National Transportation Safety Board

Office of Aviation Safety
Washington, D.C. 20594-2000
June 15, 2009

METEOROLOGICAL FACTUAL REPORT

LAX08PA259

A. ACCIDENT

Location: Weaverville, California
Date: August 5, 2008
Time: 1941 Pacific daylight time (0241 UTC[1] August 6, 2008)
Aircraft: Sikorsky S-61N helicopter, registration: N612AZ

B. METEOROLOGICAL SPECIALIST

Donald E. Eick
Senior Meteorologist
National Transportation Safety Board
Operational Factors Division, AS-30
Washington, D.C. 20594-2000

C. SUMMARY

On August 05, 2008, at 1941 Pacific daylight time, a Sikorsky, S-61N helicopter, N612AZ, crashed during takeoff near Weaverville, California. The airline transport pilot and 8 passengers were fatally injured, and the commercial copilot and 3 passengers were seriously injured. The helicopter was being operated under contract to the United States Forest Service (USFS) by Carson Helicopter Services, Inc., as a public-use flight. Visual meteorological conditions prevailed for the cross-country flight that was originating at the time of the accident. A company visual flight rules (VFR) flight plan had been filed. The helicopter was departing from Helispot 44 (H-44, elevation 5,950 feet) en route to Helispot 36 (H-36, elevation 1,575 feet) when the accident occurred.

The helicopter had been assigned to transport approximately 50 wildland firefighter helitack crewmembers out of the Trinity Alps Wilderness of the Shasta Trinity National Forest due to forecasted worsening weather conditions. The helicopter had completed two trips, and had gone

[1] UTC – is an abbreviation for Coordinated Universal Time.

to Trinity Helibase to refuel. After it had refueled, it returned to H-44 for its third load of passengers. During departure, the helicopter impacted trees and subsequently terrain, coming to rest on its left side. A postcrash fire consumed the aircraft.

D. DETAILS OF INVESTIGATION

The National Transportation Safety Board's (NTSB) meteorologist specialist was not on scene for this investigation and gathered all the weather data for this investigation from the Washington D.C. office from official National Weather Service (NWS) sources including the National Climatic Data Center (NCDC). The witness interviews were also reviewed for relevant details, and included as appropriate. All times are Coordinated Universal Time (UTC) based upon the 24 hour clock. Local time of Pacific daylight time (PDT) is +7 hours to UTC, and UTC=Z. Directions are referenced to true north and distances in nautical miles. Heights are above mean sea level (msl) unless otherwise noted. Visibility is in statute miles and fractions of statute miles.

The accident site was located at latitude 40.9138° N and longitude 123.2522° W, at an elevation of 5,950 feet msl.

1.0 Synoptic Situation

The synoptic or large scale migratory weather systems influencing the area were documented using standard NWS charts issued by the National Center for Environmental Prediction (NCEP) located in Camp Springs, Maryland. These are the base products used in describing weather features and in the creation of forecasts and warnings. Reference to these charts can be found in the joint NWS and Federal Aviation Administration (FAA) Advisory Circular "Aviation Weather Services", AC 00-45.

1.0.1 Surface Analysis Chart

The NWS Surface Analysis Chart for 1800 PDT (0300Z August 6, 2008) is provided as figure 1. The chart depicted a high pressure system with a central pressure of 1014-hectopascals (hPa) centered over western Nevada, to the southeast of the accident site. A trough of low pressure extended from a low pressure system over southern California northward and extended over the accident site. No other frontal boundaries were identified. The lack of any strong pressure gradients across the area indicated that other than localized heating, no other major influences influenced temperature and wind direction and speeds.

The station models across northern California indicated a slight cyclonic circulation over the region with clear skies to scattered clouds over the region. Temperatures ranged from the upper 80's degrees Fahrenheit (F) over the interior section and to the mid 50's along the coastal sections.

