



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

November 4, 2020

Specialist's Report

METEOROLOGY

CEN21FA026

Table Of Contents

A.	ACCIDENT	3
B.	METEOROLOGIST	3
C.	DETAILS OF THE INVESTIGATION	3
D.	WEATHER INFORMATION	3
1.0	Synoptic Conditions.....	3
2.0	Surface Observations	4
3.0	Weather Radar	6
4.0	HRRR Model Sounding.....	7
5.0	Satellite Imagery	8
6.0	Pilot Reports.....	9
7.0	Area Forecast Discussion.....	10
8.0	Terminal Aerodrome Forecasts.....	10
9.0	AIRMETs.....	10
10.0	SIGMETs	11
11.0	CWSU Products	11

A. ACCIDENT

Location: Woodbranch, Texas
Date: October 25, 2020
Time: 0837 central daylight time (1337 UTC)¹
Aircraft: Type – Grumman AA5; Registration – N26136

B. METEOROLOGIST

Mike Richards
Senior Meteorologist
Operational Factors Division (AS-30)
National Transportation Safety Board

C. DETAILS OF THE INVESTIGATION

The National Transportation Safety Board's meteorological specialist did not travel in support of this accident investigation and gathered all weather data remotely. Unless otherwise noted, all times are in central daylight time (CDT) for October 25, 2020 (based upon the 24-hour clock), directions are referenced to true north, distances are in nautical miles and heights are above mean sea level (msl). The accident site was located at about: 30.182166° north latitude; 95.19281° west longitude; elevation of about 100 feet.

This report provides information on the weather conditions and forecasts applicable to the accident location around the accident time.

D. WEATHER INFORMATION

1.0 Synoptic Conditions

A southern section of the National Weather Service (NWS) Surface Analysis Chart for 0700 CDT is presented in figure 1. The surface analysis chart identified a low-pressure center of 1007 hectopascals (hPa) over northwestern Texas with a warm front extending southeastward into central Texas. Station models across the accident region depicted overcast conditions and light or calm winds. Mist was observed north of the accident site. Dew point depressions² ranged from 0° to 6° Fahrenheit at stations nearest the accident location.

¹ UTC – abbreviation for Coordinated Universal Time

² The dew point depression is the difference between the temperature and dew point temperature at a certain height in the atmosphere.

