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SUPPORT TO AIR TRAFFIC CONTROL FACILITIES

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SUMMARY OF REVISIONS: Supersedes NWSI 10-803 "Support to Air Traffic Control Facilities" dated January 26, 2010. This instruction details the procedures NWS Weather Forecast Offices (WFOs), Alaska Aviation Weather Unit (AAWU), and Center Weather Service Units (CWSUs) use to provide weather support to the Federal Aviation Administration (FAA) Air Traffic Control Facilities. Several changes have been made to this document to better explain, streamline, and reflect the support services NWS will provide.
-Chapter 2: now has an additional statement to give CWSUs the flexibility to meet the needs of their on-site FAA partner per local request.
-Chapter 4: now includes space weather as a meteorological concern.
-Chapter 5: several changes. It is now aligned with current Interagency Agreement (IA) and includes a few new support services to be provided at the CWSU.
-Chapter 6: was updated to show the TMO (Traffic Management Officer) as the point of contact for the CWSU MIC (Meteorologist-In-Charge) per current IA.
-Chapter 7.3 and 7.4: new. Was rewritten to provide more guidance and standardization to the products the CWSU issues.
-Chapter 7.5: new. Added new required services being performed at some CWSUs.
-Chapter 7.6: new. Updated to provide more guidance on how to coordinate.
-Chapter 9: new. Provide back-up procedures in the body of the document instead of having them in appendix.
-Chapter 10: new. Quality Assurance measurements being placed on the CWSU.

//Signed// February 27, 2012

David Caldwell Date

Director, Office of Climate, Water, and Weather Services

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1. <u>Purpose</u>. This directive provides general procedures for National Weather Service (NWS) meteorological support to Federal Aviation Administration (FAA) Air Traffic Facilities. Specific guidelines are provided for NWS participation in jointly (FAA/NWS) operated weather service facilities.

2. <u>General</u>. NWS support is designed to improve aviation safety and enhance efficient flow of air traffic by forecasting and monitoring adverse weather. Efficiency is affected by maintaining close coordination with traffic managers whose decisions affect the flow of air traffic through the National Airspace System (NAS).

Any local request from FAA personnel to deviate from this document needs to be requested in writing. No deviation from this document is allowed in the "Quality Assurance" section (Chapter 10). The written documentation needs to be from the Air Traffic Manager (ATM) and Traffic Management Officer (TMO) at the Air Route Traffic Control Center (ARTCC) to the Center Weather Service Unit (CWSU) Meteorologist-In-Charge (MIC) and Aviation Service Branch Chief or designee.

3. <u>Background</u>. NWS meteorologists in Center Weather Service Units (CWSU) and FAA Traffic Management Unit (TMU) specialists are components of joint FAA/NWS units directly supporting the FAA's 21 Air Route Traffic Control Centers (ARTCC). NWS personnel work as a team with FAA Air Traffic Control (ATC) specialists assigned to the TMU. The TMU specialists, Traffic Management Coordinators (TMCs) and Supervisory Traffic Management Coordinators (STMCs), are the designated interface between CWSU meteorologists and ARTCC controllers, FAA facilities within the ARTCC area of responsibility, and CWSU product users. They provide information critical to the safe and efficient flow of air traffic and serve the NAS directly. CWSU forecasters provide meteorological consultation, forecasts, and advice to ARTCC managers, staff, and other supported FAA facilities and activities, regarding weather impact on their missions, equipment outages and repairs, and FAA staffing. In the event that assigned resources make it impossible to accomplish all of the assigned duties, the CWSU staff should work with the TMU, and refer to the local Station Duty Manual (see NWSI 10-1608 *Station Duty Manual)* for guidance, to determine which task(s) are most important.

CWSU staff members provide meteorological training for ARTCC personnel. The CWSU is also the liaison between FAA facilities and other NWS offices in its area. CWSU meteorologists may assist in the distribution of weather forecasts, advisories, and warnings issued by other NWS

offices. Complete details of the relationship between the FAA and the CWSU are contained in an interagency agreement.

Weather support is accomplished through various products and verbal briefings describing weather conditions (forecasts or observations) which may affect air traffic flow or operational safety in the ARTCC's portion of the NAS (the CWSU area of responsibility), and in other locally-defined, special operations areas (e.g., offshore helicopter operations areas). Additionally, the CWSU provides advisories of hazardous weather conditions for airborne aircraft. These advisories are disseminated through NWS and FAA communications systems and are available to both internal FAA and external aviation users. The CWSU meteorologists should remain cognizant of FAA requirements and procedures to adequately perform these tasks.

4. Air Traffic Meteorological Concerns. Aviation operations impacted by adverse weather places increased demands on the FAA Air Traffic resources that facilitate safe and efficient use of airspace and airports. FAA personnel need the best weather information available to enhance their mission of supporting aviation operations. Required weather information includes, but is not limited to, the following:

a. Convective weather including thunderstorm timing, tops, movement, intensity, and character such as broken and solid lines or large clusters

b. Operationally significant ceilings/visibility

c. Cloud tops

d. Winds and temperatures, surface and aloft

e. Wind shear

f. Operationally significant pressure changes

g. Precipitation intensity and type

h. Turbulence

i. Icing

j. Volcanic ash

k. Space Weather

The specific operational situation dictates the significance of any particular aviation weather phenomenon.

5. Support To Air Traffic Facilities.

5.1 Air Traffic Facilities.

a. ARTCC. ARTCCs provide ATC service to aircraft operating on Instrument Flight Rules (IFR) flight plans within controlled airspace, principally during the en route phase of flight. When equipment capabilities and controller work load permit, certain advisory and assistance services may also be provided to Visual Flight Rules (VFR) aircraft.

The Traffic Management Officer (TMO), or designee per interagency agreement, of each ARTCC has operational responsibility for the collocated CWSU. The TMO, or designee per interagency agreement, oversees CWSU operations and brings any special local weather support requirements to the attention of the CWSU Meteorologist in Charge (MIC).

b. TMU. The TMU in an ARTCC is responsible for the management of facility air traffic. The TMU is usually under the direct supervision of the TMO.

c. Airport Traffic Control Tower (ATCT). The ATCT is an airport terminal facility which uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport. The ATCT authorizes aircraft to land or take off at the airport it controls or to transit the associated airspace regardless of flight plan or weather conditions. An ATCT may also provide approach control services (radar or non-radar).

d. Terminal Radar Approach Control (TRACON) Facility. The TRACON is a terminal ATC facility usually located within the vicinity of an airport. The TRACON controls approaching and departing aircraft.

e. Automated Flight Service Station (AFSS) and Flight Service Station (FSS). Provide information, services and weather to pilots in preflight briefings and during enroute travel. Typically information covered by AFSS/FSS will be notice-to-airmen (NOTAMs), the filing, opening, and closing of flight plans, monitoring navigational aids (NAVAIDs) for operational use and disseminating pilot reports. The CWSU will provide briefing support to AFSS as requested.

5.2 <u>CWSU Support</u>. The CWSU meteorologist provides direct support to ATC operations. The CWSU meteorologist:

a. Provides meteorological forecasts, information and briefings in support of ATC operations;

b. Issues Center Weather Advisories (CWAs) and Meteorological Impact Statements (MISs) as conditions warrant, In Accordance With (IAW) this directive;

c. Solicits pilot reports (PIREPs) through the ATC work force

d. Advises FAA personnel on conditions meeting urgent PIREP criteria within 150 nautical miles of the ARTCC boundaries to proper FAA personnel.

e. Collaborates with local WFOs and Aviation Weather Center (AWC) on aviation products as requested including participation in TAF coordination and in collaborative decision making sessions, such as the Collaborative Convective

Forecast Product (CCFP) respectively;

f. Participates in weather discussions with ATC personnel as required, and with Air Traffic Control System Command Center (ATCSCC) personnel as requested;

g. Provides meteorological forecasts and information to pilots in contact with the ARTCC through appropriate ARTCC personnel;

h. Assists in backing up an adjacent CWSU if requested (see Appendix B);

i. Conducts weather training and product familiarization sessions for ARTCC personnel; and

j. Coordinates duty priorities with the ARTCC and TMU

k. Produce TRACON Approach and Arrival Gate Forecast for the 8 TRACONs listed here (http://www.aviationweather.gov/cwsu) or per local request.

l. Provide weather information to government pilots as requested

5.3 WFO, AWC And Alaska Aviation Weather Unit (AAWU) Support. WFOs (and AAWU for Alaska) provide collaborative and technical expertise in support of the CWSU Meteorologists' mission. During the hours the CWSU is closed, provide direct meteorological support through advice and consultation to the TMU and any ATCTs IAW local agreements. Support consists of:

a. Assisting the CWSU and/or ARTCC during in-flight emergencies;

b. Providing the ARTCC with forecast services and critical weather updates as needed during the hours the CWSU is closed; and

c. Providing Information Technology (IT) and IT security support for the CWSUs. NWS Regional Headquarters (RH) may choose to provide this support for CWSUs in their local area.

