AT NATIONAL AIRPORT, {RAIN WAS FALLING; FOG WAS REPORTED; UNDER SUNNY SKIES}. THE TEMPERATURE WAS 57 DEGREES, THE DEW POINT 56, AND THE RELATIVE HUMIDITY 97 PERCENT. THE PRESSURE 29.92 INCHES AND FALLING.

THE TEMPERATURE WAS 56 DEGREES {WITH RAIN; WITH FOG; AND IT WAS SUNNY} AT BALTIMORE WASHINGTON AIRPORT. THE DEW POINT 55, AND THE RELATIVE HUMIDITY 97 PERCENT. THE PRESSURE 29.97 INCHES AND FALLING.

(RAIN WAS OBSERVED; FOG WAS REPORTED; IT WAS SUNNY) AT DULLES AIRPORT. THE TEMPERATURE 56 DEGREES, THE DEW POINT 56, AND THE RELATIVE HUMIDITY 100 PERCENT. THE PRESSURE 29.89 INCHES AND STEADY.

MIDDLE NOMAD BUOY LOCATED 60 MILES SOUTHEAST OF NORFOLK RECORDED A SOUTH WIND 22 KNOTS, SWELLS 6 FEET, AIR TEMPERATURE 71 DEGREES, AND WATER TEMPERATURE 77 DEGREES.

SHIP DISCOVERY LOCATED AT THIRTY EIGHT DEGREES NORTH LATITUDE AND SEVENTY FOUR DEGREES WEST LONGITUDE RECORDED SOUTHEAST WINDS AT 15 KNOTS, AIR TEMPERATURE 59 DEGREES, WATER TEMPERATURE 63 DEGREES, WITH FIVE FOOT WAVES.

- 6) Substitute, in turn, each of the following sky conditions in place of sunny in the above examples, ensuring that the sentences still sound acceptable: cloudy, mostly cloudy, partly cloudy, clear, partly sunny, mostly sunny, and fair. If necessary, change any phrase so that all of these sky conditions, including "sunny," sound correct.
- 7) Place another semicolon after the phrase with sunny sky conditions. Create a phrase for weather conditions stated in plural form (e.g., snow showers), or for multiple weather conditions (e.g., drizzle and fog). To make the file easier to read, you may place carriage returns anywhere. However, don't drop the necessary spaces and punctuation marks. For example:

AT NATIONAL AIRPORT,
(RAIN WAS FALLING;
FOG WAS REPORTED;
UNDER SUNNY SKIES;
SNOW SHOWERS WERE REPORTED).

THE TEMPERATURE WAS 57 DEGREES, THE DEW POINT 56, AND THE RELATIVE HUMIDITY 97 PERCENT.

THE PRESSURE 29.92 INCHES AND FALLING.

THE TEMPERATURE WAS 56 DEGREES
(WITH RAIN; WITH FOG; AND IT WAS SUNNY; WITH SNOW SHOWERS) AT BALTIMORE WASHINGTON AIRPORT.

THE DEW POINT 55, AND THE RELATIVE HUMIDITY 97 PERCENT.

THE PRESSURE 29.97 INCHES AND FALLING.

(RAIN WAS OBSERVED; FOG WAS REPORTED; IT WAS SUNNY; SNOW SHOWERS WERE OBSERVED) AT DULLES AIRPORT.

THE TEMPERATURE 56 DEGREES, THE DEW POINT 56, AND THE RELATIVE HUMIDITY 100 PERCENT.

THE PRESSURE 29.89 INCHES AND STEADY.

MIDDLE NOMAD BUOY LOCATED 60 MILES SOUTHEAST OF NORFOLK RECORDED A SOUTH WIND 22 KNOTS, SWELLS 6 FEET, AIR TEMPERATURE 71 DEGREES, AND WATER TEMPERATURE 77 DEGREES.

SHIP DISCOVERY LOCATED AT THIRTY EIGHT DEGREES NORTH LATITUDE AND SEVENTY FOUR DEGREES WEST LONGITUDE RECORDED SOUTHEAST WINDS AT 15 KNOTS, AIR TEMPERATURE 59 DEGREES, WATER TEMPERATURE 63 DEGREES, WITH FIVE FOOT WAVES.

- 8) Substitute, in turn, each of the following weather conditions in place of snow showers in the above examples, ensuring that the sentences still sound acceptable: sleet showers, rain showers, and snow flurries. If necessary, change any phrase so that all of these weather conditions, including snow showers, sound correct. Also, try some combinations of multiple weather conditions to ensure that these combinations also sound acceptable (e.g., "SNOW AND BLOWING SNOW WERE OBSERVED").

Add Threshold Phrases

- 9) Decide which weather elements should be broadcast only if their threshold values have been met (e.g., heat index, wind chill index, visibility).
- 10) Place in parentheses the phrases describing all the threshold-dependent weather elements which you are requesting in the correct locations in the paragraph for each station. Be certain to determine if the punctuation marks and spaces belong inside or outside of the parentheses. It's also possible to imbed parentheses within parentheses (e.g., the entire sentence may be dependent on the threshold of a particular weather element, and if that threshold is met, another weather element may control the broadcast of a phrase within the sentence.) For example:

AT NATIONAL AIRPORT,

{ RAIN WAS FALLING;

FOG WAS REPORTED;

UNDER SUNNY SKIES;

SNOW SHOWERS WERE REPORTED)

(, WHICH REDUCED THE VISIBILITY TO 3/4 OF A MILE).

THE TEMPERATURE WAS 57 DEGREES, THE DEW POINT 56, AND THE RELATIVE HUMIDITY 97 PERCENT

(, PRODUCING A HEAT INDEX OF 104 DEGREES)

. (THE WIND NORTHEAST AT 12 MILES AN HOUR

(, GUSTING TO 27)

(, PRODUCING A WIND CHILL OF 8 DEGREES).)

THE PRESSURE 29.92 INCHES AND FALLING.

THE TEMPERATURE WAS 56 DEGREES

{ WITH RAIN; WITH FOG; WITH SUNNY SKIES; WITH SNOW SHOWERS)

(, AND A VISIBILITY OF 1/2 MILE) AT BALTIMORE WASHINGTON AIRPORT. THE DEW POINT 55, AND THE RELATIVE HUMIDITY 97 PERCENT

(, YIELDING A HEAT INDEX OF 98).

(THE WIND EAST(AT 14 MILES AN HOUR), WITH GUSTS TO 29(, WHICH MAKES THE TEMPERATURE FEEL LIKE 17 DEGREES).)

THE PRESSURE 29.97 INCHES AND FALLING.

{RAIN WAS OBSERVED; FOG WAS REPORTED; IT WAS SUNNY; SNOW SHOWERS WERE OBSERVED)

(, WHICH REDUCED THE VISIBILITY TO 1/4 OF A MILE) AT DULLES AIRPORT.

THE TEMPERATURE 56 DEGREES, THE DEW POINT 56, AND THE RELATIVE HUMIDITY 100 PERCENT.

(THE COMBINATION OF TEMPERATURE AND HUMIDITY FEELS LIKE 97 DEGREES.)

(STRONG WINDS FROM THE NORTH (AT 11 MILES AN HOUR)(, GUSTING TO 22), ARE PRODUCING A WIND CHILL OF 23 DEGREES.)

THE PRESSURE 29.89 INCHES AND STEADY.

MIDDLE NOMAD BUOY LOCATED 60 MILES SOUTHEAST OF NORFOLK RECORDED A SOUTH WIND 22 KNOTS, SWELLS 6 FEET, AIR TEMPERATURE 71 DEGREES, AND WATER TEMPERATURE 77 DEGREES.