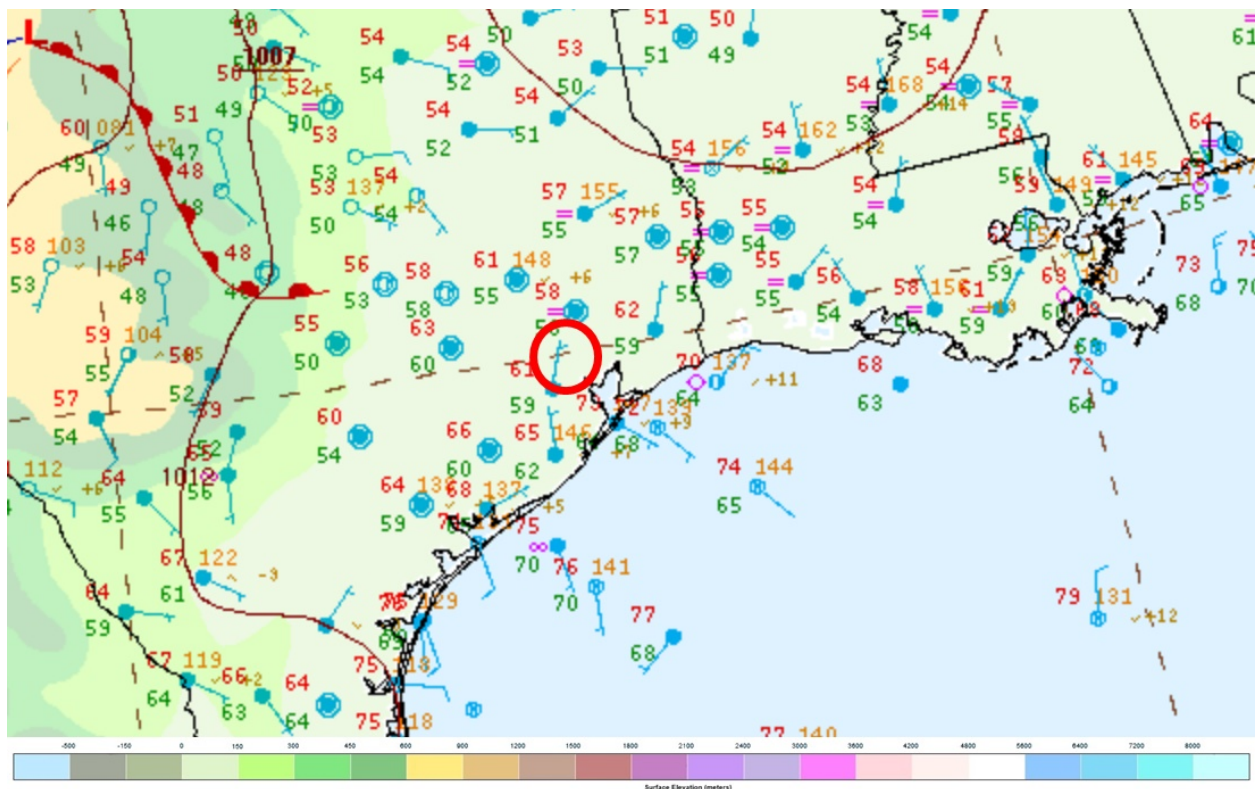


Figure 1 – Southern section of the NWS Surface Analysis Chart for 0700 CDT. Accident location is within the red circle.

2.0 Surface Observations

An Automated Weather Observing System (AWOS) was located at Cleveland Municipal Airport (6R3³) in Cleveland, Texas, which was located about 14 miles northeast of the accident location at an elevation of about 150 feet and had a magnetic variation of about 2° east. Automated longline⁴ reports from the 6R3 AWOS during the times surrounding the accident time are presented here.

[0755 CDT] METAR K6R3 251255Z AUTO 0000KT 1 1/4SM BR OVC003 15/15
A3001 RMK AO2 T01450145=

³ The National Weather Service uses the 4-digit International Civil Aviation Organization (ICAO) format for station identifiers (as seen in the body of some formatted weather observations). This report uses the 3-digit International Air Transport Association format for station identification, which does not use the geographic designating digit (“K” for stations in the continental U.S. and “P” for U.S. stations in Alaska and the Pacific region) as found in the ICAO format.

⁴ “Longline” refers to the dissemination of weather observations with the intent that they are available in near-real time to national databases (effectively, the whole world) and accessible to the general global public from a large number of vendors. This does not include public accessibility to observations from a reporting station’s Very High Frequency (VHF; line-of-site) or telephone broadcast, where applicable. Longline-dissemination of weather observations is the primary vehicle through which the general global public has access to surface weather observations, particularly outside of the aviation community.

[0815 CDT] METAR K6R3 251315Z AUTO 00000KT 2 1/2SM BR OVC003 15/15
A3001 RMK AO2 T01450145=

**[0835 CDT] METAR K6R3 251335Z AUTO 00000KT 2 1/2SM BR OVC003 15/15
A3001 RMK AO2 T01470147=**

[0855 CDT] METAR K6R3 251355Z AUTO 00000KT 1 3/4SM BR OVC003 15/15
A3002 RMK AO2 T01490149=

At 0835 CDT, the 6R3 AWOS reported a calm wind, visibility of 2.5 statute miles, mist, ceiling overcast at 300 feet above ground level (agl), temperature of 15° Celsius (C) and a dew point temperature of 15°C, altimeter setting of 30.01 inches of mercury; remarks: automated station with a precipitation discriminator, temperature of 14.7°C and a dew point temperature of 14.7°C.