6. CWSU Lines Of Authority. The supporting WFO's MIC is the first line supervisor of the CWSU MIC and is responsible for supporting the operations of the CWSU. The WFO MIC provides administrative, IT and training support to NWS personnel at the CWSU. In Alaska, the AAWU MIC is the first line supervisor of the CWSU's MIC. The supporting MIC's FAA contact at the ARTCC is the TMO or their designee.

The supporting MIC should ensure all WFO forecasters are aware of CWSU services and have a general knowledge of ARTCC meteorological needs. Forecaster exchanges between WFOs and CWSUs are encouraged. Further, NWS meteorologists are encouraged to visit ARTCCs, ATCTs, TRACONs, and AFSS/FSSs as part of their aviation training.

The supporting WFO/AAWU MIC or their designee monitors and evaluates the various aviation weather services between relevant NWS and FAA facilities. Service, product, data, or data exchange deficiencies should be documented and forwarded to the respective NWS Regional

Meteorological Services Division (MSD) or their equivalent (known hereafter as regional MSD),

The supporting MIC or their designee are encouraged to make semi-annual visits to the CWSU, and send a written report of each visit to the regional MSD with copies to the CWSU MIC, the TMO, and Aviation Services Branch of the Office of Climate, Water, and Weather Services (OCWWS), NWSH via the home region MSD.

6.1 CWSU MIC Responsibilities. The CWSU MIC is the first line supervisor for assigned CWSU meteorologists. In this position, the CWSU MIC:

a. Serves as NWS liaison to the supported ARTCC and is responsible for ensuring all CWSU services are provided to the FAA;

b. Has oversight of CWSU service obligations, labor-management relations, meteorological training for CWSU staff, and specified training for ARTCC staff;

c. In agreement with the ARTCC TMO (or a designee with responsibility for CWSU operational oversight), establishes CWSU meteorologist duty hours IAW the IA and the NWS Collective Bargaining Agreement and implements procedures and policies detailed in this instruction and compatible or approved alternate instructions to meet special local requirements; and

d. Works with the ARTCC TMO to arrange access to office supplies, internet and voice communications, and other day-to-day necessities for the CWSU office.

It may be necessary to change or amend the CWSU meteorologist's duty hours. Duty hours may change permanently or temporarily depending on the circumstances. There are two primary reasons CWSU duty hours may need to be changed: (1) Operational need and/or (2) staffing shortages. The following is a guideline of how changes to duty hours should be communicated:

1. Permanent (long term): The CWSU MIC (or acting) will ask for written notice of the change from the TMO and then coordinate the change with the WFO/AAWU MIC.

2. Temporary (short term): The CWSU MIC (or acting) will request changes due to staffing directly to the TMO. The TMO will request changes due to weather directly to the CWSU MIC (or acting).

3. Temporary (longer term): The CWSU MIC (or acting), WFO/AAWU MIC and the FAA ARTCC TMO will discuss temporary changes to the CWSU's duty hours from short staffing. If all parties agree, the hours may be changed.

In all cases, the CWSU MIC will inform the regional MSD or their equivalent of all changes to CWSU duty hours. The regional MSD will notify the National Weather Service Headquarters, Aviation Services Branch.

7. CWSU Operations And Products.

7.1 Product Preparation. Products issued by the CWSU that are available to external users such as the CWA, MIS and products available on CWSU webpages are restricted to the

boundaries of the ARTCC airspace. One exception would be for CWAs. A CWA may be issued to include portions of an adjoining ARTCC airspace after coordination with the other ARTCC CWSU. Products produced for internal use such as WARP graphics may describe conditions outside the ARTCC airspace. When describing conditions outside ARTCC airspace ensure information is consistent with other CWSU/NWS forecasts.

Reference points used in CWAs to describe the location should be the same as those used in SIGMETs and AIRMETs (See NWSI 10-811 *En route Forecasts and Advisories*), or distances from these points. The Miami CWSU uses the following reference points for CWAs, or the associated latitude and longitude coordinates, issued for the Bahama Islands: ZBV (Bimini Island), ZFP (Freeport on Grand Bahama Island), ZQA (Nassau on New Providence Island), ZLS (Stella Maris on Long Island), ZIN (Matthew Town on Great Inagua Island), and GTK (Grand Turk Island).

Forecasters should use the minimum number of points needed to describe the area accurately. Points outside the ARTCC area may be used after coordination with the adjoining CWSUs. Advisories broadcast to aircraft should be kept as brief and concise as possible. All references to distance in the location line of CWA and MIS products are in nautical miles (NM). Line and areal width are in NM.

International Civil Aviation Organization (ICAO) contractions should be used. If an ICAO contraction conflicts with a 3-letter station identifier, then the FAA, NWS or general-use contraction are acceptable. If an ICAO contraction is not available, then either the word should be spelled out or an FAA, NWS or general-use contraction will be used. Only valid contractions may be used and are listed at:
http://www.faa.gov/air_traffic/publications/atpubs/CNT/Cnthme.htm .

Scheduled briefings and products should be developed locally in agreement with the TMO or designee. All users of CWSU briefings and products should be kept aware that CWSU products are not available 24 hours a day.

7.2 Briefings. A CWSU briefing includes current and forecast weather conditions expected in the ARTCC operations area during the upcoming shift, and an outlook for the following shift or, if the CWSU is ceasing operations, the overnight hours. Each briefing should contain sufficient information for ATC and TMU managers to make decisions and appropriate operational adjustments based on weather impacts on the NAS.

A briefing product (alphanumeric or graphic) should contain a heading with the ARTCC designator (zzz); CWSU BRIEFING; date and time (UTC) issued; and valid date and time (UTC). For example:

ZKC CWSU BRIEFING 141805Z VALID TIL 151100Z

The following information should be included in each briefing when appropriate. Local requirements may determine the order of the items b-g:

a. Advisories in effect at the time of the briefing; e.g., SIGMETs, AIRMETs, airport weather warnings, CWAs, MISs, etc;

b. Synopsis - discussion of weather systems and their movements;

c. An outlook of en route flight conditions, e.g., convective weather, turbulence, icing, volcanic ash, etc.

d. Terminal weather, i.e., convection, heavy snow, freezing precipitation, low IFR ceiling and/or visibility, and/or operationally significant surface winds, for designated large airports;

e. Wind direction and speed at key flight levels, including jet stream location(s);

f. Freezing level; and

g. Locally required items affecting the ARTCC area of responsibility, e.g., altimeter settings forecast or observed below 29.92 inches or above 31.00 inches.

7.3 Meteorological Impact Statement (MIS)

7.3.1 MIS. The MIS is a non-technical plain language product intended primarily for FAA traffic managers and those involved in planning aircraft routings.

7.3.2 Standardization Of The MIS. The MIS should be a brief non-technical discussion of meteorological events causing the disruption of the safe flow of air traffic. This should be followed by specifics such as what is causing the disruption, area, altitudes and movement. The MIS valid times are determined according to local policy. The MIS is limited to not exceed a 48 hour valid period. When the forecast is no longer descriptive of expected conditions the MIS should be updated. The update should occur as soon as possible according to the local CWSU duty priorities list. The MIS may refer to an on-line graphic, especially for complex situations, using a specific web address and provide a brief description of the weather that is included in the text MIS. MIS products are numbered sequentially beginning at Midnight local time each day. The MIS is disseminated and stored as a "replaceable product". If the expiration time of the MIS is after the closing time of the CWSU, then a "No updates available after ddhhmmZ" message should be included at the end of the MIS text, where dd = date, hh= hour, mm= minutes.

7.3.3 MIS Format. The MIS format consists of an FAA header line, the words "FOR ATC PLANNING PURPOSES ONLY", and the text.

1. Header Line: zzz MIS ii Valid ddtttt-ddtttt

   Zzz is the ARTCC identification (i.e. ZJX),
   MIS is the product type,
   ii is the 2-digit sequential issuance number,
   and ddtttt is the valid beginning and ending date/time UTC.

