



National Transportation Safety Board

**Office of Aviation Safety
Washington, D.C. 20594-2000**

January 3, 2016

**WEATHER STUDY
WPR16FA041**

A. Accident

Location: Bakersfield, California
Date: December 19, 2015
Time: 1556 Pacific standard time (2356 UTC¹)
Aircraft: PA-32RT-300T; N36402

B. Meteorological Specialist

Mike Richards
Senior Meteorologist
National Transportation Safety Board
Operational Factors Division, AS-30
Washington, DC 20594-2000

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 Pacific standard time (PST) for December 19, 2015 (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).

Coordinates used for approximate accident location: 35.293989° North latitude, 119.147152° West longitude, elevation of approximately 345 feet.

¹ UTC – abbreviation for Coordinated Universal Time

Synoptic Conditions

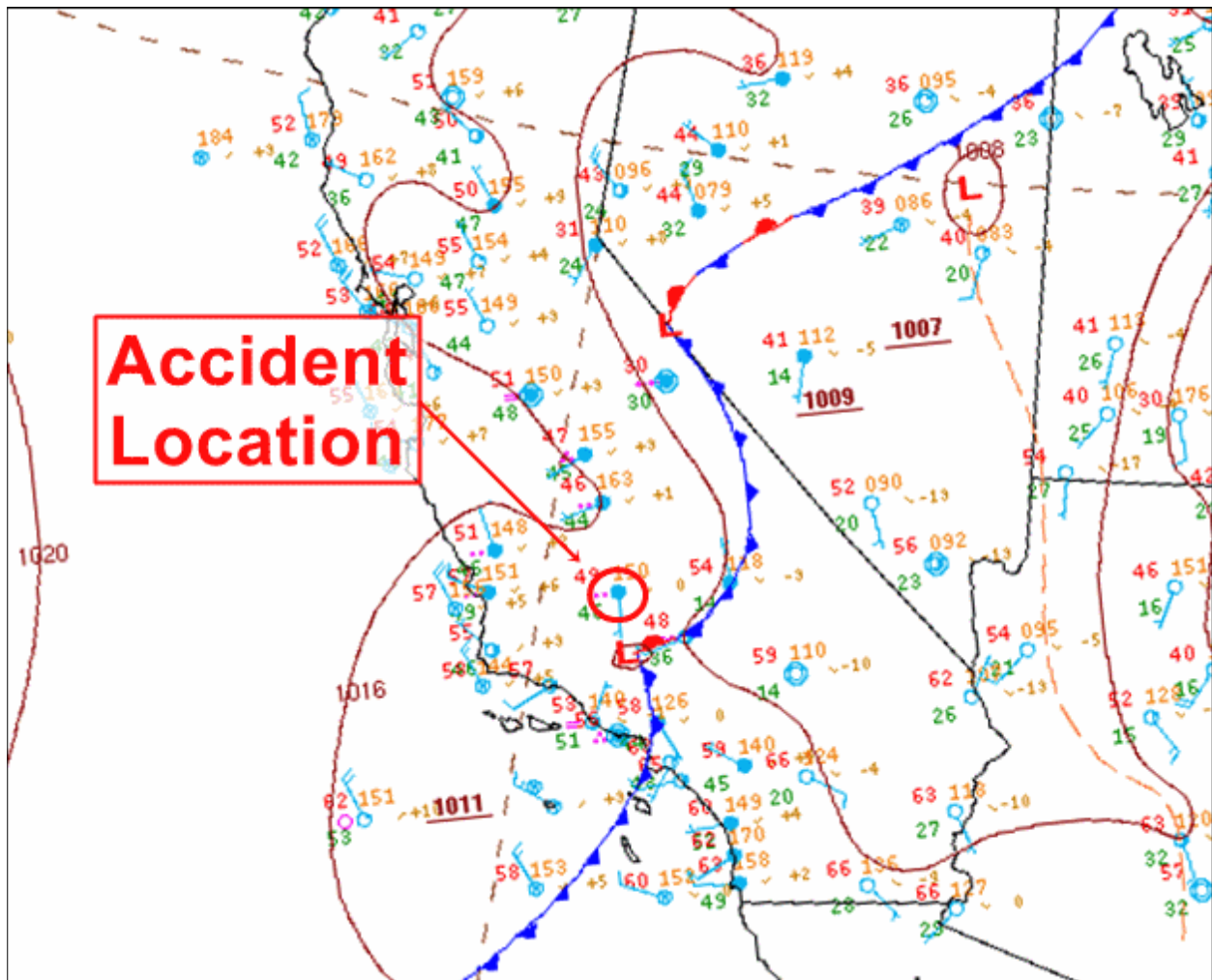


Figure 1 – NWS Surface Analysis Chart for 1600 PST.