An Automated Surface Observing System (ASOS) was located at Conroe-North Houston Regional Airport (CXO) in Houston, Texas, which was located about 15 miles northwest of the accident location at an elevation of about 245 feet and had a magnetic variation of about 2° east. Augmented longline reports from the CXO ASOS during the times surrounding the accident time are presented here.

[0725 CDT] SPECI KCXO 251225Z 11003KT 5SM BR OVC018 15/13 A2999 RMK
AO2 T01500133=

[0753 CDT] METAR KCXO 251253Z 00000KT 5SM BR OVC018 15/14 A3000 RMK
AO2 SLP155 T01500139=

**[0821 CDT] SPECI KCXO 251321Z 09003KT 4SM BR SCT006 OVC018 15/14
A3000 RMK AO2 T01500139=**

[[0853 CDT] METAR KCXO 251353Z 00000KT 3SM BR BKN006 OVC018 16/14
A3001 RMK AO2 SLP159 T01560144=

At 0821 CDT, the CXO ASOS reported a wind from 090° at 3 knots, visibility of 4 statute miles, scattered clouds at 600 feet agl, ceiling overcast at 1,800 feet agl, temperature of 15°C and a dew point temperature of 14°C, altimeter setting of 30.00 inches of mercury; remarks: automated station with a precipitation discriminator, temperature of 15.0°C and a dew point temperature of 13.9°C.

An ASOS was located at George Bush Intercontinental/Houston Airport (IAH) in Houston, Texas, which was located about 15 miles south-southwest of the accident location at an elevation of about 95 and had a magnetic variation of about 2° east. Augmented longline reports from the IAH ASOS during the times surrounding the accident time are presented here.

[0738 CDT] SPECI KIAH 251238Z 07004KT 10SM OVC022 16/14 A2998 RMK AO2
T01610144=

[0753 CDT] METAR KIAH 251253Z 06004KT 10SM SCT013 OVC022 16/14 A2998
RMK AO2 SLP153 T01610144=

[0830 CDT] SPECI KIAH 251330Z 03003KT 6SM BR OVC008 17/15 A2999 RMK
AO2 T01670150=

[0853 CDT] METAR KIAH 251353Z 03004KT 3SM BR OVC008 17/15 A3000 RMK
AO2 SLP157 T01670150=

At 0830 CDT, the IAH ASOS reported a wind from 030° at 3 knots, visibility of 6 statute miles, ceiling overcast at 800 feet agl, temperature of 17°C and a dew point temperature of 15°C, altimeter setting of 29.99 inches of mercury; remarks: automated station with a precipitation discriminator, temperature of 16.7°C and a dew point temperature of 15.0°C.

3.0 Weather Radar

A Terminal Doppler Weather Radar (TDWR) from near IAH (TDWR site: TIAH) 0.10° tilt reflectivity image is presented in figure 2. TIAH was located approximately 24 miles west-southwest of the accident location at an elevation of about 250 feet. Assuming standard refraction and considering the approximate beam width of 0.55°, the 0.10° tilt would have “seen” altitudes above the accident location of between about 200 and 1,600 feet. The radar imagery identified mostly negative values of reflectivity across the accident region.