2. The line immediately below the header line "FOR ATC PLANNING PURPOSES ONLY".

3. The maximum length of the MIS is 4 lines. The MIS is non-technical in nature to convey expected weather and impacts in the clearest and simplest manner possible to the user.

(References to a graphical product on the local CWSU website or aviationweather.gov may be included.)

7.4 CWA

7.4.1 CWA. A CWA is issued for hazardous weather when there is no existing AWC or AAWU advisory in effect. A CWA may also be is issued to supplement an advisory that has already been issued by AWC or AAWU but should not be a restatement of the another product.

7.4.2 Situations When A CWA Should Be Issued. A CWA should be issued when each of the following conditions exist:

1. There is no existing AWC or AAWU advisory in effect.
2. Any of the following condition occur:
    a. Conditions meeting convective SIGMET criteria (see NWSI 10-811)
    b. Icing – moderate or greater
    c. Turbulence – moderate or greater
    d. Heavy and extreme precipitation
    e. Freezing precipitation
    f. Conditions at or approaching Low IFR (See NWSI 10-813)
    g. Surface wind gust at or above 30 knots
    h. Low Level Wind Shear (Surface – 2000 feet)
    i. Volcanic ash, dust storms or sandstorms
    j. Cold air (temperatures -65C or colder from FL180-FL400)
    k. When a hazard has grown significantly outside of the boundary defined by the AWC or AAWU advisory
    l. To upgrade a thunderstorm advisory to include severe thunderstorms
    m. To upgrade an AIRMET to include isolated severe turbulence or icing (If greater than isolated severe turbulence or icing is occurring, then a SIGMET or a new (non-supplementary) CWA should be issued
    n. To define a line of thunderstorms within a larger area covered by the AWC or AAWU advisory
    o. To better define hazards expected at a major terminal already within an AWC or AAWU advisory
3. Anything that in the judgment of the CWSU forecaster will add value to an existing advisory
4. In the forecaster's judgment the conditions listed above, or any others may adversely impact the safe flow of air traffic

7.4.3 CWA Coordination With Other Offices.

1. AWC. Coordination with AWC should take place before issuing a CWA to avoid a duplicate advisory being issued simultaneously by AWC. Coordination may be done via chat or by telephone. If there is no AWC response using chat, then a telephone call should be initiated. Coordination should be with the Convective SIGMET Forecaster for convective CWAs. All other CWAs should be coordinated with the appropriate FA Forecaster.

2. Neighboring CWSUs. When your CWA is drawn such that it crosses into another CWSU's airspace, then the CWA should be coordinated with the impacted CWSU. Also a "Heads-up" coordination should be given when a hazard is expected to move out of your airspace and into a neighboring CWSU. Coordination may be done via chat or by phone. If there is no response using chat, then a telephone call should be initiated.
3. WFO. CWA coordination with WFOs is normally not necessary except to report occurrences of severe weather.

If you are unable to coordinate, issue the CWA and then try to follow-up with the appropriate office after CWA issuance.

7.4.4 <u>CWA Format.</u> The first line of each CWA's FAA communications system header should have an ARTCC identifier immediately followed by a phenomenon Number (1-6). The Phenomenon Number assigned to each meteorologically hazard is distinct. The first event of the local calendar day which requires a CWA should be assigned Phenomenon Number 1. The next CWA issued for a new hazard would be Phenomenon Number 2 and so on. Once all six Phenomenon Numbers have been used, then the next CWA issuance would return to Phenomenon Number 1. Each successive CWA issued for the same hazard retains the same Phenomenon Number.

The issuance time is on the first line. The issuance time is when the CWA becomes valid. When a CWA is issued with some lead time on the event, the time entered is the issuance time. The CWA is valid from the issuance time until the expiration time.

The product identifier is a three digit number on the second line of the product after the issuance time. The first digit is the Phenomenon Number. The second two digits are an issuance number. Issuance numbers should be issued sequentially beginning with 01 and followed by the VALID TIL time. CWAs are limited to not exceed two (2) hours. If the conditions associated with the meteorological hazard are expected to persist beyond two hours, then a remark may be appended to the CWA stating that conditions might continue beyond the expiration time. (i.e. CONDS CONT BYD 2030Z).

The third line contains the location of the hazard and starts with the word "FROM" except when the location is defined by a single point three-letter In Flight Advisory (IFA) points (Appendix E) are used to define the location of the hazard. For lines and polygon defined areas, up to five IFA points may be used. Using a large number of points to make a polygon fit exactly against ARTCC boundaries or another existing advisory is not necessary. Since CWAs are broadcast by ATC Controllers and Flight Service Specialists, using large numbers of IFA points results in additional workload for those broadcasting the CWA and increases the chance for confusion by the users of the CWA. In nearly all cases five or fewer points should be adequate in defining the hazard.

Each IFA point can further be defined by using a direction and distance from the IFA point. The direction may be any of the commonly used 16 points of the compass. For most lines and polygons, the forecaster may round to the nearest 5 miles for IFA points. For single point IFAs, the forecaster may use his or her best judgment in determining whether to round to the nearest 5 miles, or use an exact distance to the point. IFA points should be separated by dashes. The last IFA point used to define a hazard should end the line. Do not use a period or any other

punctuation to end the line. For all hazards defined by two or more points, start with the northern-most point and proceed clockwise with additional points. For lines, define north to south or west to east. For polygon areas, end with the same IFA point you started with. Use the closest IFA points when defining a hazard. For example, use "20S COU" instead of "90WSW STL".

The fourth line is the text line.

1. Lines: NWSI 10-811, Section 6.2.1.a. defines a line of thunderstorms as being at least 60 miles long with thunderstorms affecting at least 40 percent of its length. When defining a line hazard, begin with either "LINE" or "DVLPG LINE". If the line does not meet the definition of at least 60 miles long and 40 percent coverage, then use "DVLPG LINE" if you expect the line to build. Do not use phases such as "LINE OF ISOL TS" or "LINE OF SCT SEV TS" as this may be confusing to the user. Use nautical miles when describing the width of a line.(i.e., DVLPG LINE TS…15NM WIDE). If the line is greater than 20NM wide, then define it as an AREA instead of a line. After the width report line movement followed by tops. After tops additional remarks may be included.

2. Areas: NWSI 10-811, Section 6.2.1.b. defines an area as affecting at least 3000 square miles covering at least 40 percent of the area. When defining an Area, begin with either "AREA" or "DVLPG AREA". If coverage is less that the defined 3000 square miles with 40 percent coverage, then use "DVLPG AREA". If the area was defined using only two points, then a width may be included using nautical miles (e.g. AREA TS…30NM WIDE). Next report the movement of the area followed by the tops. After tops additional remarks may be included. Do not uses phrases such as "AREA OF ISOL TS" that may be confusing to the user.

3. Isolated: Use "ISOL" when using a single point to define a hazard. Begin the CWA with "ISOL" followed by a diameter. Use "DIAM" and the distance across the hazard in nautical miles (e.g. ISOL SEV TS DIAM 10NM). Next report the movement of the area followed by the tops. As a general rule for isolated thunderstorms, only issue a CWA for an isolated severe thunderstorm. Isolated general thunderstorms should not require a CWA unless they are located near a major terminal, an arrival/departure gatepost or any other location where it may significantly impact air traffic operations.

4. Embedded Thunderstorms: When thunderstorms are occurring within a larger area of layered cloudiness, haze or stratiform precipitation they are considered embedded (EMBD). Use the procedures above to define a LINE, AREA or ISOL EMBD TS.

5. Defining Movement: Movement should be in the same format as the SIGMET and Convective SIGMET (NWSI 10-811 Section 6.2.4.f.) (i.e., MOV FROM 26030KT).

6. Reporting Tops: Use the same reporting procedures as for Convective SIGMETs (NWSI 10-811 Section 6.2.4.g.). Tops from 18,000 to 45,000 feet should be reported in thousands of feet and include "FL" (i.e., TOPS TO FL180, TOPS TO FL450). Tops

below 18,000 feet should use a three digit number without the "FL" designator (i.e., TOPS 060, TOPS 170). Tops above 45,000 should be reported as "TOPS ABV FL450".

7. Trends: On the last line of each CWA briefly describe what you expect to occur during the duration of your advisory. (Examples "CONDS EXPECTED TO LAST TIL 13Z THEN IMPROVE TO VFR BY 14Z", "TS COVERAGE EXPECTED TO INCREASE THRU 18Z")

8. For IFR, icing and turbulence CWAs, define the location as an "AREA". Do not define the location as a LINE, ISOL, or EMBD. Try to define the location as an AREA where reports of hazardous conditions have been received or are expected during the valid time of the CWA. This also goes for defining altitudes. Large areas with large altitudes limit the effectiveness of the CWA.