SHIP DISCOVERY LOCATED AT THIRTY EIGHT DEGREES NORTH LATITUDE AND SEVENTY FOUR DEGREES WEST LONGITUDE RECORDED SOUTHEAST WINDS AT 15 KNOTS, AIR TEMPERATURE 59 DEGREES, WATER TEMPERATURE 63 DEGREES, WITH FIVE FOOT WAVES.

Choose Stations and Symbolic Weather Elements

- 11) Place a station identifier at the beginning of the paragraph (e.g., /DCA/), and replace values with symbolic words, using this key (see also Table 2):

- %SW% - Sky/weather conditions.
- %VV% - Visibility, if preformat threshold is met.
- %TF% - Temperature (Fahrenheit).
- %TC% - Temperature (Celsius).
- %DF% - Dew point (Fahrenheit).
- %DC% - Dew point (Celsius).
- %RR% - Relative humidity. This weather element can only be calculated if temperature and dew point are not missing.
- %HF% - Heat index (Fahrenheit), if preformat threshold is met.
- %HC% - Heat index (Celsius), if preformat threshold is met.
- %DD% - Wind direction (degrees)
- %FF% - Wind speed (mph).
- %GG% - Wind gusts (mph).
- %WF% - Wind chill index (Fahrenheit), if preformat threshold is met.
- %WC% - Wind chill index (Celsius), if preformat threshold is met.
- %PP% - Pressure (inches).
- %PT% - Pressure tendency, if previous hour's pressure is available.

The following marine elements may also be selected:

- %SF% - Sea surface temperature (Fahrenheit).
- %SC% - Sea surface temperature (Celsius).
- %PW% - Wave period (s).
- %HW% - Wave height (ft).
- %SD% - Swell direction (degrees).
- %HS% - Swell height (ft).
- %SP% - Swell period (s).
- %FK% - Wind speed (kt).
- %GK% - Wind gusts (kt).

Add Substitute Stations and Indicate Units of Measurement

- 12) Create phrases for stations which substitute for another station, even if the format is identical, because the HWRNWR program must match the station ID in the BRDCAST file with the requested station ID.
- 13) Place a U (for units) after the 4-character symbolic word to indicate that you want both the value and the units (e.g., %TF%U will be replaced with something like "53 DEGREES." On the other hand, %TF% will only be replaced with something like "53.") Note that sky/weather, wind direction, swell direction, and pressure tendency have no units, and

should not be used with the "U" character. Also notice that HWRNWR will use the plural form of the unit whenever the value is not one or minus one. Place a "\$\$" to mark the end of each station. For example:

/DCA/AT NATIONAL AIRPORT,
(%SW% WAS FALLING; %SW% WAS REPORTED; UNDER %SW% SKIES; %SW% WERE REPORT-
ED)
(, WHICH REDUCED THE VISIBILITY TO %VV%U).
THE TEMPERATURE WAS %TF%U, THE DEW POINT %DF%, AND THE RELATIVE HUMIDITY
%RR%U
(, PRODUCING A HEAT INDEX OF %HF%U).
(THE WIND %DD% AT %FF%U(, GUSTING TO %GG%)(, PRODUCING A WIND CHILL OF
%WF%U).)
THE PRESSURE %PP%U AND %PT%.\$\$

/ADW/AT ANDREWS AIR FORCE BASE,
(%SW% WAS FALLING; %SW% WAS REPORTED; UNDER %SW% SKIES; %SW% WERE REPORT-
ED)
(, WHICH REDUCED THE VISIBILITY TO %VV%U).
THE TEMPERATURE WAS %TF%U, THE DEW POINT %DF%, AND THE RELATIVE HUMIDITY
%RR%U
(, PRODUCING A HEAT INDEX OF %HF%U).
(THE WIND %DD% AT %FF%U(, GUSTING TO %GG%)(, PRODUCING A WIND CHILL OF
%WF%U).)
THE PRESSURE %PP%U AND %PT%.\$\$ [substitute station]

/BWI/THE TEMPERATURE WAS %TF%U(WITH %SW%; WITH %SW%; WITH %SW% SKIES; WITH
%SW%)
(, AND A VISIBILITY OF %VV%U) AT BALTIMORE WASHINGTON AIRPORT. THE DEW
POINT %DF%, AND THE RELATIVE HUMIDITY %RR%U(, YIELDING A HEAT INDEX OF
%HF%).
(THE WIND %DD%(AT %FF%U), WITH GUSTS TO %GG%(, WHICH MAKES THE TEMPERA-
TURE FEEL LIKE %WF%).)
THE PRESSURE %PP%U AND %PT%.\$\$

/IAD/({%SW% WAS OBSERVED; %SW% WAS REPORTED; IT WAS %SW%; %SW% WERE OB-
SERVED)
(, WHICH REDUCED THE VISIBILITY TO %VV%U) AT DULLES AIRPORT.
THE TEMPERATURE %TF%U, THE DEW POINT %DF%, AND THE RELATIVE HUMIDITY
%RR%U.
(THE COMBINATION OF TEMPERATURE AND HUMIDITY FEELS LIKE %HF%U.) (STRONG
WINDS FROM THE %DD%(AT %FF%U)(, GUSTING TO %GG%), ARE PRODUCING A WIND
CHILL OF %WF%U.)
THE PRESSURE %PP%U AND %PT%.\$\$

/PSN7/MIDDLE NOMAD BUOY LOCATED 60 MILES SOUTHEAST OF NORFOLK RECORDED %DD%
WINDS %FK%U, SWELLS %HS%U, AIR TEMPERATURE %TF%U, AND WATER TEMPERATURE
%SF%U.\$\$

/VD01/SHIP DISCOVERY LOCATED AT THIRTY EIGHT DEGREES NORTH LATITUDE AND
SEVENTY FOUR DEGREES WEST LONGITUDE RECORDED %DD% WINDS AT %FK%U, AIR
TEMPERATURE %TF%U, WATER TEMPERATURE %SF%U, WITH %HW% FOOT WAVES.\$\$

Choose Weather Elements to Control Threshold Phrases

- 14) At the beginning of each threshold phrase, indicate by placing into brackets, the weather element which controls the reporting of the phrase. This is necessary, because some phrases contain two elements for which there are thresholds. For example:

/DCA/AT NATIONAL AIRPORT,
{ %SW% WAS FALLING; %SW% WAS REPORTED; UNDER %SW% SKIES; %SW% WERE REPORT-
ED)

([VV], WHICH REDUCED THE VISIBILITY TO %VV%U).

THE TEMPERATURE WAS %TF%U, THE DEW POINT %DF%, AND THE RELATIVE HUMIDITY
%RR%U

([HF], PRODUCING A HEAT INDEX OF %HF%U).

([FF]THE WIND %DD% AT %FF%U([GG], GUSTING TO %GG%))

([WF], PRODUCING A WIND CHILL OF %WF%U).) *[Carefully notice the structure of this sentence which contains multiple threshold-dependent elements. If the wind speed does not meet the threshold value, no part of the sentence is created. If the gust threshold or the wind chill threshold is not met, that portion of the sentence is not created.]*

THE PRESSURE %PP%U AND %PT%. \$\$

/ADW/AT ANDREWS AIR FORCE BASE,{ %SW% WAS FALLING; %SW% WAS REPORTED; UNDER
%SW% SKIES; %SW% WERE REPORTED)

([VV], WHICH REDUCED THE VISIBILITY TO %VV%U).

THE TEMPERATURE WAS %TF%U, THE DEW POINT %DF%, AND THE RELATIVE HUMIDITY
%RR%U

([HF], PRODUCING A HEAT INDEX OF %HF%U).