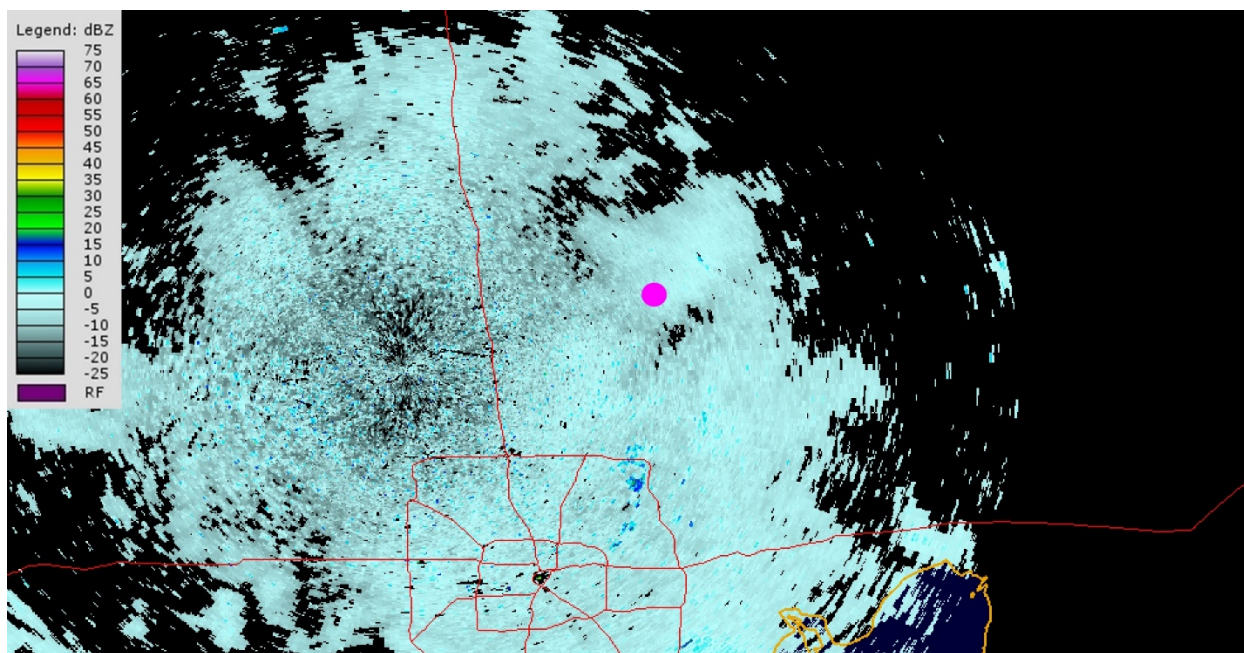
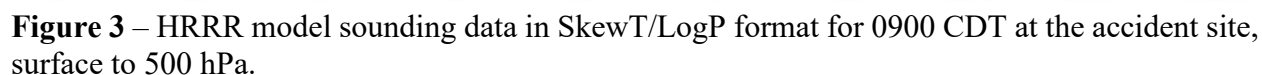


Figure 2 – TIAH 0.10° reflectivity product from 0833 CDT. Accident location denoted by the purple circle.

A High-Resolution Rapid Refresh (HRRR) model⁵ sounding (figure 3) for the accident site at 0900 CDT was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory. Near the surface the wind was from the west at 4 knots but veered to a southwest wind of 18 knots at about 3,500 feet. The relative humidity was 94 percent or greater from the surface to about 5,500 feet, and the Rawinsonde OBservation Program (RAOB) identified overcast cloud conditions between about 500 and 5,500 feet. Calculations made by the RAOB identified potential moderate turbulence and light low level wind shear between about 500 and 1,000 feet. The freezing level was near 16,000 feet. Two temperature inversions⁶ were noted below 4,000 feet.



⁶ A temperature inversion is a thin layer of the atmosphere where the normal decrease in temperature with height switches to the temperature increasing with height.

5.0 Satellite Imagery

Geostationary Operational Environmental Satellite (GOES)-16 visible (0.64 μm) and infrared (10.3 μm) data were obtained from an archive at the Space Science Engineering Center at the University of Wisconsin-Madison. Images from 0836 CDT are presented in figures 4 and 5. The GOES-16 visible imagery depicted cloudy conditions over the accident region. Infrared brightness temperatures over the accident location were 15°C, which, when considering the HRRR model sounding, corresponded to cloud tops heights of somewhere below about 8,000 feet.⁷