9. CWSUs with an over-water component in the CWA may use latitude and longitude coordinates as defined in NWSI 10-811 *Enroute Forecasts and Advisories*. References to latitude and longitude will be in degrees and minutes as follows: Nnn[nn] or Snn[nn], Wnnn[nn] or Ennn[nn]. Note: a space is placed between latitude and longitude values and a space-hyphen-space between successive points (i.e. N4030 W10530 – N3800 W10400 – N3700 W10700 – N4030 W10530).

10. VTEC coding appends latitude and longitude information to the end of the text portion of a CWA. Certain CWA composition programs incorporate VTEC coding based on the IFA points used in the CWA. Other CWA composition methods do not use VTEC coding. Until VTEC coding becomes widely used in all CWA composition methods, the addition of VTEC coded latitude and longitude information in CWAs is considered optional.

11. When describing levels of precipitation, the following terms should be used to comply with FAA Administrative Order 7110.10: Light (LGT), Moderate (MOD), Heavy (HVY), and Extreme (EXTRM). These terms are applied only to intensity of precipitation; other terms may be applied in modification of icing, turbulence, or thunderstorms.

When including thunderstorms in a CWA or MIS, precipitation may also be included by using only those modifiers listed in the above paragraph. The type of precipitation associated with the thunderstorm (TS) follows the symbol TS.

The symbol TS may be preceded by only one modifier, SEV. If a thunderstorm does not meet the criteria for SEV no modifier should be placed in front of the symbol.

7.4.5 <u>CWA Cancellations.</u> When issuing CWAs for thunderstorms, it is good practice to have the CWA expire at the top of the hour. If a Convective SIGMET is issued it will then replace the CWA as it is about to expire. If a SIGMET or Convective SIGMET is issued for the same hazard where an existing CWA is still valid, then the CWA should be cancelled. The CWA need not be

cancelled if it has less than 15 minutes until it expires, or if it contains additional more specific information than the AWC advisory. To cancel a CWA, issue another CWA using the next higher number in sequence. For example, if CWA 201 is in effect, cancel it by issuing CWA 202. The expiration time for the new CWA should be 15 minutes after the issuance time. The cancellation CWA may contain information referring to other advisories that are replacing the CWA, such as a new Convective SIGMET.

7.5 TRACON Approach And Departure Gate Forecasts

7.5.1 Product/Service Description. TRACON Approach and Departure Gate Forecasts will complement the Collaborative Convection Forecast product by providing greater detail of convective occurrence. TRACON Approach and Departure Gate Forecasts will be developed for the 8 TRACONs listed here (http://www.aviationweather.gov/cwsu) or per local request.

7.5.2 Purpose. TRACON Approach and Departure Gate Forecasts will provide ATCSCC, ARTCC, TMU and TRACON a graphical product for planning air traffic flow safely and efficiently around convection into and out of the TRACON area. The graphic will provide easy to interpret color-coded convective forecasts and allow partners to make more informed decisions regarding the air traffic flow through the NAS.

7.5.3 Audience. The target audience for this graphical product includes the ATCSCC, ARTCC TMU and TRACONs serviced by the CWSU or WFO issuing the product. Other FAA supervisors and controllers will have access to the product through the CWSU website.

7.5.4 Presentation Format. Use any appropriate graphical creation software and then upload to the web. See Figure 7.1.

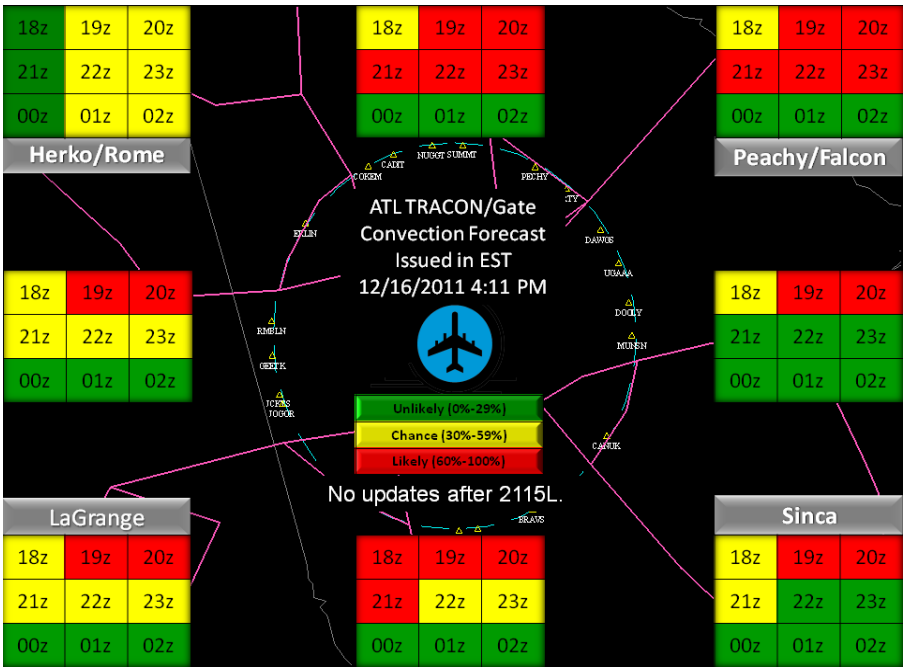


Figure 7.1.

7.5.5 Format And Scientific Basis. The TRACON Approach and Departure Gate Forecast

may be issued daily for the likelihood of convection affecting the air traffic control sectors associated with arrival and departure gates. Convection is defined as moderate or greater precipitation and tops equal to or exceeding FL250. The following values and colors will be used to indicate the likelihood of convection affecting the sector.

Unlikely (0%-29%)	Green	R=0 G=155 B=0
Chance (30%-59%)	Yellow	R=255 G=255 B=0
Likely (60%-100%)	Red	R=255 G=0 B=0

Figure 7.2.

Guidance from the Storm Prediction Center (SPC) and the National Center for Environmental Prediction (NCEP) should be considered. Trends in satellite, lightning and radar data will be considered in addition to the mesocscale analysis and the CCFP forecasts as well as Corridor Integrated Weather System (CIWS) and Consolidated Storm Prediction for Aviation (CoSPA). Collaboration between the CWSU and WFO is necessary to ensure consistent convective forecasts. Forecasters should strive for consistency between this forecast and other convective forecasts.

Forecasts should be 1-hour intervals for a minimum of 6 hours and a maximum of 12 hours. Each hour will have a color associated with the likelihood of convection affecting the sector. See Figure 7.2.

1. A forecast of no convection may be issued when no (0% chance) convection is forecasted in the area for extended periods of time (e.g. winter, strong ridging). This product is a single forecast that can be used to alleviate the workload of the forecaster during times of no convection and should state that the TRACON/Approach and Departure Forecast will be updated when convection is once again expected. See Figure 7.3.

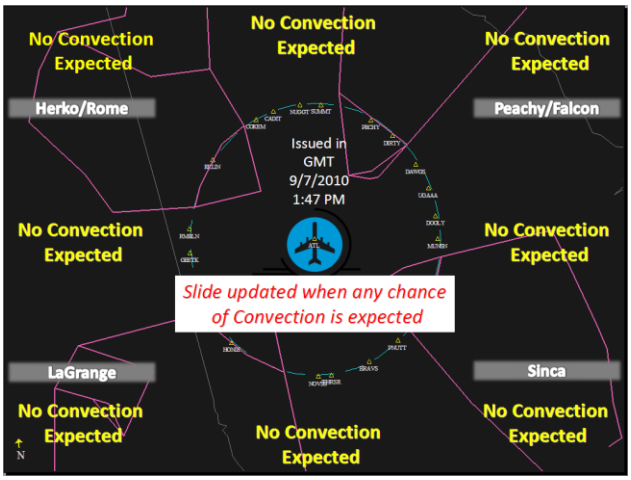


Figure 7.3.

2. The background for the forecast may be generated from the FAA's Performance Data Analysis and Reporting System (PDARS) available at each ARTCC, or other graphics software. Black backgrounds are recommended to reduce controller eye strain in dark control rooms.