([FF]THE WIND %DD% AT %FF%U([GG], GUSTING TO %GG%))

([WF], PRODUCING A WIND CHILL OF %WF%U).)

THE PRESSURE %PP%U AND %PT%. \$\$

/BWI/THE TEMPERATURE WAS %TF%U(WITH %SW%; WITH %SW%; WITH %SW% SKIES; WITH
%SW%)

([VV], AND A VISIBILITY OF %VV%U) AT BALTIMORE WASHINGTON AIRPORT. THE DEW
POINT %DF%, AND THE RELATIVE HUMIDITY %RR%U

([HF], YIELDING A HEAT INDEX OF %HF%).

([GG]THE WIND %DD% ([FF]AT %FF%U),

WITH GUSTS TO %GG%

([WF], WHICH MAKES THE TEMPERATURE FEEL LIKE %WF%).) *[The wind gust threshold controls this entire sentence. In this case, the sentence sounds better if you set your wind speed threshold at a low value].*

THE PRESSURE %PP%U AND %PT%. \$\$

/IAD/({%SW% WAS OBSERVED; %SW% WAS REPORTED; IT WAS %SW%; %SW% WERE OB-
SERVED)

([VV], WHICH REDUCED THE VISIBILITY TO %VV%U) AT DULLES AIRPORT. THE
TEMPERATURE %TF%U, THE DEW POINT %DF%, AND THE RELATIVE HUMIDITY %RR%U.

([HF]THE COMBINATION OF TEMPERATURE AND HUMIDITY FEELS LIKE %HF%U.)

([WF]STRONG WINDS FROM THE %DD%

([FF]AT %FF%U)([GG], GUSTING TO %GG%), ARE PRODUCING A WIND CHILL OF
%WF%U.) *[This sentence is created only if the wind chill threshold is met.]*

THE PRESSURE %PP%U AND %PT%. \$\$

/PSN7/MIDDLE NOMAD BUOY LOCATED 60 MILES SOUTHEAST OF NORFOLK RECORDED %DD% WINDS %FK%U, SWELLS %HS%U, AIR TEMPERATURE %TF%U, AND WATER TEMPERATURE %SF%U.\$\$

/VD01/SHIP DISCOVERY LOCATED AT THIRTY EIGHT DEGREES NORTH LATITUDE AND SEVENTY FOUR DEGREES WEST LONGITUDE RECORDED %DD% WINDS AT %FK%U, AIR TEMPERATURE %TF%U, WATER TEMPERATURE %SF%U, WITH %HW% FOOT WAVES.\$\$

Create Files for Additional Transmitters

- 15) If your office is served by multiple transmitters, establish HWRLIST.On files and an associated BRDCAST.nA files for each remaining transmitter, using the approach outlined above.

J. Additional Considerations

At this point, you've established HWRLISTS (up to 10, one for each transmitter) and a BRDCAST file that contains a fixed phrase broadcast format for each weather element for selected stations for each HWRLIST file. Thus, you have the ability to vary the expression from station to station. The only variation in phrases from hour to hour occurs when weather conditions vary. You have also set apart a number of stations that broadcast only sky/weather conditions and temperature. These stations will be grouped and possibly summarized, depending on weather conditions. You also have the ability to modify the output by producing variability in the expression for a station from hour to hour, by including a station in both the fixed phrase and summary group stations, and by recapping the weather conditions for one or more stations. These additional considerations are discussed below.

Create Files and Weights for Hourly Variability

There is also a way to obtain additional variability from hour to hour for the fixed phrase format stations. You may create as many as ten BRDCAST files for each HWRLIST file, each with a different fixed format for each station. If you choose this route, you must also provide to the program the probability with which you want each file accessed. The program will then randomly access the files with the probability distribution you have provided.

Indicate the access frequency in the HWRLIST file. The total of the frequencies MUST be 10. If you only need one BRDCAST file for a transmitter, either omit the frequency from the HWRLIST file, or enter "[10]." In the example below, the "1, 4, 5" values indicate that there are three BRDCAST files associated with this HWRLIST file. For example, let's call this file HWRLIST.05 (indicating that this is the file associated with the fifth transmitter). The HWR program is aware of three BRDCAST files, one of which will be selected this hour for transmitter 5: BRDCAST.5A, BRDCAST.5B, or BRDCAST.5C. The program will randomly generate a number in order to choose one of the three files. After multiple executions of the program, one would expect that file 5A would be selected 10% of the time, while file 5B would be selected 40%, and file 5C would be selected 50% of the time. For example:

[1,4,5]

...HERE ARE THE %TIME OBSERVATIONS FOR THE METROPOLITAN AREA.
WBCSAODCA*NATIONAL AIRPORT;WBCSAODW+ANDREWS AIR FORCE BASE
WBCSAOBWI+BALTIMORE WASHINGTON AIRPORT

WBCSAOIAD+DULLES
...NOW FOR SOME OBSERVATIONS IN THE SURROUNDING AREAS.
//[SW,TF]
...ACROSS THE REGION,
WBCSAOHGR+HAGERSTOWN
CRWSAOMRB+MARTINSBURG
WBCSAOSBY+SALISBURY
WBCSAODOV+DOVER
WBCSAOCHO+CHARLOTTESVILLE
WBCSAOILG-WILMINGTON
WBCSAORIC+RICHMOND
//
...THESE ARE THE OBSERVATIONS FOR PHILADELPHIA AND VICINITY.
//[SW,TF,TC]
PHLSAOPHL+PHILADELPHIA
PHLSAOACY+ATLANTIC CITY
PHLSAOMIV+MILLVILLE
//
...THESE ARE THE MARINE OBSERVATIONS.
**
PSN7+MIDDLE NOMAD BUOY
VD01+SHIP DISCOVERY
**

Add Stations to Both Fixed Phrase and Summary Groups

Sometimes, when the geography warrants, it may be desirable to place a station into the fixed phrase broadcast format, and also to include it in a summary group. In this manner, a summary which encompasses the region in which the fixed phrase format station is a part, will be more accurate. For example, if Indianapolis is in fixed phrase broadcast format, a group of stations which constitutes central Indiana would not be entirely complete without the Indianapolis observations. Thus, Indianapolis should appear twice in the HWRLIST file, once as a fixed phrase format station, and once within the group that comprises central Indiana. Therefore, temperature and sky/weather conditions specifically for Indianapolis will sometimes be broadcast twice. Using our HWRLIST above:

[1,4,5]
...HERE ARE THE *TIME OBSERVATIONS FOR THE METROPOLITAN AREA.
WBCSAODCA*NATIONAL AIRPORT;WBCSAODW+ANDREWS AIR FORCE BASE
WBCSAOBWI+BALTIMORE WASHINGTON AIRPORT
WBCSAOIAD+DULLES
...NOW FOR SOME OBSERVATIONS IN THE SURROUNDING AREAS.
//[SW,TF]
...ACROSS THE REGION,
WBCSAOHGR+HAGERSTOWN
CRWSAOMRB+MARTINSBURG
WBCSAOSBY+SALISBURY
WBCSAODCA+NATIONAL AIRPORT
WBCSAODOV+DOVER
WBCSAOCHO+CHARLOTTESVILLE
WBCSAOILG-WILMINGTON
WBCSAORIC+RICHMOND
//

```
...THESE ARE THE OBSERVATIONS FOR PHILADELPHIA AND VICINITY.  
//[SW,TF,TC]  
PHLSAOPHL+PHILADELPHIA  
PHLSAOACY+ATLANTIC CITY  
PHLSAOMIV+MILLVILLE  
//  
...THESE ARE THE MARINE OBSERVATIONS.  
**  
PSN7+MIDDLE NOMAD BUOY  
VD01+SHIP DISCOVERY  
**
```

