

CHAPTER 3

GENERAL OPERATIONS AND PROCEDURES

3.1 General. Every effort has been made to standardize terminology, adopt common definitions, and adjust criteria to a common base; however, each agency has different operational watch and warning criteria that must be met. Although standardization will be used wherever possible in forecasts and warnings, each agency retains the right to specify the forecast, watch and warning criteria needed to carry out its mission.

3.2 National Weather Service (NWS) Watch/Warning Procedures.

3.2.1 General. The NWS has statutory responsibility for providing a severe local storms watch and warning service for all 50 States. This responsibility is fulfilled by the National Centers for Environmental Prediction (NCEP) Storm Prediction Center (SPC) and the NWS Weather Forecast Offices (WFOs). NCEP Central Operations (NCO), as the central data processing center for the NWS, issues prognostic charts, discussions, and other forecast data and information, that are used by the WFOs, SPC, and NCEP's Aviation Weather Center (AWC) in fulfilling their severe local storm responsibilities.

3.2.1.1 Geographical responsibilities. For the conterminous U.S., the SPC issues Severe Weather Outlooks and Watches. SPC does not issue severe local storm watches for Alaska or Hawaii. The WFOs at Anchorage and Honolulu have the responsibility for maintaining weather watches and issuing warnings as needed for their respective states. Each WFO in the 50 states and the U.S. territories, located in the NWS Pacific and Southern Regions, issues a Thunderstorm Outlook/Hazardous Weather Outlook for a forecast of and Warnings for imminent severe thunderstorms and/or tornadoes.

3.2.1.2 Watch/Warning Criteria. Any or all of the criteria listed in para. 2.2 Severe Local Storms, para. 2.5 Density/Risk of Severe Thunderstorms, and para. 2.6 Thunderstorm Intensity Categories/Severe Thunderstorms may be mentioned in severe weather watches/warnings to indicate more fully that severe weather is expected. Severe weather watches/warnings that mention tornadoes or waterspouts imply that thunderstorm activity, usually severe, also is expected/occurring.

3.2.2 Outlooks The SPC issues separate Convective Outlooks for severe weather for Day One and Day Two, with each forecast covering 24 hours (see Figure 3-1), in both text and graphical format. The outlook conveys forecasts of expected severe weather coverage as defined in Chapter 2. Additionally, each outlook covers the general thunderstorm outlook, where greater than 10 percent chance of a thunderstorm is forecast. Each WFO issues a Thunderstorm Outlook/Hazardous Weather Outlook to outline the severe convective threats of the day, public watches based on SPC watches, and public warnings for imminent severe thunderstorms and/or tornadoes.

3.2.3 Public Watches.

3.2.3.1 SPC. The SPC coordinates watch issuances with local Weather Forecast Offices and issues watches where severe thunderstorms and/or tornadoes are expected (see Figure 3-2). The watch type reflects the anticipated predominant threat, so a severe thunderstorm watch will be primarily for thunderstorms producing damaging winds or large hail. Tornadoes, if any, in a severe thunderstorm watch are expected to be isolated.

3.2.3.1.1 Watch Status Message. Following the issuance of a severe thunderstorm or tornado watch, the Storm Prediction Center issues hourly watch status messages indicating which areas remain under the threat of severe weather (see Figure 3-3).

3.2.3.1.2 Aviation Watch. Accompanying the Public severe thunderstorm or tornado watch is the Aviation version of the same watch, which outlines the watch area for plotting purposes (see Figure 3-4). This watch also includes the primary threats and mean storm motion vector of severe thunderstorms in the watch area.

3.2.3.2 WFO. Once a watch is issued by SPC, the WFOs issue a local areal outline statement indicating which counties in their area of responsibility are in the watch area. As the event unfolds, Special Weather Statements are issued by Weather Forecast Offices to clear counties from each watch until the watch has expired.