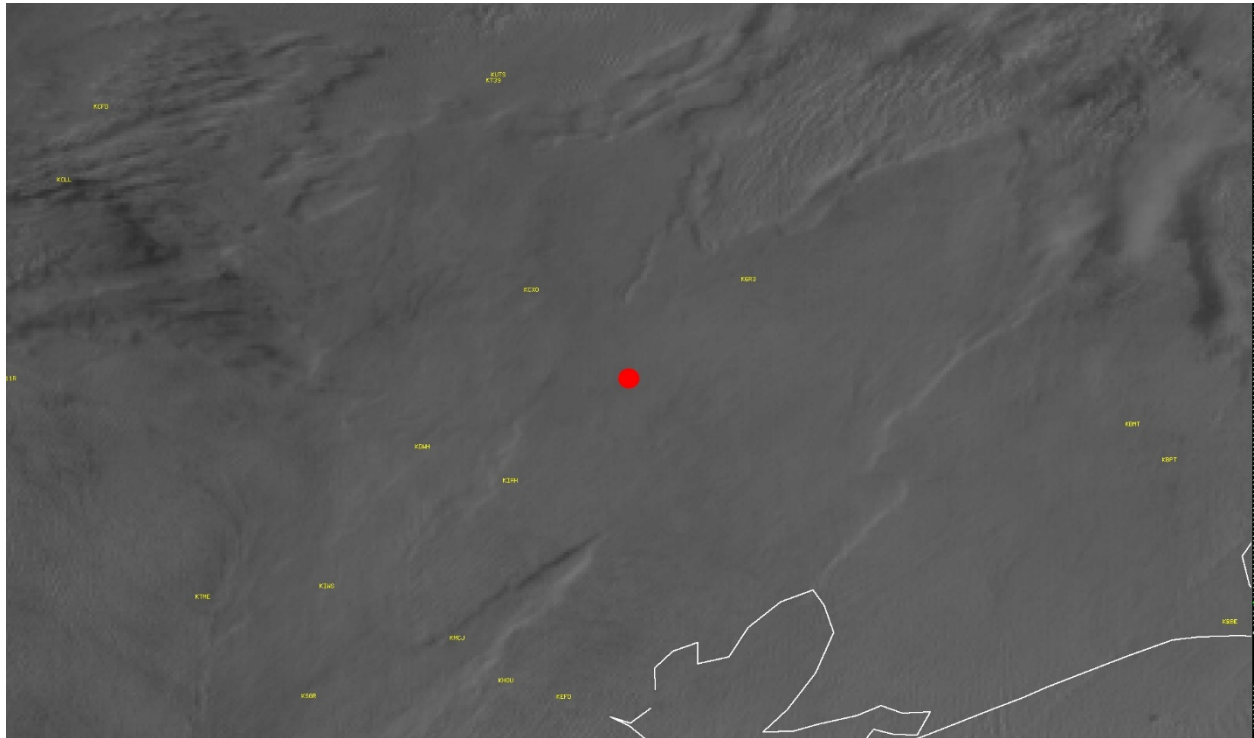


Figure 4 – GOES-16 visible imagery from 0836 CDT. Accident location is denoted by the red dot. This image has not been corrected for any parallax error.

⁷ A discrete height could not be determined due to (1) the near-isothermal nature of the HRRR model sounding's temperature profile below about 8,000 feet and (2) that sounding's temperature profile being near 15°C below 8,000 feet.