Recap the Weather Conditions

At many offices, it is a common practice to repeat the temperature and weather for a major city or cities at the end of a roundup. To set up your text in the BRDCAST file to accomplish this task, enter a second fixed format for these stations after your first text format in the BRDCAST file using the guidelines described previously. Then, in your associated HWRLIST file, re-enter the stations at the end of the list, this time using a station flag of "&". This instructs the program to search for the second format in the BRDCAST file. If the observation is missing, this station will be treated as a "-" station and ignored. For example:

```
[1,4,5]  
...HERE ARE THE *TIME OBSERVATIONS FOR THE METROPOLITAN AREA.  
WBCSAODCA*NATIONAL AIRPORT;WBCSAOADW+ANDREWS AIR FORCE BASE  
WBCSAOBWI+BALTIMORE WASHINGTON AIRPORT  
WBCSAOIAD+DULLES  
...NOW FOR SOME OBSERVATIONS IN THE SURROUNDING AREAS.  
//[SW,TF]  
...ACROSS THE REGION,  
WBCSAOHGR+HAGERSTOWN  
CRWSAOMRB+MARTINSBURG  
WBCSAOSBY+SALISBURY  
WBCSAODCA+NATIONAL AIRPORT  
WBCSAODOV+DOVER  
WBCSAOCHO+CHARLOTTESVILLE  
WBCSAOILG-WILMINGTON  
WBCSAORIC+RICHMOND  
//  
...THESE ARE THE OBSERVATIONS FOR PHILADELPHIA AND VICINITY.  
//[SW,TF,TC]  
PHLSAOPHL+PHILADELPHIA  
PHLSAOACY+ATLANTIC CITY  
PHLSAOMIV+MILLVILLE  
//  
...THESE ARE THE MARINE OBSERVATIONS.  
**  
PSN7+MIDDLE NOMAD BUOY  
VD01+SHIP DISCOVERY  
**  
WBCSAODCA&NATIONAL AIRPORT
```

The corresponding BRDCAST file needs to be modified to incorporate the second entry for this station. For example:

/DCA/AT NATIONAL AIRPORT,
(%SW% WAS FALLING; %SW% WAS REPORTED; UNDER %SW% SKIES; %SW% WERE REPORT-
ED)
([VV], WHICH REDUCED THE VISIBILITY TO %VV%U).
THE TEMPERATURE WAS %TF%U, THE DEW POINT %DF%, AND THE RELATIVE HUMIDITY
%RR%U
([HF], PRODUCING A HEAT INDEX OF %HF%U).
([FF]THE WIND %DD% AT %FF%U([GG], GUSTING TO %GG%
([WF], PRODUCING A WIND CHILL OF %WF%U).) *[Carefully notice the structure
of this sentence which contains multiple threshold-dependent elements. If
the wind speed does not meet the threshold value, no part of the sentence
is created. If the gust threshold or the wind chill threshold is not met,
that portion of the sentence is not created.]*
THE PRESSURE %PP%U AND %PT%. \$\$

/ADW/AT ANDREWS AIR FORCE BASE, (%SW% WAS FALLING; %SW% WAS REPORTED; UNDER
%SW% SKIES; %SW% WERE REPORTED)
([VV], WHICH REDUCED THE VISIBILITY TO %VV%U).
THE TEMPERATURE WAS %TF%U, THE DEW POINT %DF%, AND THE RELATIVE HUMIDITY
%RR%U
([HF], PRODUCING A HEAT INDEX OF %HF%U).
([FF]THE WIND %DD% AT %FF%U([GG], GUSTING TO %GG%
([WF], PRODUCING A WIND CHILL OF %WF%U).)
THE PRESSURE %PP%U AND %PT%. \$\$

/BWI/THE TEMPERATURE WAS %TF%U(WITH %SW%; WITH %SW%; WITH %SW% SKIES; WITH
%SW%)
([VV], AND A VISIBILITY OF %VV%U) AT BALTIMORE WASHINGTON AIRPORT. THE DEW
POINT %DF%, AND THE RELATIVE HUMIDITY %RR%U
([HF], YIELDING A HEAT INDEX OF %HF%).
([GG]THE WIND %DD% ([FF]AT %FF%U)
WITH GUSTS TO %GG%
([WF], WHICH MAKES THE TEMPERATURE FEEL LIKE %WF%).) *[The wind gust
threshold controls this entire sentence. In this case, the sentence sounds
better if you set your wind speed threshold at a low value].*
THE PRESSURE %PP%U AND %PT%. \$\$

/IAD/(%SW% WAS OBSERVED; %SW% WAS REPORTED; IT WAS %SW%; %SW% WERE OB-
SERVED)
([VV], WHICH REDUCED THE VISIBILITY TO %VV%U) AT DULLES AIRPORT. THE
TEMPERATURE %TF%U, THE DEW POINT %DF%, AND THE RELATIVE HUMIDITY %RR%U.
([HF]THE COMBINATION OF TEMPERATURE AND HUMIDITY FEELS LIKE %HF%U.)
([WF]STRONG WINDS FROM THE %DD%
([FF]AT %FF%U)([GG], GUSTING TO %GG%), ARE PRODUCING A WIND CHILL OF
%WF%U.) *[This sentence is created only if the wind chill threshold is
met.]*
THE PRESSURE %PP%U AND %PT%. \$\$

/PSN7/MIDDLE NOMAD BUOY LOCATED 60 MILES SOUTHEAST OF NORFOLK RECORDED %DD%
WINDS %FK%U, SWELLS %HS%U, AIR TEMPERATURE %TF%U, AND WATER TEMPERATURE
%SF%U. \$\$

/VD01/SHIP DISCOVERY LOCATED AT THIRTY EIGHT DEGREES NORTH LATITUDE AND SEVENTY FOUR DEGREES WEST LONGITUDE RECORDED %DD% WINDS AT %FK%U, AIR TEMPERATURE %TF%U, WATER TEMPERATURE %SF%U, WITH %HW% FOOT WAVES.\$\$

/DCA/ONCE AGAIN, AT NATIONAL AIRPORT IT WAS %TF%U (WITH %SW%; WITH %SW%;UNDER %SW% SKIES;WITH %SW%).

K. Treatment of Missing Data

The HWRNWR program treats missing data in various ways which are described below. You should be aware of these special cases, and it is recommended that you review the HWRLIST and BRDCAST files with this understanding.

For fixed phrase format observations:

- If the entire station is missing and the station is marked in the HWRLIST file with a "+" symbol, the site is broadcast as "NOT AVAILABLE."
- If the entire station is missing and the station is marked with a "-" symbol, the site is dropped from the broadcast.
- If the entire station is missing and the station is marked with a "*" symbol, the second station substitutes for the first. If the second station is also missing, the first station is broadcast as "NOT AVAILABLE," or not broadcast at all, depending on the symbol with the second station.
- If one or more non-threshold weather elements are missing, the fixed phrases established by the user for that station are ignored, and the program reverts to a default format (see Fig. 8). HWRNWR has been programmed to handle one or more missing weather elements in conjunction with a default format. A default format is necessary because there is virtually an unlimited number of phrases that can be established by the users, and the HWRNWR program cannot realistically be programmed to structure a new sentence required by the absence of the missing weather elements. The only exception to this rule is that the HWRNWR program will not revert to a default format if the pressure tendency is missing. HWRNWR assumes that the only way that a user will ever wish to report a pressure tendency is immediately after the pressure. Since this weather element, when requested, always appears in a predictable manner, a missing pressure tendency will not cause the program to revert to a default format.