3.2.4 Public Warnings.

3.2.4.1 WFO. Each WFO issues severe thunderstorm and tornado warnings (see Figure 3-5), which encompass severe weather expected within an hour of the warning issuance (warnings can be issued for a shorter period). Warnings are often updated with a severe weather statement while the warning is in effect, and a severe weather statement will indicate when a warning has expired. The warnings use a 'bullet' format to highlight the most important warning parameters, such as type of warning, when a warning is in effect, basis for the warning, and an optional pathcast forecasting the times and locations of the severe weather.

3.2.4.2 Convective SIGMETs. The AWC issues Convective SIGMET bulletins both hourly, at 55 minutes past the hour, and as required over the conterminous U.S. and adjacent coastal waters (see Figure 3-6) for areas greater than 3000 square miles. Negative bulletins are issued if none of the criteria specified in Chapter 2 are met. Convective SIGMETs alert in-flight interests for:

- tornadoes
- lines of thunderstorms
- embedded thunderstorms of any intensity
- active thunderstorms affecting at least 3000 square miles
- severe thunderstorms with hail greater than 3/4" diameter or greater or winds 50 knots or greater

3.2.4.3 National Convective Weather Forecast (NCWF) Product. The NWS and FAA recently approved AWC's National Convective Weather Forecast (NCWF) product for operational use. The NCWF supplements the convective airmen's meteorological information (AIRMETs) and SIGMET products. The NCWF product provides forecasts of significant thunderstorm locations one hour in the future, and is updated every five minutes. This product is available via Internet from AWC's operational server: <http://www.awc-kc.noaa.gov/>.

3.2.4.4 Center Weather Service Unit (CWSU). The CWSU prepares the Center Weather Advisory message for the aviation community which can include severe weather convective SIGMETs for areas less than 3000 square miles.

3.2.4.5 Special Marine Warnings (SMW). The WFOs issue SMWs for hazardous over-water events of short duration (up to 2 hours) and for events inadequately covered by existing marine warnings and forecasts (see Figure 3-7). These events can include convective activity, squalls or wind shift lines, waterspouts, cold air funnels and other localized short-lived phenomena.

3.2.5 Notification of Military Installations. Selected military installations whose weather units are not staffed by forecasters, whose radars are inoperative, or whose Operational Weather Squadron can not support them will be notified by the NWS when severe convective weather is expected to affect them. The notification will be performed by selected NWS offices that have radar or other information available. Notification will be via NOAA Weather Radio (NWR) Warning Tone Alert for those sites within the receiving area. This is the most rapid notification available. Otherwise, notifications will be according to "alerting agreements" between the DOD and NWS offices concerned. Such written agreements are initiated by the military weather units, but require approval of the NWS WFO Meteorologist-in-Charge or the River Forecast Center (RFC) Hydrologist-in-Charge and the military unit commander or Officer in Charge before they can go into effect. See Appendix A for a recommended format for the written agreement. Appendix B contains a partial list of military bases and corresponding WFOs that may be interested in this notification.

The service to be provided is a wake-up/alerting service to cover severe convective weather occurrences with short lead times, i.e., those developments that the normal alerting system may miss. No other service will normally be required. As appropriate, radar data may be exchanged. If NWR services are not available, telephone notification is authorized. Notification will be made to one telephone number only and only one call will be made. However, if the line is busy, one additional call will be made. The notification will be made after the news media and Civil Defense authorities have been notified according to the NWS' present warning dissemination procedures and priorities. The agreement will specify the hours during which the alerting service is to be provided.

3.3 DOD Watch/Warning Procedures.

3.3.1 USAF. The Air Force provides weather warning support for both the Air Force and Army, including both active and reserve components. All sites are warned for moderate thunderstorms, severe thunderstorms, and tornadic thunderstorms. Those sites where a lightning

strike could lead to catastrophic damage, as during ground refueling of aircraft, receive warnings for general thunderstorms. A lead time of 2 hours is required for severe thunderstorms, 30 minutes for tornadoes, and 30 minutes (prior to a thunderstorm within 5 nm) for lightning watches. Lightning warnings are issued when lightning is observed within 5 nm.”