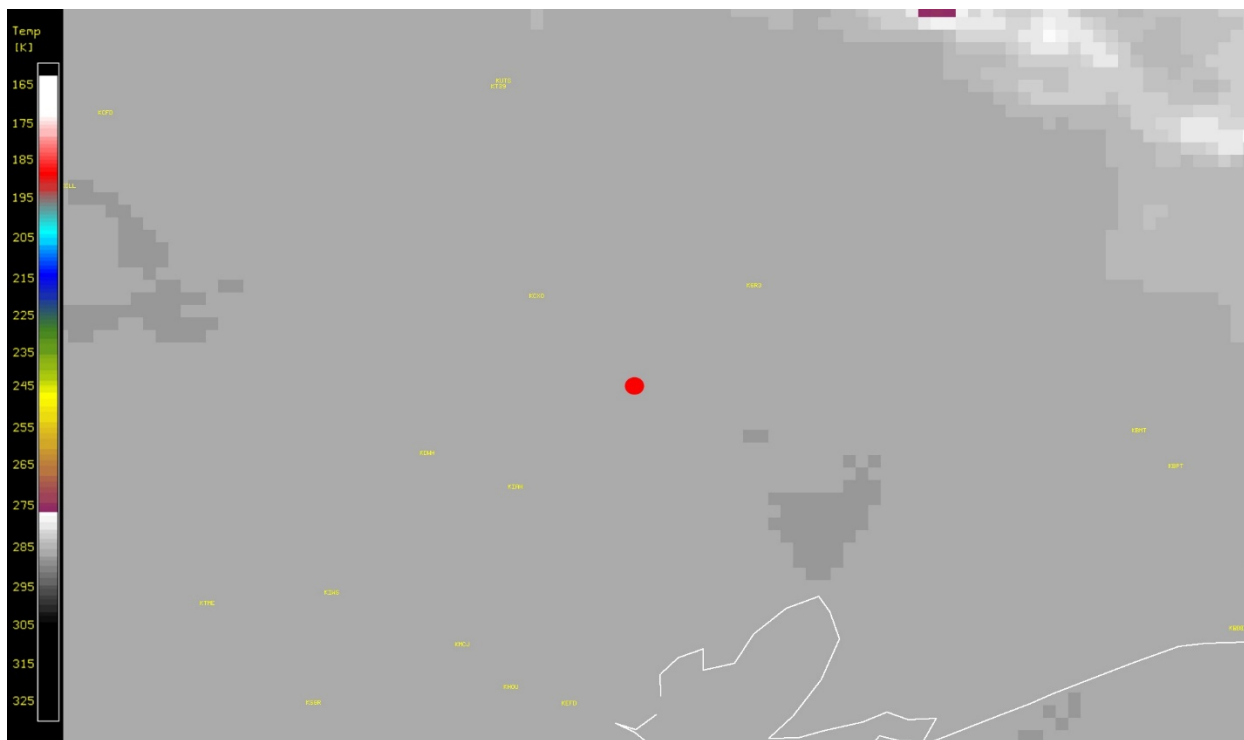


Figure 5 – GOES-16 infrared brightness temperature imagery from 0836 CDT. Accident location is denoted by the red dot. This image has not been corrected for any parallax error.

6.0 Pilot Reports

Publicly longline-disseminated pilot reports⁸ (PIREPs) made within two hours of the accident time within 30 miles of the accident location are presented here. Most of these PIREPs reported cloud bases below 1,000 feet and cloud top reports were between 3,200 and 5,200 feet.

IAH UA /OV 4NE/TM 1206/FL018/TP B738

IAH UA /OV 5 N DWH/TM 1218/FL015/TP PC12/SK BASES 015

IAH UA /OV 8 SW IAH/TM 1234/FL032/TP P46T/SK BASES 013 TOPS 032 CLR ABV

IAH UA /OV 1 WEST/TM 1303/FL005/TP E175/SK BASES 005

IAH UA /OV 1 WEST/TM 1315/FL007/TP E175/SK BASES 007

IAH UA /OV 1 WEST/TM 1349/FL004/TP E175/SK BASES 004

IAH UA /OV 5 N IAH/TM 1415/FL050/TP B712/SK BASES 008 TOPS OVC 042

IAH UA /OV 1 WEST/TM 1424/FL003/TP B712/SK BASES 004

IAH UA /OV 5 N T78/TM 1430/FLDURC/TP C421/SK BASES 006 TOPS 035

IAH UA /OV 5 E/TM 1525/FL060/TP E175/SK BASES OVC005 TOPS 052

⁸ These do not include pilot reports only broadcast via radio.