For summary group stations:

- Any station marked with a "+" whose observations are missing is reported as "NOT AVAILABLE," and the observations for the remaining stations are grouped but not summarized.
- A station marked with a "-" whose observations are missing is dropped from the broadcast, and the summary for the remaining stations is unaffected.

- If the observations for a station are missing and the station is marked with a "*" symbol, the second station is substituted for the first. If both stations are missing, the first station is reported as "NOT AVAILABLE" or not reported at all, depending on the symbol associated with the second station. The observations for the remaining stations are grouped but not summarized.
- If only one of the two (sky/weather and temperature) weather elements is missing for any station, the missing element is not summarized for the remaining stations, but the available weather element remains eligible for summarizing.

For ASOS stations, all of the above rules hold. However, there is an additional consideration, because low-level cloud cover observations are supplemented with satellite-derived middle and upper-level cloud cover observations:

- If the ASOS cloud cover observation is missing, but the SCP product, which contains information on only middle and high level cloud cover is available, the cloud cover is considered missing.
- If the ASOS observation shows overcast conditions, the SCP product is not needed, since the sky conditions will be reported as cloudy.
- If the ASOS observation shows broken clouds, the SCP product will be accessed to determine if the sky is overcast. If the SCP product is missing, the sky conditions will be reported as "PARTLY SUNNY" or "MOSTLY CLOUDY," depending on the time of day.
- If the ASOS observation shows clear skies or scattered clouds, the SCP product will be accessed to determine if the higher-level sky conditions are cloudier than at lower levels. If the SCP product is missing, the sky conditions will either be considered missing, or reported as "FAIR," depending on the user's preformat selection.

L. Changing the Runtime Macro

If necessary, the HWR.MC macro file may be changed to reflect the extension of the CCCLIST.xx file. Finally, execute the macro and display the output.

5. CAUTIONS

Some important points that should be considered while setting up the software application are given below.

- 1) Delete the ALTIM.DT file whenever you add or delete a station from any of the HWRLIST files.
- 2) Punctuation will be very important during the CRS era, since the voice synthesizer will be confused by spaces preceding commas and periods. Therefore, be sure to check the printout when initially setting up and testing your files.

- 3) When it is desirable to repeat an observation for a station, be sure that the first entry contains a station flag of "+" or "-", and that only the second entry in the HWRLIST file contains the "&" station flag.
- 4) There must be four sky/weather condition phrases for each fixed-format station, even if two or more of the four sky/weather types are to be broadcast identically.
- 5) One or more missing weather elements from a fixed phrase station's observation cause the program to revert to a default format. This is necessary because the program is incapable of patching together the remaining phrases to form a coherent report. Check the station's reported observation first whenever an unexpected output is encountered. The same unexpected result will be encountered whenever an observation is encoded incorrectly at the originating site.

6. REFERENCES

- Beasley, R. A., 1993a: AFOS surface observation decoding. NOAA Techniques Development Laboratory Computer Program NWS TDL CP 93-2, National Weather Service, NOAA, U.S. Department of Commerce, 74 pp.
- _____, 1993b: Decoding satellite cloud products. NOAA Techniques Development Laboratory Computer Program NWS TDL CP 93-3, National Weather Service, NOAA, U.S. Department of Commerce, 15 pp.
- Sunkel, W. E., 1987: Regional weather roundup: Program RWR. Central Region Computer Programs and Problems NWS CR CP No. 18, National Weather Service, NOAA, U.S. Department of Commerce, 83 pp.

7. PROGRAM INFORMATION AND PROCEDURES FOR INSTALLATION AND EXECUTION

CREATE HOURLY WEATHER SUMMARY PRODUCTS FOR NOAA WEATHER RADIO

PART A: PROGRAM INFORMATION AND INSTALLATION PROCEDURES

PROGRAM NAME: HWRNWR

AAL ID: DBC081

Revision No.: 02.04

PURPOSE: Create hourly weather products in a format compatible with the Console Replacement System of the NOAA Weather Radio.

PROGRAM INFORMATION:

Development Programmer:

Gerry A. Kokolis

Gary F. Battel

James E. Calkins

Maintenance Programmer:

James E. Calkins

Location: Techniques Development
Laboratory

Location: Techniques Development
Laboratory

Phone: 301-713-0056

Phone: 301-713-0056

Language: FORTRAN IV/Rev 5.57
Macroassembler/Rev 6.30

Type: Overlay

Save file creation dates: HWRNWR.SV

Original release/Rev 01.00 -

September 1, 1992

First revision/Rev 01.01 -

September 10, 1992

Second revision/Rev 02.00 -

July 23, 1993

Third revision/Rev 02.04 -

December 22, 1993

Running time: 20 sec for 10 stations for 1 transmitter

Disk space: Program files -

213 RDOS blocks

Data files -

20 RDOS blocks (1 transmitter,
3 BRDCAST.nX files)

PROGRAM REQUIREMENTS

Program files:

NAME

HWRNWR.SV

HWRNWR.OL

Data files:

NAME

Disk location

READ/WRITE

COMMENTS

SAODATASUP User directory

R

Decoded SAO data.

SCPDATA User directory

R

Decoded SCP data.

<u>NAME</u>	<u>Disk location</u>	<u>READ/WRITE</u>	<u>COMMENTS</u>
HWRLIST.On	User directory	R	Stations for which to generate products for each transmitter.
ALTIM.DT	User directory	R/W	Pressure tendency for each station.
BRDCAST.nx	User directory	R	Broadcast format for fixed-format stations.

AFOS products:

<u>ID</u>	<u>ACTION</u>	<u>COMMENTS</u>
cccHWRxxx	Read	The preformat screen containing options concerning product creation.
ccchWRNWn	Stored	The output products, one for each transmitter.

LOAD LINE

```

RLDR/P/E OCHN TROUBL INITAR SEARCH BMOVE ICEQAL CCAT ^
ILEN BLDPHR HWRREV 2000/N HWRNWR HWRNWR/S NUMBLD BCONVRT WMOV^
[HWRINIT EXTRACT IPANDEC HWRTIME DATIMPHR WDATE, HWRO2 HWRO3 HWROM, ^
SUMSETUP ISWCHK LTR HWRWX, BLDREST BLDTEMP GETSTA GETFILES, ^
HWRSETUP GETPF APACK FPAT, WINDSET HWRELE STOPROD INDEX SUMPFR CRFILE, ^
HWR1BLD VISBLD] ^
VISCHK ^
XMEM.LB UTIL.LB TOP.LB FORT.LB

```

PROGRAM INSTALLATION

1. Move HWRNWR.SV and HWRNWR.OL to applications directory. Create links in master directory to HWRNWR.SV, HWRNWR.OL, SAODATASUP, HWRLIST.On, BRDCAST.nx, and ALTIM.DT.
2. Ensure that the database files for the preformat (cccMCPHWR and ccchWRxxx) and the output products (ccchWRNWn) have been added to the PIL.

CREATE HOURLY WEATHER SUMMARY PRODUCTS FOR NOAA WEATHER RADIO

PART B: PROGRAM EXECUTION AND ERROR CONDITIONS

PROGRAM NAME: HWRNWR

AAL ID: DBC081

Revision No.: 02.04

PROGRAM EXECUTION

1. Run HWRNWR. At the ADM, enter:

RUN:HWRNWR/S/I/H aaa/A ee/E xx/X

Definition of switches:

GLOBAL

/S = Save (and inactivate) this product after the expiration time.
/I = Save this product inactively.
/H = Used only in test mode, format the output to be read by humans,
rather than the CRS.

Defaults (switches not used):

/S = Delete this product after it expires.
/I = Broadcast this product at its normally scheduled time.
/H = Format the output for the CRS.