Figure 1 presents the National Weather Service (NWS) Surface Analysis Chart for 1600 PST. The chart depicts a low pressure center immediately south of the accident site. From this low pressure center, a cold front extended south, then southwest over the Pacific Ocean. Extending east from the low pressure center was a short stationary front with a cold front extending northeast and east from that. WSR-88D regional radar composite reflectivity mosaic imagery from 1600 PST was obtained from the National Mosaic and Multi-Sensor (NMQ) Project² (figure 2), which depicted light to moderate values of reflectivity over much of the accident region.

²The NMQ project is a joint initiative between the National Severe Storms Laboratory, Federal Aviation Administration, National Weather Service/Office of Hydrologic Development, the Office of Climate, Water and Weather Services and the University of Oklahoma Cooperative Institute in Mesoscale Meteorological Studies.

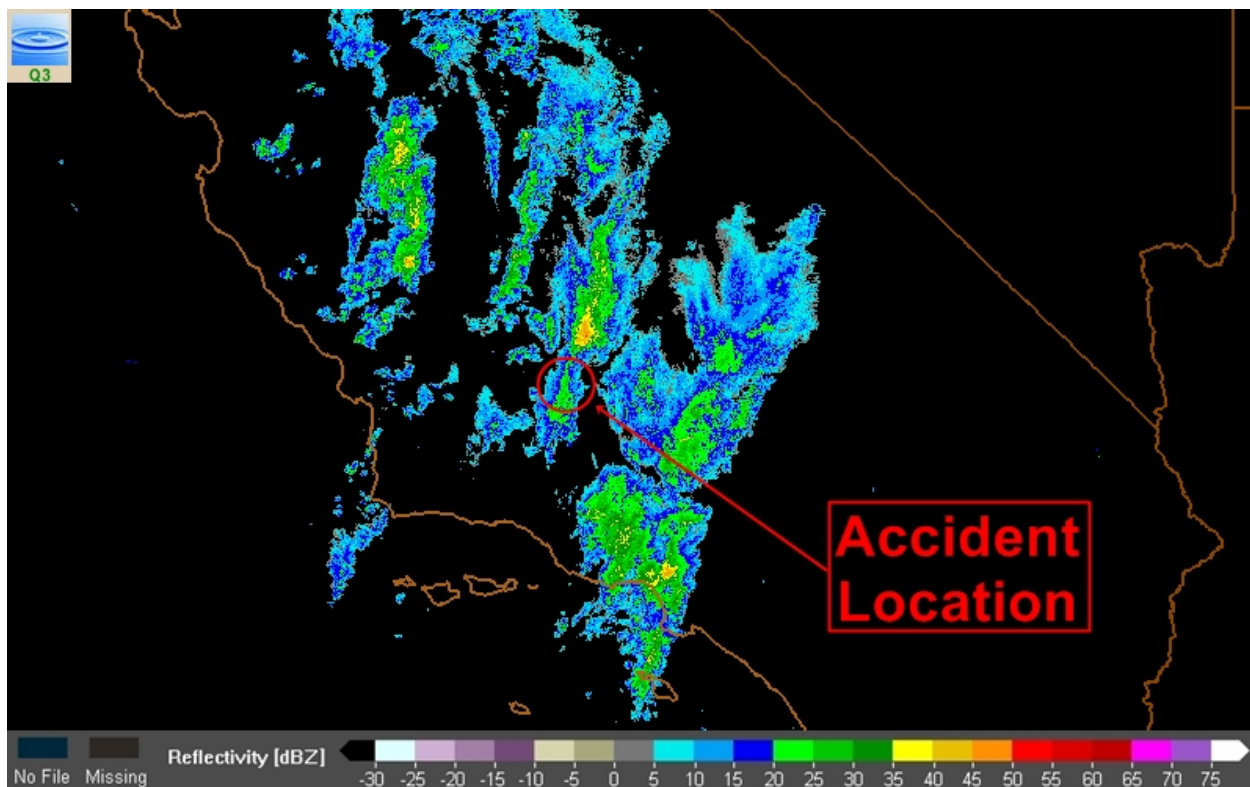


Figure 2 – NMQ NEXRAD composite reflectivity (QC'ed) mosaic from 1600 PST.