3. Automated TRACON/Gate forecast may be developed for the core airports (Fig. 7.4). Automated TRACON/ Approach and Departure Gate convection forecasts may be derived automatically from meteorological models or gridded data produced at the parent WFO, but should follow the same standards as the manually developed products stated above

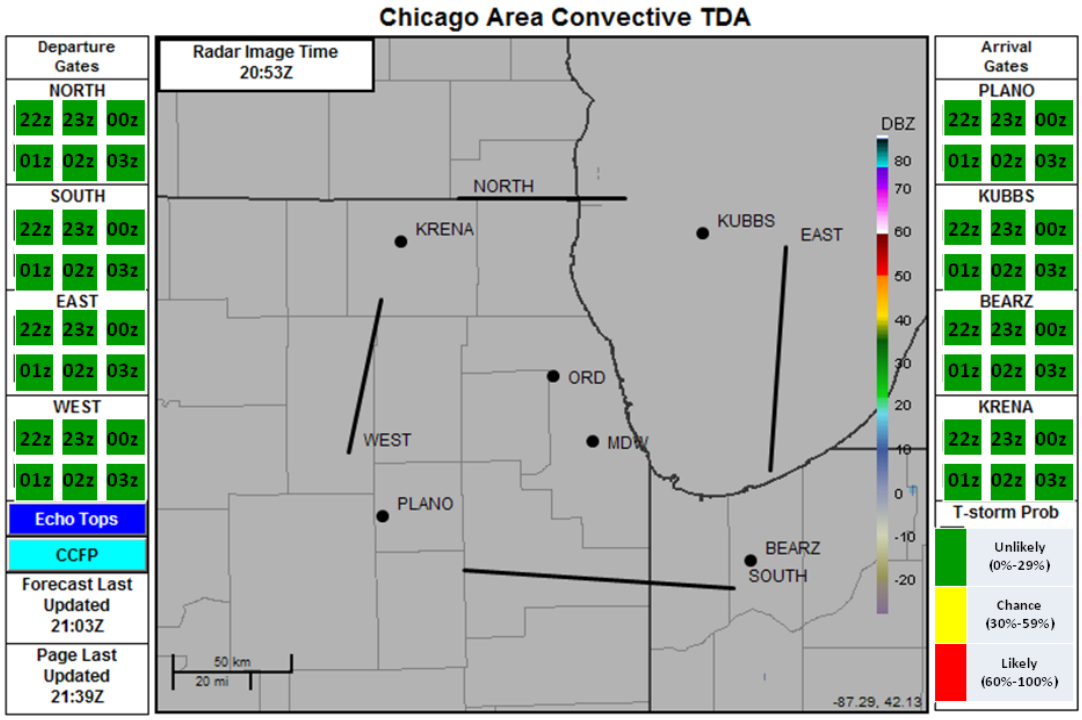


Figure 7.4.

7.5.6 <u>Product Availability</u>. The TRACON Approach and Departure Gate Forecast graphic should be available each morning, afternoon and for the overnight. Recommended times of issuance are 0700L, 1300L and 1900L (at a minimum). If product is valid during a time the CWSU is closed, the product needs to have disclaimer citing product will not be updated until CWSU opens. Additional forecast lengths and product delivery methodology should meet local requirements set forth by ARTCC TMO.

7.5.7 <u>Non-Convective TRACON/Gate Forecasts</u>. Non-convective TRACON Approach and Departure Gate Forecast, such as icing, compression and other hazards, may also be developed to meet local requirements. Established procedures contained in NWS Instruction 10-102 should be followed for each product.

7.5.8 Graphical Weather Impact Products. Graphical Weather Impact products may be developed and used to provide a quick reference to ARTCC users, or augment the official alphanumeric MIS products with specific details as locally determined. A graphical Weather Impact Product should depict significant hazards with clearly defined boundaries.

7.6 Forecast Coordination. Forecast products issued by WFOs, AWC, AAWU, other NCEP centers, and CWSUs often address the same spatial and temporal events. CWSU meteorologists should ensure forecasts, advisories, or information they provide are consistent with other forecast products, whether those products are issued locally or by other NWS offices. Coordination with responsible NWS offices prior to product issuances is important and necessary, especially when those products concern unexpected or suddenly changing observed weather conditions. This coordination prevents or minimizes confusion to end users, reducing impacts to aviation safety. In the interest of preserving forecast consistency, the issuing office's decision on the forecast product is considered final.

The following is an exception:
CWSU meteorologists routinely provide TMU decision-makers with TRACON-area weather briefings. The TRACON-area briefing typically contains high-resolution details on weather conditions expected to occur within the TRACON's airspace.

CWSU personnel should coordinate with personnel at the appropriate WFOs/AAWU/AWC to avoid discrepancies between their TRACON-area weather briefings and the affected forecasts. However, since the TRACON briefing and other aviation forecasts can involve different spatial and time resolution, minor differences may occur.

National Weather Service Chat (NWS Chat) should be used for collaboration between offices whenever possible to allow FAA and airline users to contribute to the collaboration. NWS Chat also provides a permanent written log of the conversation, so entries in other logs may not be needed. Multiple collaborations may also be conducted simultaneously (i.e. WFOs, AWC, users, and adjoining CWSUs).

Occurrences when CWSU/WFO/AAWU/AWC coordination fails to produce a common forecast solution should be documented on the CWSU operations log. In any case, the CWSU meteorologist is the final authority for the TRACON-area weather briefing, the WFO forecaster is the final authority for the TAF, and AAWU/AWC is the final authority for their in-flight advisories and CCFP.

When there are repeated significant forecast differences between the CWSU area weather briefing and other aviation forecasts, the MICs of the CWSU and the WFO(s)/AAWU/AWC should coordinate to resolve the problem.

7.6.1 TAF Collaboration. The TAF for the core airports (http://aspmhelp.faa.gov/index.php/Core_30) is an important part in determining air traffic flow at the terminal and throughout the NAS. Consistency between the TAF and the information provided by the CWSU meteorologist is paramount in providing the FAA with weather information to aid in their decision-making process. The CWSU and WFO MICs should agree to the content, and level of detail, provided in the collaboration process; and keep documentation of that agreement in their respective offices.

For CWSUs with one or more of the core airports in their area of responsibility, the CWSU meteorologist should collaborate on the TAF for each core airport(s) with the WFO meteorologist responsible for issuing the TAF as necessary. The collaboration can be conducted using any method available to the meteorologist (e.g. telephone, chat, etc.) and should include the production of the core collaboration product described in section 7.6.2 below.

7.6.2 <u>Collaborative Core Product</u>. The CWSU meteorologists provide airport-specific operations information for each of the core airports in their area of responsibility to the WFO issuing the TAF. Other airports may be added to this requirement in coordination with the local WFO. This information should be in the form of a core product on the AWIPS Remote Display. This product is designed as a technical communication between qualified meteorologists, and not intended for use by non-meteorologists or the general public.

The CWSU meteorologist should provide, at least once prior to each scheduled TAF issuance (see NWSI 10-813, *Terminal Aerodrome Forecasts*, for TAF issuance times) during the CWSU operational hours, input into the TAF for each of their core airports by sending a collaborative core product to the responsible WFO. The core product should contain a brief discussion of the anticipated weather elements for inclusion in the TAF and weather impacts at the affected airport using the format below. The weather impacts are generally static and for the TAF forecaster's information only. They do not need to be changed with each core product issuance. To minimize workload issues, those CWSUs with multiple core airports should incorporate the information for each core airport into a single core product whenever possible.

CWSUs with operational hours starting at 1100 UTC or later should not provide a collaborative core product to the WFO for the 1200Z issuance unless the meteorologist has adequate time and information to provide input to the WFO. In these cases, and as time allows, the CWSU meteorologist should contact the WFO meteorologist to discuss the TAF.