LOCAL

aaa/A = Routing address for Regional or State Distribution Circuits.
ee/E = Change the effective to the requested number of minutes
after the nominal hour.
xx/X = Change the expiration time to the requested number of
minutes after the nominal hour.

Defaults (switch not used):

/A = None.
/E = Effective time is the current time.
/X = Expiration time is either one hour after the nominal hour, or
the time specified by a preformat selection.

ERROR CONDITIONS

DASHER MESSAGES

MEANING

- | | |
|-------------------------------|---|
| 1. "GETTING CHANNEL - 'file'" | Couldn't get I/O channel to
'file.' Probable system or
disk problem. |
| 2. "OPENING 'file'" | Couldn't open 'file.' Program
not linked to or located in
same directory as 'file.' |

DASHER MESSAGES

MEANING

- | | |
|--|--|
| | Establish appropriate link to 'file.' |
| 3. "CREATING 'file'" | Couldn't create 'file.' Determine if 'file' exists. If so, delete it, and rerun program. If problem persists, call maintenance programmer. |
| 4. "READING 'file'" | Couldn't read 'file.' Delete 'file.' You may need to reload 'file' from starter diskette or recreate it by running another program. |
| 5. "AFOS PROD TOO BIG" | Couldn't find End-of-Text character of AFOS product. Purge cccHWRxxx and reedit preformat (M:HWR). If problem persists, call maintenance programmer. |
| 6. "SETTING FILE POS" | Couldn't set file position in SKEL file to read the "ccc." Probable system or disk problem. |
| 7. "READING SKEL" | Couldn't read the "ccc" from the SKEL file. Probable system or disk problem. |
| 8. "TROUBLE READING BLOCK 0" | Couldn't read 'file.' Delete 'file.' You may need to reload 'file' from starter diskette or recreate it. |
| 9. "END] NOT FOUND IN HWRLIST.0n" | Couldn't find the "]" character at end of weighting factors in HWRLIST.0n. This can only occur when more than one BRDCAST.Xn file is used. |
| 10. "ILLEGAL % TOTAL IN HWRLIST.0n" | The total of the weighting factors does not equal ten. Correct the appropriate file and rerun. |
| 11. "MISSING STATION NAME IN HWRLIST.0n" | No station name was found after the semicolon following the station ID in HWRLIST.0n. Correct this in the appropriate HWRLIST.0n. |

<u>DASHER MESSAGES</u>	<u>MEANING</u>
12. "ILLEGAL META-CHARACTER IN HWRLIST.0n"	Meta-character encountered is not from the list in Table 1. Correct the problem in the appropriate HWRLIST and rerun.
13. "NO SUMMARY GROUP IN HWRLIST.0n"	A summary section in HWRLIST.0n was not ended with "//". Correct the appropriate HWRLIST.0n and rerun.
14. "SEMICOLON NOT FOUND IN HWRLIST.0n"	Two stations paired for substitution in HWRLIST.0n were not separated by a semicolon. Correct the appropriate HWRLIST.0n and rerun.
15. "STATION NOT FOUND IN BRDCAST.nX"	A fixed-format station listed in the HWRLIST.0n file was not found in the corresponding BRDCAST.nX file. Edit the appropriate BRDCAST.nX to include a format for this station and rerun.
16. "ILLEGAL WX ELEMENT IN BRDCAST.nX"	Meta-character encountered is not from the list in Table 2. Correct the problem in the appropriate BRDCAST.nX and rerun.
17. "MISSING [AFTER (IN BRDCAST.nX"	A threshold phrase in BRDCAST.nX does not have a controlling weather element. Correct the appropriate BRDCAST.nX file and rerun.
18. "MISSING) IN BRDCAST.nX" "TOO MANY) IN BRDCAST.nX"	Incorrect number of ")" characters in BRDCAST.nX. Correct the appropriate BRDCAST.nX file and rerun.
19. "NOT ENOUGH EXTENDED MEMORY"	Ensure that your background memory is set to 128 blocks.

Table 1. A list of symbolic words to be used in comment lines, as used by the HWRNWR software. The user places the symbolic words into the comment lines in the HWRLIST.On file, and the application software converts them into the current time according to the definitions below.

Symbolic Word	Definition
%DATE	Current Date (e.g., AUGUST SIXTH)
%DAY	Current day of the week (e.g., THURSDAY)
%TIME	Current hour (e.g., NINE A M)
%TIMEZ	Current hour and time zone (e.g., TWO A M PACIFIC STANDARD TIME)

Table 2. A list of symbolic words used for weather elements as used by the HWRNWR software. The user places the symbolic words into the fixed-formatted text in the BRDCAST.nx file, and the application converts them into the current weather or marine element value, according to the definitions below.

Symbolic Word	Definition
%SW%	Sky/weather condition
%VV%	Visibility
%TF%	Temperature (Fahrenheit)
%TC%	Temperature (Celsius)
%DF%	Dew point (Fahrenheit)
%DC%	Dew point (Celsius)
%RR%	Relative humidity
%HF%	Heat index (Fahrenheit)
%HC%	Heat index (Celsius)
%DD%	Wind direction (degrees)
%FF%	Wind speed (mph)
%GG%	Wind gusts (mph)
%WF%	Wind chill index (Fahrenheit)
%WC%	Wind chill index (Celsius)
%PP%	Pressure (inches)
%PT%	Pressure tendency
%SF%	Sea surface temperature (Fahrenheit)
%SC%	Sea surface temperature (Celsius)
%PW%	Wave period (s)
%HW%	Wave height (ft)
%SD%	Swell direction (degrees)
%HS%	Swell height (ft)
%SP%	Swell period (s)
%FK%	Wind speed (kt)
%GK%	Wind gusts (kt)