Surface Observations

An Automated Surface Observing System was located at Meadows Field Airport (BFL) in Bakersfield, California, which was located about 9 miles north-northeast of the accident location at an elevation of 509 feet. Human-augmented reports from BFL during the times surrounding the accident time are presented here:

[1454 PST] METAR KBFL 192254Z 11005KT 6SM -RA BR OVC055 10/08 A2997
RMK AO2 SLP147 P0003 T01000078=

[1554 PST] **METAR KBFL 192354Z 17003KT 4SM -RA BR BKN050 OVC065
09/08 A2997 RMK AO2 SLP150 P0002 60008 T00940078 10150 20083
55000=**

[1627 PST] SPECI KBFL 200027Z 26006KT 3SM -RA BR FEW004 BKN025
OVC070 09/08 A2998 RMK AO2 P0001 T00940078=

[1635 PST] SPECI KBFL 200035Z 27006KT 1 3/4SM -RA BR SCT004 BKN015
OVC025 09/08 A2998 RMK AO2 TWR VIS 2 P0001 T00890078=

[1644 PST] SPECI KBFL 200044Z 27008KT 1 1/4SM BR BKN004 BKN015 OVC025
08/07 A2998 RMK AO2 TWR VIS 1 1/2 RAE42 P0001 T00830072=

[1654 PST] **METAR KBFL 200054Z 27007KT 1 1/2SM BR OVC002 08/07 A2998
RMK AO2 RAE42 SLP153 P0001 T00830072=**

At 1554 PST, BFL reported a wind from 170° at 3 knots, visibility of 4 statute miles, mist, ceiling broken at 5,000 feet above ground level (agl), overcast cloud base at 6,500 feet agl, temperature of 9° Celsius (C) and a dew point temperature of 8°C, altimeter setting of 29.97 inches of mercury; remarks included: station with a precipitation discriminator.

Over the next hour, visibility and ceiling lowered significantly. At 1654 PST, BFL reported a wind from 270° at 7 knots, visibility of 1 ½ statute miles, mist, ceiling overcast at 200 feet agl, temperature of 8°C and a dew point temperature of 7°C, altimeter setting of 29.98 inches of mercury; remarks included: station with a precipitation discriminator.

Weather Radar

WSR-88D Level-II base reflectivity imagery from the San Joaquin Valley, California (KHNX), radar are presented in figures 3 and 4. KHNX was located approximately 65 miles to the north-northwest of the accident site at an elevation of 243 feet. Assuming standard refraction and considering the 0.95° beam width³ for the WSR-88D, the KHNX 0.55° tilt would have “seen” altitudes between about 3,560 and 10,110 feet msl at the accident location. The next highest tilt of this WSR-88D depicted a similar reflectivity pattern.

Figure 3 presents the 0.55° base reflectivity imagery for 1552 PST, about the time the accident aircraft made a turn to the east and then northeast. Figure 4 presents the 0.55° base reflectivity imagery for the accident time.