Example:

```
OEPZFW
CONCERNS…WIND TREND CDFROPA. CDFRNT CRRNTLY NR A ADM-XBP-BKD LN…CONTS TO MOV SEWRD THIS AM.  18Z
STILL LUKS GOOD FOR CDFROPA AT THE DFW TERM. VFR CONDS AHD AND BHND THE FNT WL PRVL THRU THE
AFTN/EVE HRS.ONLY CLDS TO MENTION DURG THIS PD WL BE SCT/BKN CI. AFT 06Z THUR XPECTG TO SEE BKN-
OVC MVFR CIGS DVLP AS ISNETRPC LIFT AT 295K BFNS TO SATURATE THE LWR LYRS PER NMM.

ADDITIONAL/OPTIONAL ELEMENTS

DFW AIRPORT ACCEPTANCE RATE...S FLOW 126.
DFW WX DELAYS/ACFT...NONE.

IMPORTANT NUMBERS FOR DFW (Timing of onset/ending very important)

CIGS        VSBY   ARRIVALS/HR   IMPACT
                     (AAR)
>4000        >6       120+       No ARTCC problems
1000-4000    3-6     112-114     Limited or no vis approaches (NO VAPS)
200-900     1/2-3      96        In-trail spacing needed (MIT)
<200        <1/4      78-84      Significant delays (MIT GDP)
TSRA                   0+        Variable delays (MIT GDP GS)
FZRA/FZDZ                        Major delays for de-icing (MIT GDP GS)
WINDSHIFTS                       Up to 30 minutes of ground/airborne
                                   delays to switch rwys.
CROSSWINDS
20-24KT               114-84     MIT
>25KT                 < 78       MIT GDP

Miles in Trail (MIT)     Ground Delay Program (GDP)     Ground Stop (GS)
```

NWSChat may be used for collaboration between offices in lieu of the core airport product, as long as it meets the requirements stated above. Entries indicating airport operational limitations and weather concerns should be made specific to each core airport and posted prior to mandatory TAF issuance time stated in NWS10-813 during CWSU operating hours. NWSChat also provides a permanent written log of the conversation, so entries in other logs may not be required.

7.7 Support To Enroute Flight Advisory Services (EFAS) And Automated Flight Service Stations/Flight Service Stations (AFSS/FSS). The CWSU in each ARTCC is designated the primary support facility for each associated EFAS facility. CWSUs (and WFOs when CWSUs are closed) should assist the EFAS specialist to the best of their ability. Exchange of weather information can be helpful to both parties since the EFAS staff has access to additional sources of PIREP information.

Shift briefings for AFSS/FSS personnel should normally be done by the CWSU IAW FAA Order 7110.10. Weather support when the CWSU is closed or not available (unless back-up services are in effect) is the responsibility of designated WFOs IAW FAA Order 7110.10. This responsibility ensures the link with a NWS facility able to provide 24-hour support remains clear. Refer any requests for CWSU Pilot Weather Briefings (PWBs) to an AFSS/FSS.

8. Operational Records. The CWSU MIC is responsible for ensuring shift logs are maintained. Information logged should include, but not be limited to, weather discussions, briefings, and equipment functionality. Each entry should record the time, the name or initials of the individual requesting information, and a brief summary of the discussion.

Electronically displayed products generated on AWIPS or any other computerized system should not be printed solely for retention purposes. Worksheets used to update briefings or to supplement other products need not be retained. If the FAA ARTCC requires the CWSU daily operations log or its equivalent be turned over to the FAA as part of a facility record, the CWSU should make a copy of the log to meet NWS retention purposes**.**

8.1 Retention. Logs should be retained in accordance with NOAA policies and practices as stated in NWSI 1-803, *Records Management*. Retain texts of written weather briefings and hard copy graphic records, and copies of the Daily Record of Facility Operation Log (FAA Form 7230-4) or its equivalent prepared by the CWSU for 30 days at the CWSU. After 30 days, copies of all these records should be retained for 5 years at either the CWSU or supporting WFO.

8.2 Protection Of CWSU Records. All requests for copies of weather exhibits or written records prepared by CWSU meteorologists are handled IAW NWSI 10-2003. In the event of an aircraft mishap or accident within the ARTCC's area of responsibility, retention procedures described above should be followed unless otherwise requested by the Manager, Forensic Services, Office of Climate, Water and Weather Services, NWSH. In the event of a major accident, all relevant products prepared by CWSU meteorologists, including available observations, charts, and forecasts, should be collected together. If space is limited in the CWSU work area, the records may be forwarded to the appropriate WFO. These records should be protected and retained in either the CWSU or the WFO for at least 30 days, allowing time to determine:

a. To what extent weather was a factor, and/or

b. What weather information is required for investigation purposes.

After 30 days, follow normal retention procedures unless the Forensic Services manager requests otherwise.

8.3 Statements. Refer to NWSI 10-2004, 10-2005, and 10-2006 for detailed instructions for handling requests for information, including forecaster statements. CWSU meteorologists do not provide written statements concerning a system incident, or an aircraft incident or accident to any government or public offices, agencies, organizations, or individuals outside of NWS without the approval of the Forensic Services manager at NWSH.

There is no requirement to allow anyone that is not part of a government investigation team to question or interview personnel in connection with an aircraft accident, whether in person or over the phone. Refer requests for interviews to the Forensic Services manager at NWSH.

9. Back-Up Of CWSU Operations.

9.1 General. In the event of scheduled and unscheduled CWSU closures, the following plan is recommended to be used for the time a CWSU is closed:

a. Upon request AWC should provide consultation directly to ATCSCC. AWC does not issue CWAs and cannot be expected to perform the duties of the CWSU. In Alaska, the AAWU may provide backup weather support to the Anchorage ARTCC.

b. During CWSU duty hours if a CWSU is non-operational (either unstaffed or for other reasons), for all or part of that time, the adjacent CWSU (or AAWU for Alaska) should provide, if able to do so, back-up CWAs, MISs, briefings, TRACON gates forecasts and other support (if necessary) to FAA facilities such as the ARTCC, TRACONs, ATCTs, and FSS. The back-up pairings can be found in Appendix B. In the event the non-operational CWSU back-up site is unable to assume back-up the non-operational CWSU may contact another neighboring CWSUs to see if they can assume back-up.

If the back-up CWSU is being impacted by weather such that support to the affected CWSU's FAA-supported facilities would cause undue hardship, then support to these facilities would be on an as-requested basis. Such occurrences should be logged with the reason(s) for not providing support.

Restoration of normal service occurs when the affected CWSU is back in operation and no longer needs back-up. Briefings, TRACON Gate forecasts, MISs, and other products may contain different information for each CWSU. Therefore, the CWSU providing back-up may not be able to provide the same range of services that the affected CWSU provided to its ARTCC.

Each CWSU MIC should ensure that their staff is fully trained on their paired CWSUs unique requirements and are capable of performing them. Information exchanges are necessary between CWSU pairs and should include support requirement information about the operational and meteorological differences between the CWSUs should back-up become necessary. Information should be shared as to the type and extent of back-up which is to be provided.

9.2. Notification Procedures. When the CWSU determines it will be unstaffed or non-operational, the CWSU should inform its back-up CWSU, the ARTCC Operations -Manager, supporting WFO, NWS Region MSD, and the AWC forecaster for the region in which the CWSU resides, i.e. FA East, FA Central, FA West, or the AAWU for Alaska. If time permits, the back-up CWSU should call the ATCSCC National Operations Manager when they have assumed responsibility for the affected CWSU.

If the back-up CWSU is unavailable for support, the affected CWSU should call the AWC lead forecaster. The AWC should support the closed CWSU with its own products, except for the CWA, MIS, TRACON Gate forecasts and briefings. No support to other air traffic facilities in the closed CWSU's operational area should be given or expected in this case. NOTE: This occurrence should also be logged with a reason for the backup not being available.

The WFO/AAWU can be considered as a resource for the ARTCC in the event the CWSU is not in operation. The WFO/AAWU cannot provide all the services of a CWSU. The WFO/AAWU can answer questions about the TAF and weather affecting its local terminal as workload permits.

The closing CWSU should issue a MIS specifying which CWSU has backup responsibility, any expected MIS criteria weather, the closing time, and reopening time (if known).

9.3. MIS Example For Back-Up Operations:

FAUS20 KZDV 092112
ZDV MIS 01 VALID 070200-070400
...FOR ATC PLANNING PURPOSES ONLY...
ZDV CWSU WILL CLOSE 07/0200Z DUE TO SHORT STAFFING. ZAB CWSU WILL ASSUME SERVICE BACKUP. ZDV CWSU WILL REOPEN 071230Z.

9.4. Back-Up Exercise: A back up exercise should be performed at least once a year. This exercise should be coordinated with the local WFO, the primary back-up for the CWSU and AWC. The exercise at a minimum should consist of issuing the back-up sites CWAs and checking all phone numbers to make sure they are current.

10. Quality Assurance. The CWSUs should verify the delivery of services to the ARTCC, TRACON, or Tower for decision support. These are the type of forecasts that are provided in person, via telephone or VSCS to the FAA member needing information which will directly impact his or her operational decision.

10.1 Forecast Accuracy. The CWSUs should provide a measure of decision support services for their TMU. This is accomplished using the Forecast Accuracy Matrix available at https://ocwws.weather.gov/cwsu/fam.shtml along with the following guidance.