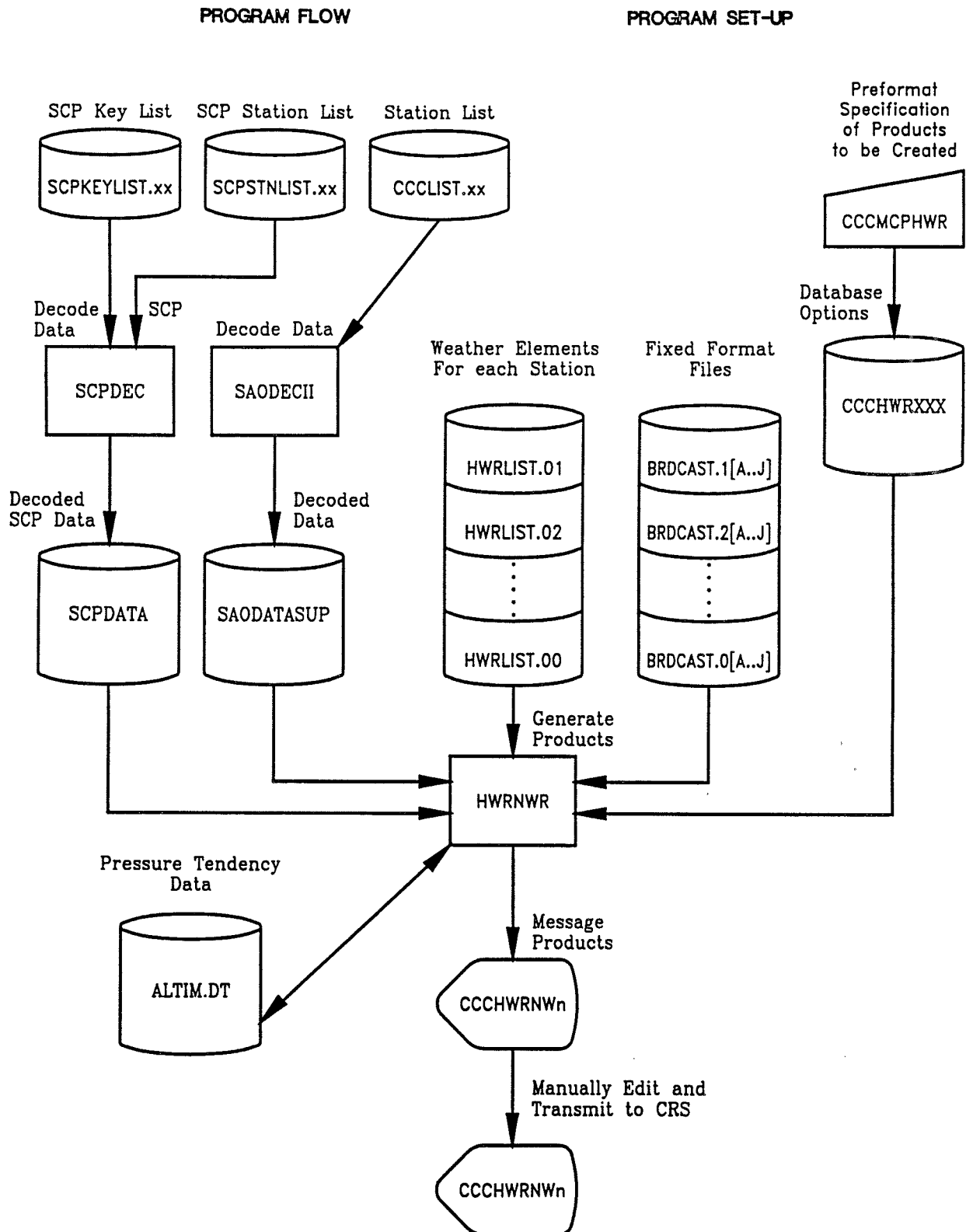


Figure 1. Program flow for the hourly weather roundup software.

TDLMCPHWR
TTAA00 KTDL 121444

HOURLY WEATHER ROUNDUP

REVIEW BEFORE TRANSMISSION [] (N) TWO HOUR WINDOW FOR MARINE OBS [] (N)
STANDARD TIME YEAR ROUND [] (N) TIME ZONE [] (UTC)
LISTENING AREA #1 [] #2 []
#3 [] #4 []
#5 [] #6 []
#7 [] #8 []
#9 [] #0 []
MINUTES AFTER NOMINAL HOUR FOR EXPIRATION TIME [] (60)

WIND SPEED THRESHOLD [] (0) WIND CHILL THRESHOLDS:
WIND GUST THRESHOLD [] (0) MAX TEMP [] (35)
VIS THRESHOLD (MI*.25) [] (4) MIN SPEED [] (4)
HEAT INDEX THRESHOLD [] (96) MAX WCI [] (30)

TEMPERATURE RANGE SUMMARY PHRASE [] (5)
EXPRESS SKY CONDITIONS AS FAIR WHEN SCP MISSING [] (N)

[]

Figure 2. Preformat cccMCPHWR, which may be edited prior to running the HWRNWR program.

BHMSAOBHM
CRWSAOCRW
RDUSAORDU
INDSAOIND
SEASAOSEA
SLCSAOSLC
TDLBOYBS1
TDLSHPAT1
999999999

Figure 3. Contents of a sample CCCLIST.xx file. This file contains the list of stations to be decoded.

TDLSCPCR1
TDLSCPWR1
TDLSCPSR1

Figure 4. Contents of a sample SCPKEYLIST.xx file, which contains the list of the satellite-derived cloud cover products to be decoded.

AMA
BLU
CNK
COS
DDC
GRI
OKC
TUP

Figure 5. Contents of a sample SCPSTNLIST.xx file, which contains the list of stations to be extracted from the satellite-derived cloud cover product collectives.

[4,3,3]
...FOR %DAY, THESE ARE THE %TIMEZ OBSERVATIONS, ON %DATE,
...FOR THE LOCAL AREA.
WBCSAODCA+NATIONAL AIRPORT
WBCSAOIAD+DULLES AIRPORT
WBCSAOBWI+B W I AIRPORT
WBCSAOADW*ANDREWS;WBCSAONYG*QUANTICO
...HERE ARE SOME OBSERVATIONS OUTSIDE THE METRO AREA.
//[SW,TF]
...THROUGHOUT THE REGION,
CRWSAOMRB+MARTINSBURG
WBCSAOHGR*HAGERSTOWN;WBCSAODOV*DOVER
WBCSAONHK-PATUXENT RIVER
WBCSAOILG+WILMINGTON
WBCSAOSBY+SALISBURY
//
...HERE ARE SOME SHIP REPORTS
**
DPLE+SHIP WASHINGTON
VD01-SHIP DIXON
7049-SHIP SEVEN
...HERE ARE SOME BUOY REPORTS
SLN7+WEST SEA OTTER
BIS1-HALIBUT
HLV2-EUREKA BUOY
**
WBCSAODCA&NATIONAL AIRPORT

Figure 6. Contents of a sample HWRLIST.On file, which contains comment lines, symbolic words for time, day, and date; stations; weather and marine elements to be broadcast; and missing data indicators.

```

/DCA/AT NATIONAL AIRPORT,
{ %SW% WAS FALLING; %SW% WAS REPORTED; IT WAS %SW%; %SW% WERE REPORTED)
([VV], REDUCING THE VISIBILITY TO %VV%U).
THE TEMPERATURE WAS %TF%U, THE DEWPOINT %DF%, AND THE RELATIVE HUMIDITY %RR%
PERCENT([HF], PRODUCING A HEAT INDEX OF %HF%).
([FF]THE WIND WAS %DD% AT %FF%U([GG], GUSTING TO %GG%)([WF], PRODUCING A
WIND CHILL OF %WF%). )
THE PRESSURE WAS %PP%U AND %PT%. $$
/IAD/AT DULLES AIRPORT,
{ %SW% WAS FALLING; %SW% WAS REPORTED; IT WAS %SW%; %SW% WERE REPORTED)
([VV], REDUCING THE VISIBILITY TO %VV%U).
THE TEMPERATURE WAS %TF%U, THE DEWPOINT %DF%, AND THE RELATIVE HUMIDITY %RR%
PERCENT([HF], PRODUCING A HEAT INDEX OF %HF%).
([FF]THE WIND WAS %DD% AT %FF%U([GG], GUSTING TO %GG%)([WF], PRODUCING A
WIND CHILL OF %WF%). )
THE PRESSURE WAS %PP%U AND %PT%. $$
/BWI/AT B W I AIRPORT,
{ %SW% WAS FALLING; %SW% WAS REPORTED; IT WAS %SW%; %SW% WERE REPORTED)
([VV], REDUCING THE VISIBILITY TO %VV%U).
THE TEMPERATURE WAS %TF%U, THE DEWPOINT %DF%, AND THE RELATIVE HUMIDITY %RR%
PERCENT([HF], PRODUCING A HEAT INDEX OF %HF%).
([FF]THE WIND WAS %DD% AT %FF%U([GG], GUSTING TO %GG%)([WF], PRODUCING A
WIND CHILL OF %WF%). )
THE PRESSURE WAS %PP%U AND %PT%. $$
/ADW/AT ANDREWS AIR FORCE BASE,
{ %SW% WAS FALLING; %SW% WAS REPORTED; IT WAS %SW%; %SW% WERE REPORTED)
([VV], REDUCING THE VISIBILITY TO %VV%U).
THE TEMPERATURE WAS %TF%U, THE DEWPOINT %DF%, AND THE RELATIVE HUMIDITY %RR%
PERCENT([HF], PRODUCING A HEAT INDEX OF %HF%).
([FF]THE WIND WAS %DD% AT %FF%U([GG], GUSTING TO %GG%)([WF], PRODUCING A
WIND CHILL OF %WF%). )
THE PRESSURE WAS %PP%U AND %PT%. $$
/NYG/AT QUANTICO,
{ %SW% WAS FALLING; %SW% WAS REPORTED; IT WAS %SW%; %SW% WERE REPORTED)
WITH A TEMPERATURE OF %TF%U([HF], AND A HEAT INDEX OF %HF%).
THE WIND WAS %DD% AT %FF%U([WF], PRODUCING A WIND CHILL OF %WF%).
THE PRESSURE WAS %PP%U AND %PT%. $$
/DPLE/SHIP WASHINGTON RECORDED WINDS FROM THE %DD% AT %FK%U. SEA TEMPERATURE
%SF%U. AIR TEMPERATURE %TF%. WAVE HEIGHT %HW%U. WAVE PERIOD %PW%U. $$
/VD01/SHIP DIXON REPORTED A WATER TEMPERATURE OF %SF%. AIR TEMPERATURE %TF%.
WAVE HEIGHT %HW%U. WAVE PERIOD %PW%U. $$
/7049/THE WATER TEMPERATURE AT SHIP SEVEN WAS %SF%. THE AIR TEMPERATURE
%TF%. THE WAVE HEIGHT %HW%U, AND WAVE PERIOD %PW%U. $$
/SLN7/WEST SEA OTTER BUOY RECORDED WINDS FROM THE %DD% AT %FK%U. SWELL HEIGHT
%HS%U. SWELL PERIOD %SP%. $$
/BIS1/HALIBUT RECORDED A SWELL HEIGHT OF %HS%U FROM THE %SD%. $$
/HLV2/EUREKA BUOY REPORTED SWELL HEIGHTS OF %HS%U FROM THE %SD%. $$
/DCA/ONCE AGAIN, AT NATIONAL AIRPORT IT WAS %TF%U (WITH %SW%;WITH %SW%;
UNDER %SW% SKIES;WITH %SW%).