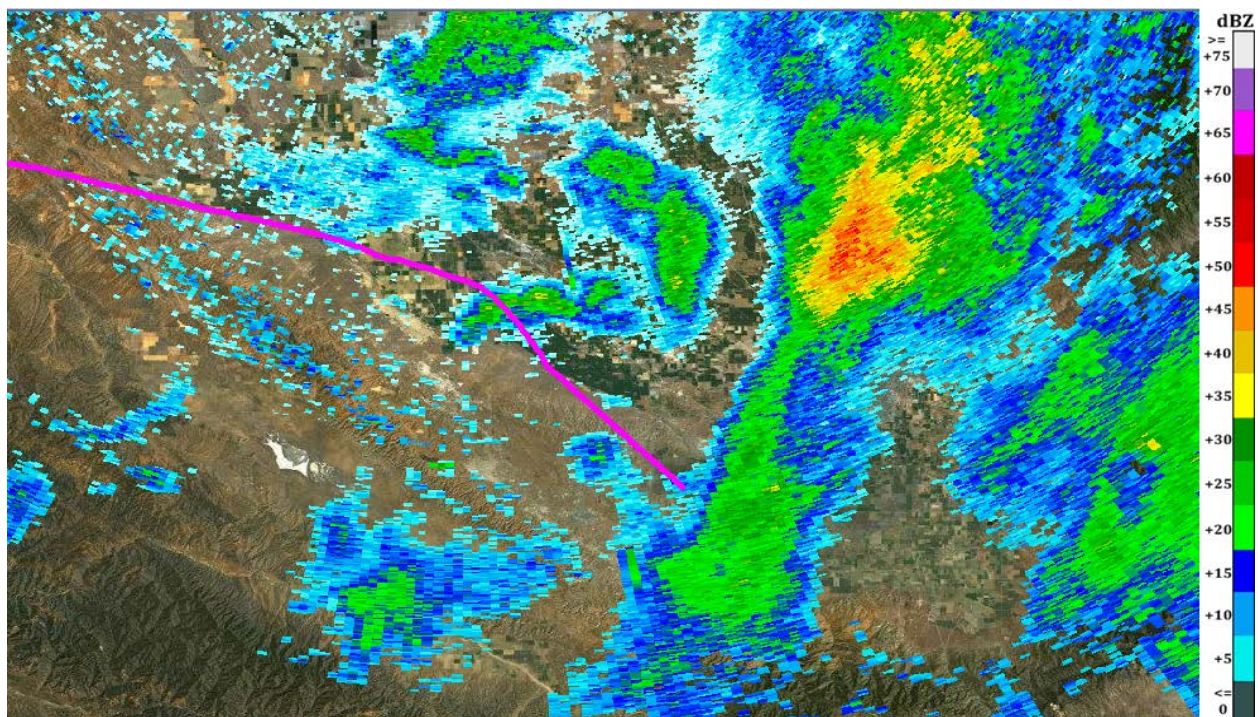


Figure 3 – KHNX WSR-88D 0.55° Level-II base reflectivity for 1552 PST. Accident aircraft flight path marked by pink line.

³ Beam width - the angular separation between the half power points on the antenna radiation pattern, where the gain is one half the maximum value.