3.3.1.1 AFWA. The CONUS Severe Forecasting Operations at HQ AFWA issues Point Weather Warnings (PWWs) for 350 locations, including Air Force and Army Guard and Reserve locations, the White House, and the Pentagon. They also prepare Military Weather Advisories (MWAs) but will transition from MWAs to providing threat assessments to assist OWSs providing regional MWAs.

3.3.1.2 Operational Weather Squadrons (OWSs). The Air Force created OWSs at Shaw AFB, SC; Barksdale AFB, LA; Scott AFB, IL; Davis Monthan AFB, AZ; and Elmendorf AFB, AK and is forming a squadron at Hickam AFB, HI. These squadrons serve as regional forecasting hubs. These squadrons (except Hickam AFB until operational) currently provide PWW support for active duty Air Force and Army installations within their areas of responsibility. They also provide regional MWAs. In the near future, they will assume all PWW responsibility for all Air Force and Army installations in their areas of responsibility.

3.3.1.3 Local Unit Warning. At those locations where a USAF forecaster is on duty, the forecaster has final responsibility for warning those agencies being supported. The criteria and lead time for such local warnings are established locally, based on customer needs.

3.3.2. USN and USMC. Navy Theater Meteorology and Oceanography (METOC) Command Centers and Detachments, and Marine Corps weather activities are responsible for the timely dissemination of hazardous or destructive weather warnings via designated area commands and activities as directed by the local area commander. In addition to internally prepared warnings, they shall appraise the commands and activities they support of NWS Bulletins affecting local interests. If USN and USMC weather activities are not available, full use should be made of storm warning information disseminated by other agencies (e.g. NWS, USAF, and local foreign meteorological services). In the U.S., NWS Bulletins are often heard first over television or radio, therefore prior familiarity with their terminology will enhance their value and avoid confusion when Warning Conditions are normally set by the local area commanders. For severe local storms, Conditions II and I are used to avoid or minimize loss and damage due to destructive weather phenomena and are based on all available weather information.

3.3.2.1 Condition II. Destructive winds accompanying the phenomena indicated are expected in the general area within 6 hours. Associated lightning/thunder, torrential rain, hail, severe downbursts, and sudden wind shifts are possible. Take precautions that will permit establishment of an appropriate state of readiness on short notice.

3.3.2.2 Condition I. Destructive winds accompanying the phenomena indicated are imminent or are occurring. Associated lightning/thunder, torrential rain, hail, severe downbursts, and sudden wind shifts are possible. Take immediate safety precautions and shelter.

3.4 Backup Operations for SPC and AWC. The SPC, AWC and AFWA have agreed that the AFWA will provide limited backup capability for both SPC and AWC. Appendix C specifies the agreed to severe weather forecast and aviation products that AFWA will produce when required to backup either SPC or AWC. The coordination channel for backup plans and procedures and for exchange of data and products among SPC, AWC and AFWA shall be between the Commander, AFWA, and the Director, SPC or AWC, as appropriate. Unresolved differences will be worked out between the Director, NCEP and the Commander, AFWA.

MKCSWODY2
ACUS2 KMKC 171714
STORM PREDICTION CENTER NORMAN OK

DAY 2 CONVECTIVE OUTLOOK...REF AFOS NMC GPH980.

VALID 231200Z - 241200Z

THERE IS A SLGT RISK OF SVR TSTMS TO THE RIGHT OF A LINE FROM
35 ESE GAG END FSM PBF MLU LFK AUS 50 NNW SAT ABI LTS 35 ESE GAG.

GEN TSTMS ARE FCST TO THE RIGHT OF A LINE FROM PSX SAT ABI BGS CNM
4CR RTN LIC SNY MHN OFK CID SPI 25 SSE MDH DYR GWO HEZ 25 S LCH.