```

Figure 7. Contents of a sample BRDCAST.nx file, which contains fixed formats for user-selected stations. The program retrieves or calculates the value for each symbolic weather or marine element word (e.g., "%SW%") in the above report, and substitutes that value for the symbolic word.

FOR TUESDAY, THESE ARE THE TEN A M OBSERVATIONS, ON JANUARY TWELFTH, FOR THE LOCAL AREA.

AT NATIONAL AIRPORT, RAIN WAS FALLING, REDUCING THE VISIBILITY TO ONE MILE. THE TEMPERATURE WAS THIRTY FIVE DEGREES, THE DEWPOINT THIRTY, AND THE RELATIVE HUMIDITY EIGHTY FIVE PERCENT. THE WIND WAS NORTHEAST AT FOURTEEN MILES AN HOUR, GUSTING TO TWENTY TWO, PRODUCING A WIND CHILL OF SEVEN. THE PRESSURE WAS TWENTY NINE POINT NINE EIGHT INCHES AND FALLING.

AT DULLES AIRPORT, RAIN AND FOG WERE REPORTED, REDUCING THE VISIBILITY TO THREE QUARTERS OF A MILE. THE TEMPERATURE WAS THIRTY THREE DEGREES, THE DEWPOINT THIRTY, AND THE RELATIVE HUMIDITY NINETY ONE PERCENT. THE WIND WAS NORTHEAST AT THREE MILES AN HOUR. THE PRESSURE WAS TWENTY NINE POINT NINE SIX INCHES AND FALLING.

AT B W I AIRPORT, SNOW WAS FALLING, REDUCING THE VISIBILITY TO THREE QUARTERS OF A MILE. THE TEMPERATURE WAS THIRTY ONE DEGREES, THE DEWPOINT THIRTY, AND THE RELATIVE HUMIDITY NINETY SEVEN PERCENT. THE WIND WAS NORTHEAST AT SEVEN MILES AN HOUR, PRODUCING A WIND CHILL OF TWENTY NINE. THE PRESSURE WAS TWENTY NINE POINT NINE NINE INCHES AND FALLING.

AT ANDREWS AIR FORCE BASE, SNOW WAS FALLING. THE TEMPERATURE WAS THIRTY TWO DEGREES, THE DEWPOINT THIRTY, AND THE RELATIVE HUMIDITY NINETY FOUR PERCENT. THE WIND WAS CALM. THE PRESSURE WAS TWENTY NINE POINT NINE EIGHT INCHES AND FALLING.

HERE ARE SOME OBSERVATIONS OUTSIDE THE METRO AREA. THROUGHOUT THE REGION, TEMPERATURES WERE BETWEEN TWENTY EIGHT AND THIRTY FIVE DEGREES. LIGHT SNOW WAS REPORTED IN MARTINSBURG AND WILMINGTON. AT HAGERSTOWN, MODERATE SNOW WAS REPORTED. LIGHT RAIN WAS REPORTED IN SALISBURY AND PATUXENT RIVER. AT WILMINGTON, SLEET AND LIGHT SNOW WERE REPORTED.

HERE ARE SOME SHIP REPORTS. SHIP WASHINGTON RECORDED WINDS FROM THE NORTHEAST AT 15 KNOTS. SEA TEMPERATURE THIRTY EIGHT DEGREES. AIR TEMPERATURE THIRTY SIX. WAVE HEIGHT SIX FEET. WAVE PERIOD SEVENTEEN SECONDS.

SHIP DIXON REPORTED A WATER TEMPERATURE OF THIRTY NINE DEGREES. AIR TEMPERATURE THIRTY NINE. WAVE HEIGHT SEVEN FEET. WAVE PERIOD 18 SECONDS.

THE WATER TEMPERATURE AT SHIP SEVEN WAS FORTY DEGREES. THE AIR TEMPERATURE FORTY THREE. THE WAVE HEIGHT EIGHT FEET, AND WAVE PERIOD TWENTY THREE SECONDS.

WEST SEA OTTER BUOY RECORDED WINDS FROM THE NORTHEAST AT SIXTEEN KNOTS. SWELL HEIGHT SIX FEET. SWELL PERIOD EIGHTEEN SECONDS.

HALIBUT RECORDED A SWELL HEIGHT OF SEVEN FEET FROM THE EAST.

EUREKA BUOY REPORTED SWELL HEIGHTS OF EIGHT FEET FROM THE EAST.

ONCE AGAIN AT NATIONAL AIRPORT, IT WAS THIRTY FIVE DEGREES WITH RAIN.

Figure 8. Sample text output to be transmitted to the Console Replacement system, and scheduled for broadcast on the NOAA Weather Radio. Although not shown above, instructions for the CRS are also transmitted to the console.

(Continued from inside front cover)

Computer Program NWS TDL

- CP 92-1 Separating Individual Synoptics from within Synoptic Collectives.
Beasley, August 1992. (PB92-232313)
- CP 93-1 AFOS Profiler Software System. Battel, Leaphart, Moeller, and
Petrie, August 1993. (PB94-112711)
- CP 93-2 AFOS Surface Observation Decoding. Beasley, September 1993.
(PB94-112042)
- CP 93-3 Decoding Satellite Cloud Products. Beasley, October 1993.
(PB94-116845)
- CP 93-4 Decoding Nested Grid Model Statistical Forecasts. Beasley, October
1993. (PB94-129210)
- CP 93-5 Retrieving Alphanumeric and Graphic Products from the AFOS Database
through the Background Partition. Beasley, November 1993.
(PB94-143245)
- CP 93-6 NOAA Weather Radio Climatological Data Reports. James E. Calkins and
Gary F. Battel, December 1993. (PB94-143252)