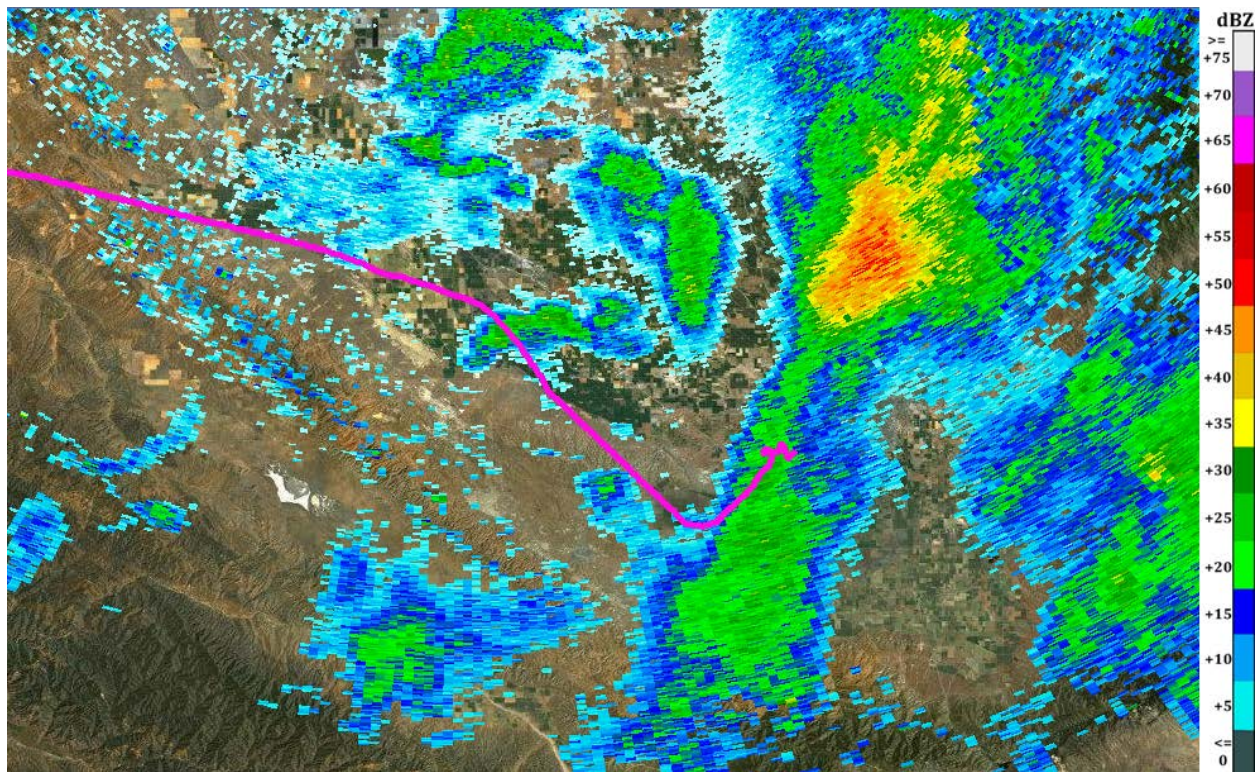


Figure 4 – KHNX WSR-88D 0.55° Level-II base reflectivity for 1555 PST. Accident aircraft flight path marked by pink line.

Upper Air

Atmospheric data were retrieved from a 1600 PST rawinsonde launch from Vandenberg Air Force Base in California (rawinsonde station: VBG), which was located about 78 miles southwest of the accident site. Low-level meteorological data was likely retrieved beginning between 1500 and 1530 PST. These data are presented graphically in figure 5. Note that VBG is located near the coast of the Pacific Ocean and may not accurately represent the profile for the accident region.

The freezing level was at approximately 5,500 feet. Relative humidity through the entire atmosphere remained below 87 percent. Near-surface wind was from the north-northwest at 10 knots. Above this level through 14,000 feet the wind was northwesterly to westerly at magnitudes below 30 knots. Between 15,000 and 20,000 feet, the wind remained westerly at magnitudes between 30 and 45 knots. The RAwinsonde OBservation program (RAOB) for this sounding did not identify any areas of icing or any significant areas of turbulence below 25,000 feet.