UPPER LOW OVER AZ IS FORECAST TO MOVE EASTWARD ON THURSDAY ACROSS
THE CENTRAL PLAINS AND INTO THE UPPER MS VALLEY. ASSOCIATED
SURFACE LOW SHOULD TRACK ACROSS OK DURING THE DAY...WITH WARM
FRONT EXTENDING SOUTHEASTWARD INTO LA. MEANWHILE...SURFACE DRYLINE
WILL MIX EASTWARD INTO NORTHEAST TX BY AFTERNOON. THE TRIPLE-POINT
OF THE DRYLINE AND WARM FRONT MAY BE THE PRIMARY FOCUS FOR SEVERE
THUNDERSTORM THREAT ON THURSDAY.

...NORTH-CENTRAL TX THURSDAY MORNING...

SCATTERED THUNDERSTORMS ARE EXPECTED TO BE ONGOING AT THE
BEGINNING OF THE PERIOD OVER CENTRAL TX AND SOUTHERN OK. STRONG
WIND FIELDS AND RELATIVELY STEEP LAPSE RATES MAY SUPPORT ISOLATED
STRONG/SEVERE STORMS WITH DAMAGING WINDS AND HAIL. THIS ACTIVITY
SHOULD SLOWLY WEAKEN THROUGH THE DAY AS IT MOVES NORTHEASTWARD
WITH WARM FRONT ACROSS OK INTO AR.

...NORTHEAST TX AND SOUTHEAST OK...

AMPLE MOISTURE IS IN PLACE ACROSS CENTRAL/ SOUTH TX WHICH SHOULD
SPREAD RAPIDLY NORTHWARD. CLOUDINESS WILL LIMIT HEATING...BUT
FORECAST SOUNDINGS IN NORTHEAST TX SUGGEST THAT CAPE VALUES OF
1000-1500 J/KG ARE LIKELY. SHEAR PROFILES WILL ALSO BE QUITE FAVORABLE IN
THIS REGION WITH 6KM SHEAR OVER 50 KNOTS AND 3KM HELICITY VALUES
AROUND 200 M2/S2. ISOLATED SUPERCELL DEVELOPMENT MAY OCCUR IN THIS
REGION...ESPECIALLY NEAR WARM FRONT/DRYLINE TRIPLE-POINT DURING THE
AFTERNOON WITH THREAT OF LARGE HAIL AND ISOLATED TORNADOES.

...CENTRAL OK...

MID LEVEL DRY SLOT IS EXPECTED TO SWEEP ACROSS WESTERN/CENTRAL OK
DURING THE DAY...WITH DAYTIME HEATING AND RAPID MID LEVEL COOLING
EXPECTED. REGION OF STEEP LAPSE RATES AND MARGINAL INSTABILITY MAY
RESULT IN ISOLATED THUNDERSTORM DEVELOPMENT DURING THE AFTERNOON...
WITH POTENTIAL FOR HAIL IN STRONGER STORMS. ACTIVITY SHOULD
DIMINISH QUICKLY AFTER SUNSET.

..HART.. 03/22/00

NOTE: THE NEXT DAY 2 OUTLOOK IS SCHEDULED FOR 0800Z

Figure 3-1. An example of a NWS Severe Weather Outlook. Note: in the product's WMO header, 1 stands for the Day One Outlook, 2 stands for the Day Two outlook.

WWUS9 KMKC 251710
MKC WW 251710
KSZ000-260100-

URGENT - IMMEDIATE BROADCAST REQUESTED
TORNADO WATCH NUMBER 183
NATIONAL WEATHER SERVICE NORMAN OK
1210 PM CDT FRI FEB 25 2000

.A...THE STORM PREDICTION CENTER HAS ISSUED A TORNADO WATCH FOR
PARTS OF CENTRAL AND EASTERN KANSAS

EFFECTIVE THIS FRIDAY AFTERNOON AND EVENING UNTIL 800 PM CDT.