1. Each CWSU will select one (1) core airport to monitor forecast accuracy and service delivery. In the event that a CWSU does not have a core airport within their area of responsibility, another locally important airport can be used.

2. Operationally significant wind shifts will be tracked by all CWSUs. Every CWSU will provide a monthly report to their Regional Aviation Meteorologist (RAM). The RAM will

compile all reports from his or her region and report to ASB monthly. ASB will track all reports and publish the results to the FAA on a quarterly basis. Operational significant wind shifts for the purpose of this document are defined as a shift in wind speed, direction or combination of that would normally require a runway change. A wind shift is significant if it occurs during peak demand times. It is recommended that peak demand times be determined on a local basis by the CWSU MIC with input from the TMO as times will vary greatly by ARTCC.

10.2 CCFP. The CCFP is issued by the AWC during the convective season (typically March-October) to assist FAA decision makers in planning safe and efficient jet routes throughout the NAS. The product is issued at the top of hour, every two hours, from 0700-0100 UTC. Prior to issuance the producers of the product hold a 30 minute chat session for collaboration and coordination with CWSUs, FAA personnel and airline meteorologists. The chat session begins at 15 minutes past the hour and goes to 15 minutes till the next hour (example 1415z-1445z chat for 15z issuance).

10.2.1 Participation Requirements. Meteorologists at the CWSUs are expected to participate on the CCFP when convection is expected in their area of responsibility. During peak planning times (shown in the table below as chat 1 and chat 2) it is required for all CWSU to participate at least 90% of the time when convection is expected in the SPC Outlook. The chart below also shows what SPC Outlook is in effect to determine if CWSU participation is required.

CWSU	Chat 1	SPC Outlook	Chat 2	SPC Outlook
ZBW, ZNY, ZDC, ZOB, ZID, ZTL, ZJX and ZMA	1415Z	1300Z	1815Z	1630Z
ZAU, ZMP, ZKC, ZME, ZHU and ZFW	1315Z	1300Z	1715Z	1630Z
ZDV, ZAB, ZSE, ZOA, ZLA and ZLC	1715Z	1630Z	2115Z	2000Z

10.2.2 Quality Assurance For CCFP Participation. RAMs will oversee the participation of each CWSU. Participation for this document is considered when the CWSU is logged in to the CCFP Chat and provides at least one comment. Late or missed logins are not considered as participation. If a CWSU has technical difficulties logging into the chat it needs to be reported to the RAM and ASB. The participation scores will be calculated monthly by ASB monthly and sent to the RAMs. This information will also be reported to the FAA on at least a quarterly basis.

10.3 Quality Assurance For CWAs. This illustrates quality control of CWAs. This number

is reported as the number of CWAs with formatting error(s) out of the total number of CWAs issued. The reports are generated by each CWSU MIC evaluating each CWA for proper format, time (beginning and ending), and contractions. Each MIC will report this to their RAM on a monthly basis by the 15th of the following month. The RAM will ensure reports from CWSU MICs are timely and accurate then send to ASB for review. ASB will receive reports from RAMs and send to FAA on at least a quarterly basis.

10.4 Quality Assurance For MISs. This illustrates quality control of MISs. The number is reported as the number of MISs with error(s) out of the total number of MISs including the product length. Each MIC will report this to their RAM on a monthly basis by the 15th of the following month. The RAM will insure reports from CWSU MICs are timely and accurate then send to ASB for review. ASB will receive reports from RAMs and send to FAA on at least a quarterly basis.

10.5 Quality Assurance For Hours Without Service. This illustrates the total number of hours a CWSU is closed and receiving back-up services from another CWSU. In the event a CWSU is closed and back-up is being provided the MIC needs to report how many hours back-up service was provided and why the back-up service was needed (emergency sick leave, short staffing, etc.). Each MIC will report this to their RAM on a monthly basis by the 15th of the following month. The RAM will insure reports from CWSU MICs are timely and accurate then send to ASB for review. ASB will receive reports from RAMs and send to FAA on at least a quarterly basis.

10.6 Quality Assurance For Missed Stand-Up Briefings. This illustrates the number of stand-up briefings not being performed by the CWSU. If a stand-up briefing is missed the CWSU MIC needs to report how many briefings were missed and provide a reason why a briefing was missed (sick leave, limited duty hours, etc.). Each MIC will report this to their RAM on a monthly basis by the 15th of the following month. The RAM will ensure reports from CWSU MICs are timely and accurate then send to ASB for review. ASB will receive reports from RAMs and send to FAA on at least a quarterly basis.

Appendix A
CWSU Support Facility Locations

CWSU		Supporting NWS WFO
ZAB	Albuquerque Center	WFO Albuquerque, NM
ZAN	Anchorage Center	AAWU
ZTL	Atlanta Center	WFO Peachtree, GA
ZBW	Boston Center	WFO Boston/Taunton, MA
ZAU	Chicago Center	WFO Chicago, IL
ZOB	Cleveland Center	WFO Cleveland, OH
ZDV	Denver Center	WFO Denver-Boulder, CO
ZFW	Fort Worth Center	WFO Fort Worth, TX
ZHU	Houston Center	WFO Houston/Galveston, TX
ZID	Indianapolis Center	WFO Indianapolis, IN
ZJX	Jacksonville Center	WFO Jacksonville, FL
ZKC	Kansas City Center	WFO Kansas City/Pleasant Hill, MO
ZLA	Los Angeles Center	WFO Los Angeles/Oxnard, CA
ZME	Memphis Center	WFO Memphis, TN
ZMA	Miami Center	WFO Miami-South Florida, FL
ZMP	Minneapolis Center	WFO Chanhassen, MN
ZNY	New York Center	WFO Upton, NY
ZOA	Oakland Center	WFO San Francisco Bay Area/Monterey, CA
ZLC	Salt Lake City Center	WFO Salt Lake City, UT
ZSE	Seattle Center	WFO Seattle, WA
ZDC	Washington Center	WFO Baltimore/Washington Sterling, VA

Appendix B
CWSU Back-Up Pairings

Station Needing Backup	Station Doing Backup
ZAB	ZDV
ZAN	AAWU
ZTL	ZME
ZBW	ZOB
ZAU	ZID
ZDV	ZAB
ZFW	ZHU
ZHU	ZFW
ZOB	ZBW
ZID	ZAU
ZJX	ZMA
ZKC	ZMP
ZLA	ZOA
ZME	ZTL
ZMA	ZJX
ZMP	ZKC
ZNY	ZDC
ZOA	ZLA
ZLC	ZSE
ZSE	ZLC
ZDC	ZNY

Appendix C
MIS Examples

ZKC MIS 01 VALID 281415-291200
…FOR ATC PLANNING PURPOSES ONLY…
AN UPPER-LVL DISTURBANCE OVER COLORADO IS FCST TO MOVE EAST INTO WRN KS BY 00Z. AS THE DISTURBANCE APCHS WRN KS…TS ARE FCST TO DVLP ALG A DRYLINE EXTENDING FROM WRN KS TO THE TEXAS PANHANDLE. SCT TS FCST TO DVLP 18Z-20Z OVER ZKC W HYS-MMB LINE.

ZAB MIS 02 VALID 281300-290300
…FOR ATC PLANNING PURPOSES ONLY…
AN UPPER-LVL DISTURBANCE OVER COLORADO COMBINED WITH A STRONG JET STREAM MOVING ACROSS THE SWRN U.S. IS FCST TO PRODUCE AREAS OF TURBULENCE ACROSS PORTIONS OF ZAB. THE TURBULENCE IS FCST TO SUBSIDE AFT 00Z AS THE DISTURBANCE AND JETSTREAM MOVE FURTHER EAST.

ZBW MIS 03 VALID 302100-311200
…FOR ATC PLANNING PURPOSES ONLY…
A COLD FRONT IS BECMG STNR FROM WRN PA TO SRN NJ WITH A MOIST NE LOW-LVL FLOW PRODUCING AREAS OF LOW CLOUDS AND FOG. AS THE COLDER AIR DEEPENS AREAS OF ICING ARE FCST TO DVLP. OVER ZBW E BGR-CMK LINE…LGT OCNL MOD RIME ICE DVLPG 00Z-03Z BTN 020 AND 080.