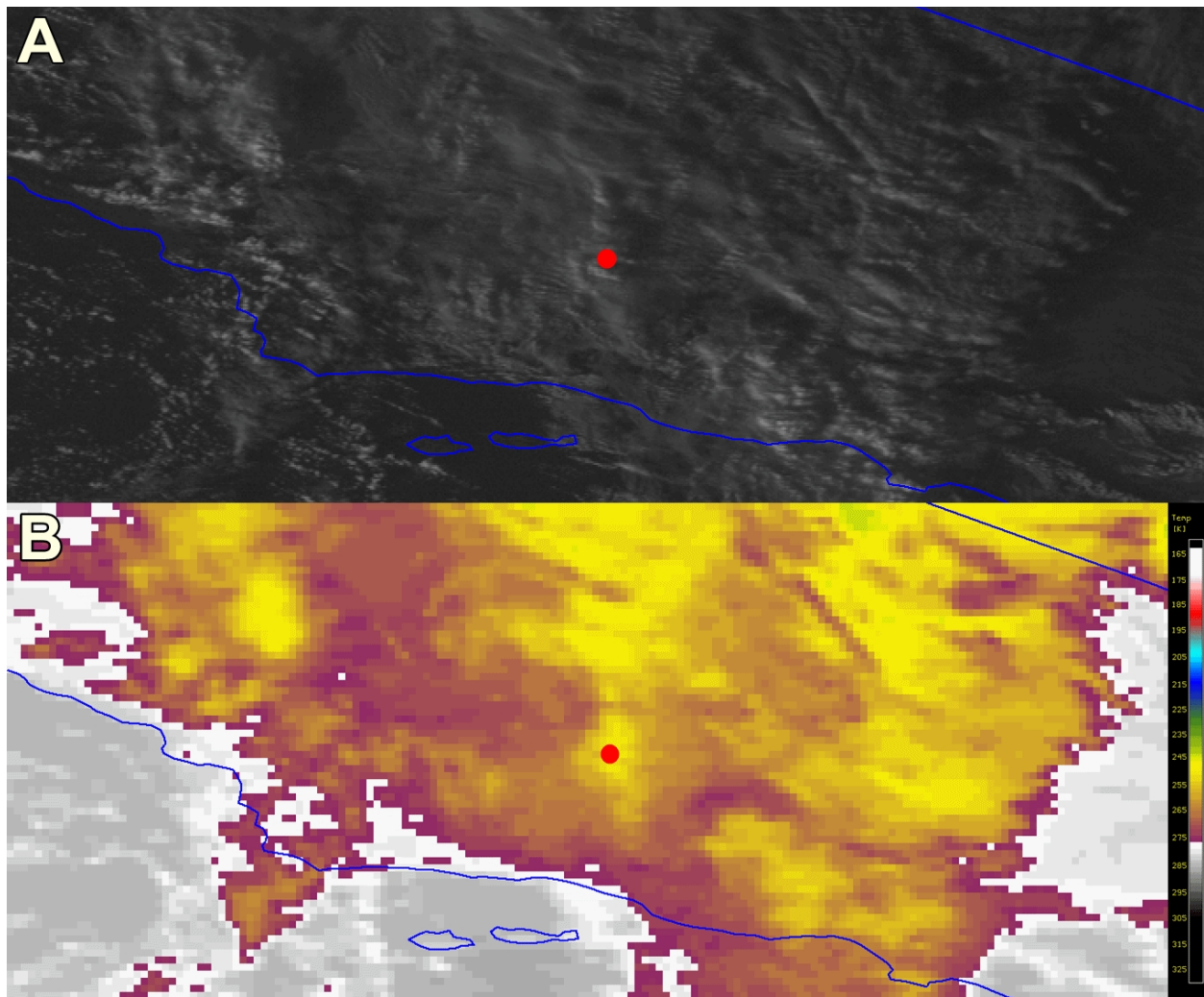


Figure 6 – Panel A: GOES-15 0.62μm (visible) imagery from 1600 PST; Panel B: 10.7μm (infrared) imagery from 1600 PST. Red dots denote accident location.

Area Forecast

An Area Forecast that included the central portion of the state of California was issued at 1245 PST by the Aviation Weather Center in Kansas City, Missouri. Cloud heights are above msl. The section of the Area Forecast directed toward the San Joaquin Valley forecasted for the accident time: ceiling broken at 1,000 feet with cloud tops to FL200⁴, visibility of 3 to 5 statute miles, mist, scattered light rain showers.

FAUS46 KKCI 192045
 FA6W
 _SFOC FA 192045
 SYNOPSIS AND VFR CLDS/WX
 SYNOPSIS VALID UNTIL 201500
 CLDS/WX VALID UNTIL 200900...OTLK VALID 200900-201500
 WA OR CA AND CSTL WTRS

⁴ Flight Level (FL) - standard nominal altitude of an aircraft, in hundreds of feet. This altitude is calculated from the International standard atmosphere using 1013.25 hPa (29.92 in. Hg) for surface pressure.

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SEE AIRMET SIERRA FOR IFR CONDS AND MTN OBSCN.
TS IMPLY SEV OR GTR TURB SEV ICE LLWS AND IFR CONDS.
NON MSL HGTS DENOTED BY AGL OR CIG.

.
SYNOPSIS...ALF..TROF INTO FCST AREA. STG NW WNDZ MOVING INTO
ADJACENT CSTL WTR AREAS. BY 15Z...FLOW WILL BECOME ZONAL AS
THE TROF PUSHES TO THE EAST. STRONGEST WNDZ EXPD IN NRN CA
AND ADJACENT CSTL WTRS. SFC..HIGH PRESS ERN WA. LOW PRESS ERN
OR WITH CDFNT TRAILING INTO NRN CA. LOW PRESS N CNTRL CA.
CDFNT CONTINUES ALONG THE CSTLN AND INTO ADJACENT CSTL
WTRS OF CNTRL CA. BY 15Z...HIGH PRESS CA SWD. FNT MOVING IN TO
WA AND OR AND ADJACENT CSTL WTRS.

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CNTRL CA
CSTL SXNS...BKN030 TOP FL200. OCNL VIS 3-5SM BR. WDLY SCT -SHRA.
BECMG 0306 SCT100. OTLK...VFR.
SAN JOAQUIN VLY...BKN010 TOP FL200. CIS 3-5SM BR. SCT -SHRA.
BECMG 0609 BKN050 TOP FL200. OTLK...MVFR BR.
SRN SIERNEV...BKN080 TOP FL200. VIS 3-5SM BR. SCT -SHSN. BECMG 0609
BKN120 TOP FL200. OTLK...VFR.

Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 1413 PST by the NWS Weather Forecast Office (WFO) in Hanford, California (HNX). Included here are the "Synopsis" and "Aviation" sections.