7.0 Area Forecast Discussion

Presented here is the “Aviation” section of the Area Forecast Discussion issued at 0612 CDT by the NWS Houston/Galveston, Texas, Weather Forecast Office.

FXUS64 KHGX 251121

AFDHGX

Area Forecast Discussion

National Weather Service Houston/Galveston TX

621 AM CDT Sun Oct 25 2020

.AVIATION [12Z Issuance]...

Widespread MVFR cigs around 1500 to 2000 ft are the main aviation concern during the TAF period. Some clearing will be possible later this afternoon and evening, mainly over the coastal terminals and KCLL. However, low to mid clouds return later tonight through Monday across all terminals. Light rain or drizzle will be possible at KLBX and KGLS throughout the day. Did not mention VCSH in TAFs due to low confidence in timing/coverage. South to southeast winds with gusts up to 15 kts will prevail through the period. Higher gusts possible at KLBX and KGLS tonight. 05

8.0 Terminal Aerodrome Forecasts

The closest NWS Terminal Aerodrome Forecast (TAF) site was CXO but its TAFs were not applicable to the accident site. According to NWS Instruction 10-813: “A NWS TAF consists of the expected meteorological conditions significant to aviation at an airport for a specified time period. For the U.S., this is the area within five (5) statute miles (SM) of the center of an airport's runway complex.”⁹

At 0658 CDT a TAF was issued by the NWS for CXO that forecasted for the accident time: a variable wind at 2 knots, visibility greater than 6 statute miles, ceiling broken at 500 feet agl and overcast clouds at 1,800 feet agl.

KCXO 251158Z 2512/2612 VRB02KT P6SM BKN005 OVC018

FM251400 VRB04KT P6SM OVC019

FM252000 13007KT P6SM BKN029 OVC090

FM260100 VRB05KT P6SM BKN012=

9.0 AIRMETs

The NWS Aviation Weather Center (AWC) issued an Airmen's Meteorological Information (AIRMET) SIERRA advisory at 0804 CDT for instrument meteorological conditions (IFR) that was applicable to the accident location at the accident time.

⁹ www.nws.noaa.gov/directives/sym/pd01008013curr.pdf

WAUS44 KPCI 251304 AAB

WA4S

-DFWS WA 251304 AMD

AIRMET SIERRA UPDT 4 FOR IFR AND MTN OBSCN VALID UNTIL 251500

AIRMET IFR...OK TX AR LA KS MO AND CSTL WTRS

FROM 40WNW BUM TO 20N SGF TO 70SSE COU TO 40E ARG TO 20SE LIT TO

40ESE AEX TO 20S MCB TO 60ESE LEV TO 70S LEV TO 130S LCH TO 20SSW IAH

TO 20SSW ACT TO 60SSE SPS TO 40NE OKC TO 40WNW BUM

CIG BLW 010/VIS BLW 3SM BR/FG. CONDS CONTG BYD 15Z ENDG 18-21Z.

10.0 SIGMETs

There were no convective or non-convective Significant Meteorological Information (SIGMET) advisories active for the accident location at the accident time.

11.0 CWSU Products

At 0652 EDT a Center Weather Advisory (CWA) was issued by the Houston Air Route Traffic Control Center (ZHU), which was valid until 0900 CDT, that advised of low IFR conditions with widespread ceilings at or below 500 feet agl and local visibility at or below one statute mile with mist and fog for an area to the east of the accident location. The closest point the boundary of this CWA was to the accident location was about 35 miles.

FAUS21 KZHU 251152

ZHU1 CWA 251200

ZHU CWA 102 VALID UNTIL 251400

FROM 25SSE MLU-45NW CEW-30SSE SJI-10WNW LEV-45WSW LCH-35WNW

LFK-25SSE MLU

AREA LIFR CONDS CONT. WDSPRD CIGS AOB 005/LCL VIS AOB 1SM

BR/FG. CONDS TO IMPR AFT 14Z.

Submitted by:

Mike Richards

Senior Meteorologist