Appendix D
CWA Examples

1. **Line of Thunderstorms:**

ZKC1 CWA 011915
ZKC CWA 101 VALID UNTIL 012000
FROM 65N MCI-30W BUM-45SE ICT
DVLPG LINE TS 10NM WIDE MOV FROM 25030KT TOPS TO FL410. MOD TO HVY PCP IS EXPECTED

ZKC1 CWA 012000
ZKC CWA 102 VALID UNTIL 012100
FROM 70NNE MCI-20W BUM-60W OSW
LINE SEV TS 15NM WIDE MOV FROM 25025KT TOPS ABV FL450. HAIL 1 INCH REP. TS VC KMCI THRU 21Z. ..THIS IS ADDN INFO TO CONVECTIVE SIGMET 55C.

2. **Area of Thunderstorms:**

ZFW2 CWA 021210
ZFW CWA 202 VALID UNTIL 021300
FROM 75W OKC-15S CDS
AREA TS 40NM WIDE MOV FROM 19015KT TOPS TO FL370.

ZFW1 CWA 181227
ZFW CWA 101 VALID UNTIL 181300
FROM 45W ADM -55SW ADM -ABI -40SSE CDS -60E CDS - 45W ADM
AREA TSRA MOV FROM 27020KT TOPS TO FL380. MOD TO HVY PCPN.

3. **Isolated Thunderstorms:**

ZDV3 CWA 172115
ZDV CWA 301 VALID UNTIL 172200
15NW DEN
ISOL TS…DIAM 10NM…MOV FROM 32025KT…TOP FL350. TS VC KDEN THRU 22Z. MICROBURSTS...WIND GUST TO 45KT POSS. ..THIS IS ADDN INFO TO CONVECTIVE SIGMET 70C.

ZAU3 CWA 181405
ZAU CWA 301 VALID UNTIL 181500
45SW ORD
ISOL SEV TS DIAM 15NM MOV FROM 21025KT TOP FL430. HAIL TO 1 INCH WIND GUST 50KT POSS.

4. **Embedded Thunderstorms:**

ZMA4 CWA 181410
ZMA CWA 402 VALID UNTIL 181500
15SSW MIA
ISOL EMBD TS DIAM 10NM MOV FROM 21025KT TOP FL370. TS VC KMIA THRU 15Z WIND GUST 35KT POSS.

5. **Cancel CWA:**

ZFW5 CWA 181305
ZFW CWA 502 VALID UNTIL 181320
CANCEL ZFW CWA 501. SEE CONVECTIVE SIGMET 83C.

ZOB5 CWA 202100
ZOB CWA 503 VALID UNTIL 202115
CANCEL ZOB CWA 502. ICING CONDS HAVE IMPR WITH SEV ICE NO LONGER EXPECTED. SEE AIRMET ZULU.

6. **Turbulence CWA:**

ZID6 CWA 210100
ZID CWA 601 VALID UNTIL 210300
FROM FWA-CVG-PXV-TTH-FWA
AREA OCNL MOD ISOL SEV TURB FL290-350. CONDS MOV NE AND CONT BYD 03Z. THIS IS ADDN INFO TO AIRMET TANGO. ..NO UPDATES AVBL AFT 02Z.

ZOA1 CWA 221400
ZOA CWA 101 VALID UNTIL 221600
FROM RBL-30E FMG-50S CZQ-OAK-RBL
AREA FRQ MOD OCNL SEV TURB FL180-230. CONDS MOV SE AND CONT BYD 16Z.
..THIS IS ADDN INFO TO AIRMET TANGO.

ZNY2 CWA 232100
ZNY CWA 203 VALID UNTIL 232300
FROM HNK-JFK-HAR-HNK
AREA OCNL MOD ISOL SEV TURB BLW 060 AND LLWS. CONDS ENDING BY 23Z.

7. **Icing CWA:**

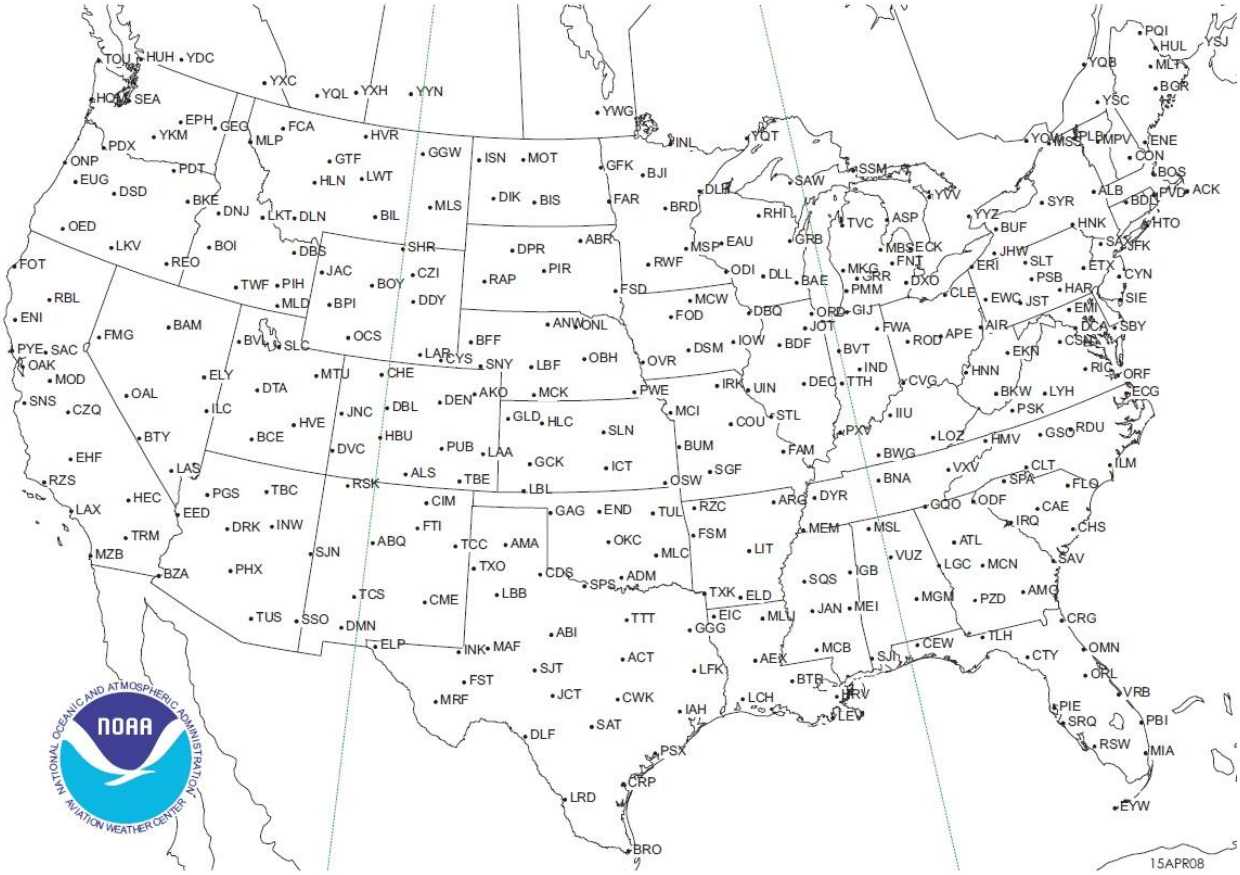
ZMP3 CWA 240010
ZMP CWA 301 VALID UNTIL 240210
FROM INL-EAU-RWF-INL
AREA OCNL MOD ISOL SEV RIME/MX ICE 100-FL180. CONDS MOV E AND CONT BYD 0210Z. ..THIS IS ADDN INFO TO AIRMET ZULU.. ..NO UPDATES

AVBL AFT 0200Z.

ZLC4 CWA 251420
ZLC CWA 401 VALID UNTIL 251620
FROM GGW-SHR-GTF-GGW
AREA OCNL SEV MX/CLR ICE 120-170. CONDS IMPR TO LGT ISOL MOD RIME/MX ICE BY 1620Z. ..THIS IS ADDN INFO TO SIGMET QUEBEC.

8. **IFR/LIFR CWA:**

ZLA5 CWA 261415
ZLA CWA 501 VALID UNTIL 261615
FROM HEC-MZB-50SW LAX-HEC
AREA CIGS BLW 010 VIS BLW 3SM –DZ BR. CONDS CONT BYD 1615Z.

ZDC6 CWA 271500
ZDC CWA 603 VALID UNTIL 271700
FROM ORF-75E ILM-RDU-ORF
AREA OCNL CIGS BLW 005/VIS AOB 1/2SM FG. CONDS ENDING BY 17Z. ..THIS IS ADDN INFO TO AIRMET SIERRA.

Appendix E
Plotting Point Map