THIS IS A PARTICULARLY DANGEROUS SITUATION WITH THE POSSIBILITY OF VERY DAMAGING
TORNADOES. ALSO LARGE HAIL...DANGEROUS LIGHTNING...AND DAMAGING THUNDERSTORM
WINDS CAN BE EXPECTED.

THE TORNADO WATCH AREA IS ALONG AND 65 STATUTE MILES EAST AND WEST OF A LINE FROM 45
MILES EAST SOUTHEAST OF MEDICINE LODGE KANSAS TO 45 MILES NORTHEAST OF CONCORDIA
KANSAS.

REMEMBER...A TORNADO WATCH MEANS CONDITIONS FAVOR TORNADOES AND SEVERE
THUNDERSTORMS IN AND CLOSE TO THE WATCH AREA. PERSONS IN THESE AREAS SHOULD BE ON
THE LOOKOUT FOR THREATENING WEATHER CONDITIONS AND LISTEN FOR LATER STATEMENTS
AND POSSIBLE WARNINGS.

DISCUSSION...WARM MOIST UNSTABLE AIR MASS IN PLACE OVER WESTERN
KANSAS WITH MUCAPES NOW AROUND 2000 TO 3000 J/KG. UPPER FORCING WILL
INCREASE AS UPPER TROUGH APPROACHES REGION. 30 TO 40 KT LOW LEVEL JET UNDER 50 TO 60
KT MID LEVEL FLOW WILL RESULT IN FAVORABLE SHEAR FOR AT LEAST ISOLATED DESTRUCTIVE
TORNADOES AND SCATTERED LARGE HAIL AND DAMAGING DOWNBURSTS.

AVIATION...TORNADOES AND A FEW SEVERE THUNDERSTORMS WITH HAIL SURFACE AND ALOFT
TO 3 INCHES. EXTREME TURBULENCE AND SURFACE WIND GUSTS TO 75 KNOTS. A FEW
CUMULONIMBUS WITH MAX TOPS TO 600. MEAN WIND VECTOR 23040.
...ROGASH

Figure 3-2. An example of a redefined NWS Public Watch bulletin issued by SPC.

MKCWWAKMKC
NWUS8 KSPC 222100
MKC WWA 222100
TXZ000-222100

STATUS REPORT #1 ON WW 108

VALID 222000Z - 222100Z
SEVERE WEATHER THREAT CONTINUES ACROSS THE ENTIRE WATCH AREA.

..RACY.. 03/22/00

Figure 3-3. An example of a NWS Watch Status message issued by SPC.

WWUS40 KMKC 041913
MKC AWW 041913
WW 689 SEVERE TSTM NY 042000Z - 050200Z
AXIS..90 STATUTE MILES EITHER SIDE OF LINE..
40ESE BGM/BINGHAMPTON NY/ - 15WNW MSS/MASSENA NY/
..AVIATION COORDS.. 80NM EITHER SIDE /38NE AVP - 55NW SLK/
HAIL SURFACE AND ALOFT..2 ½ INCHES. WIND GUSTS..70 KNOTS.
MAX TOPS TO 450. MEAN STORM MOTION VECTOR 270/30.

Figure 3-4. An example of a NWS Aviation Watch bulletin issued by SPC.

RDUTORMHX
TTAA00 KMHX 061730
NCC013-147-061815-

BULLETIN - EAS ACTIVATION REQUESTED
TORNADO WARNING
NATIONAL WEATHER SERVICE NEWPORT/MOREHEAD CITY NC
130 PM EDT TUE MAY 6 1997

THE NATIONAL WEATHER SERVICE IN NEWPORT/MOREHEAD CITY
HAS ISSUED A

- * TORNADO WARNING FOR...
PITT COUNTY IN EASTERN NORTH CAROLINA
BEAUFORT COUNTY IN EASTERN NORTH CAROLINA
- * UNTIL 215 PM EDT
- * AT 130 PM EDT...NATIONAL WEATHER SERVICE DOPPLER
RADAR INDICATED A TORNADO 5 MILES NORTH OF
WINTERVILLE...MOVING TO THE EAST AT 20 MPH.
- * THE TORNADO IS EXPECTED TO BE NEAR...
SIMPSON AT 140 PM EDT
GRIMESLAND AT 145 PM EDT
WASHINGTON AT 155 PM EDT

PERSONS IN OR CLOSE TO THE WARNED AREA...TAKE SHELTER IN
A BASEMENT OR SMALL INTERIOR ROOM...AWAY FROM WINDOWS.