FXUS66 KHNX 192213
AFDHNX
AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE SAN JOAQUIN VALLEY - HANFORD CA
213 PM PST SAT DEC 19 2015

.SYNOPSIS...

A STORM SYSTEM WILL CONTINUE TO IMPACT THE CENTRAL CALIFORNIA INTERIOR THIS AFTERNOON WITH RAIN IN THE SAN JOAQUIN VALLEY AND SNOW IN THE SOUTHERN SIERRA. ANOTHER SYSTEM WILL MOVE INTO THE AREA LATE SUNDAY AND CONTINUE THROUGH MONDAY. UNSETTLED WEATHER IS EXPECTED THROUGH MOST OF NEXT WEEK.

.AVIATION...

CONDITIONS MOSTLY IN THE MVFR CATEGORY WITH LOCAL IFR AT TIMES IN THE SAN JOAQUIN VALLEY WITH DUE TO SHRA THROUGH AROUND 03Z SUN. ALSO WIDESPREAD MTN OBSCURING IFR/LIFR IN LIGHT TO MODERATE SNOW IN THE SIERRA...MAINLY NORTH OF KINGS CANYON NP THROUGH AROUND 06Z SUN. SOME UPSLOPE CLOUDS IN

KERN COUNTY MTNS PRODUCING MVFR CONDITIONS WITH LOCAL IFR AT TIMES DUE TO CIGS AND -SHRA FROM 06Z THRU 16Z SUN. OTHERWISE...VFR CONDITIONS WILL PREVAIL ACROSS THE CENTRAL CALIFORNIA INTERIOR FOR THE NEXT 24 HRS.

AIRMETs

Airmen's Meteorological Information (AIRMET) advisories for instrument flight rules (IFR) conditions, mountain obscuration, and moderate icing (between the freezing level and FL180) were active for the accident site at the accident time. AIRMETs applicable to altitudes at and/or above FL200 are not presented here.

WAUS46 KPCI 192045

WA6S

_SFOS WA 192045

AIRMET SIERRA UPDT 4 FOR IFR AND MTN OBSCN VALID UNTIL 200300

.

AIRMET IFR...CA NV

FROM 60NNW RBL TO 60NNW FMG TO 50SSE OAL TO 40WSW BZA TO 20S MZB TO 30SE LAX TO 60WNW RZS TO 30S MOD TO 30WSW SAC TO 60NNW RBL

CIG BLW 010/VIS BLW 3SM PCPN/BR. CONDS CONTG BYD 03Z ENDG 03-06Z.

.

AIRMET MTN OBSCN...WA OR CA ID MT WY NV UT

FROM 60WSW YQL TO 20ENE SHR TO 60S OCS TO 60S BVL TO 20S MZB TO 50WSW RZS TO 30W SNS TO 70S OED TO 40W PDT TO 20NNW YKM TO 70ESE YDC TO 60WSW YQL

MTNS OBSC BY CLDS/PCPN. CONDS CONTG BYD 03Z THRU 09Z.

WAUS46 KPCI 192045

WA6Z

_SFOZ WA 192045

AIRMET ZULU UPDT 3 FOR ICE AND FRZLVL VALID UNTIL 200300

.

AIRMET ICE...WA OR CA ID MT WY NV UT AND CSTL WTRS

FROM 60ESE YXC TO 50NNW ISN TO 80SW DIK TO 40WSW BPI TO 80S RZS TO 20SE RBL TO 60ESE YXC

MOD ICE BTN FRZLVL AND FL180. FRZLVL 050-080. CONDS CONTG BYD 03Z THRU 09Z.

SIGMETs

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

CWSU Products

There were no Center Weather Advisories or Meteorological Impact Statements issued by the Center Weather Service Unit (CWSU) at the Los Angeles Air Route Traffic Control Center that were active for the accident location at the accident time.

Lightning

Total lightning data from the Earth Networks Total Lightning Network did not identify the presence of any lightning in the accident area.

Astronomical Data

The astronomical data obtained from the United States Naval Observatory for 35° 18' north latitude and 119° 9' west longitude, indicated the following:

SUN

Sunrise	0700 PST
Sunset	1647 PST

MOON

Moonrise	1246 PST
Moonset	0142 PST (December 20, 2015)

*Submitted by: Mike Richards
NTSB, AS-30*