Figure 3-5. An example of a NWS WFO Warning bulletin in the format used for tornado, severe thunderstorm, and flash flood warnings.

MKCC WST 231855
CONVECTIVE SIGMET 20C
VALID UNTIL 2055Z
ND SD
FROM 90W MOT-GFK-ABR-90W MOT

INTSFYG AREA SVR TSTMS MOVG FROM 2445. TOPS ABV 450. WIND GUSTS TO 60 KT RPRTD.
TORNADOES...HAIL TO 2 IN...WIN GUSTS TO 65 KT PSBL ND PTN.

CONVECTIVE SIGMET 21C
VALID UNTIL 2055Z
TX
50SE CDS
ISOLD SVR TSTM D30 MOVG FROM 2420. TOP ABV 450.
HAIL TO 1 ½ IN...WIND GUSTS TO 60 KT RPRTD.
HAIL TO 2 IN...WIND GSUST TO 65 KT PSBL.

OUTLOOK VALID 232055-230055
AREA 1...FROM INL-MSP-ABR-MOT-INL
SVR TSTMS CONT TO DVLP IN AREA OVER ND. AREA IS EXPCD TO
RMN SVR AND SPREAD INTO MN AS STG PVA MOVES OVR VERY
UNSTBL AMS CHARACTERIZED BY -12 LIFTED INDEX.

AREA 2...FROM CDS-DFW-LRD-ELP-CDS
ISOLD STG TSTMS WILL DVLP OVR SWRN AND WRN TX THRUT FCST
PD AS UPR LVL TROF MOVES NEWD OVR VERY UNSTBL AMS.
LIFTED INDEX RMNS IN THE -8 TO -10 RANGE. DRY LINE WILL BE THE FOCUS OF TSTM DVLPMT.

Figure 3-6. An example of a NWS Convective SIGMET issued by AWC.

WMUS1 KLAX 062150
SMWLAX
PZZ650-062300-

BULLETIN - EAS ACTIVATION REQUESTED
SPECIAL MARINE WARNING
NATIONAL WEATHER SERVICE OXNARD CA
250 PM PDT WED AUG 6 1997

THE NATIONAL WEATHER SERVICE IN OXNARD HAS ISSUED A

- * SPECIAL MARINE WARNING FOR...
THE EAST SANTA BARBARA CHANNEL
FROM PT CONCEPTION TO PT MUGU INCLUDING SANTA CRUZ ISLAND
- * UNTIL 400 PM PDT
- * AT 245 PM PDT...NATIONAL WEATHER SERVICE DOPPLER RADAR
INDICATED STRONG THUNDERSTORMS DEVELOPING BETWEEN OXNARD
AND SANTA CRUZ ISLAND...MOVING TO THE NORTHWEST AT 20 MPH.
- * THE THUNDERSTORM THREAT WILL BE GREATEST FROM...
OXNARD TO EAST SANTA CRUZ ISLAND BY 300 PM PDT WEST SANTA
CRUZ ISLAND TO SANTA BARBARA HARBOR BY 330 PM PDT

THESE THUNDERSTORMS WILL PRODUCE WIND GUSTS TO 40
KNOTS...ROUGH SEAS AND NEAR ZERO VISIBILITY. BOATERS IN
AST SANTA BARBARA CHANNEL SHOULD TRY TO SEEK SAFE HARBOR.

Figure 3-7 An example of a NWS Special Marine Warning bulletin issued by WFOs.