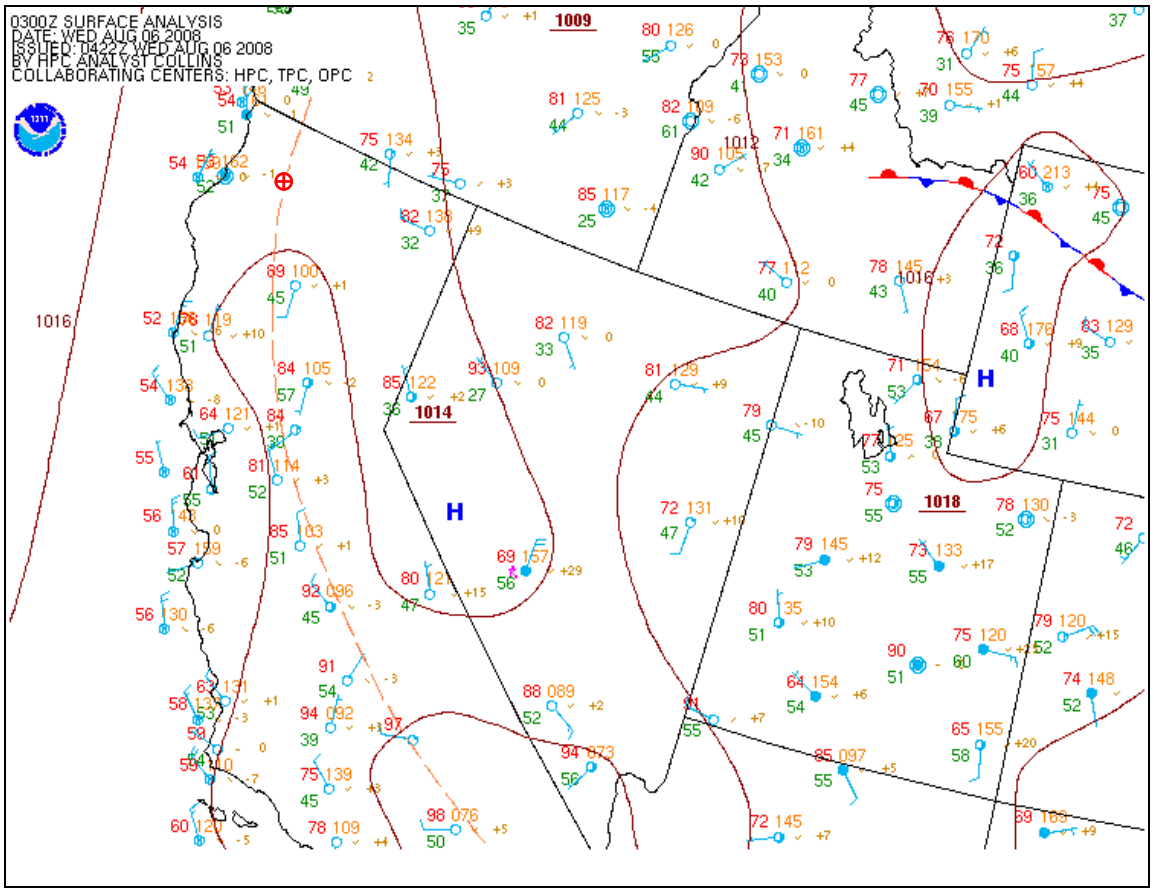

Figure 1 – NWS Surface Analysis Chart for 1800 PDT

1.0.2 Upper Air Charts

The NWS Constant Pressure Charts for 850-hPa and 700-hPa for 1700 PDT on August 5, 2008 are included as figures 2 and 3 respectively. The 850-hPa chart depicted conditions at approximately 5,000 feet, and the 700-hPa chart conditions at approximately 10,000 feet. The 850-hPa chart depicted light and variable winds (LV) over western Nevada and southern Oregon, with winds from the west-southwest at 15 knots over northeastern California near San Fransico. The accident site was between the 20° and 25° C isotherms.

The 700-hPa chart depicted southerly winds from 5 knots over western Nevada to a satellite observation of 20 knots to the southwest of the accident site along the coastal section of California, and 15 knots over southern Oregon.

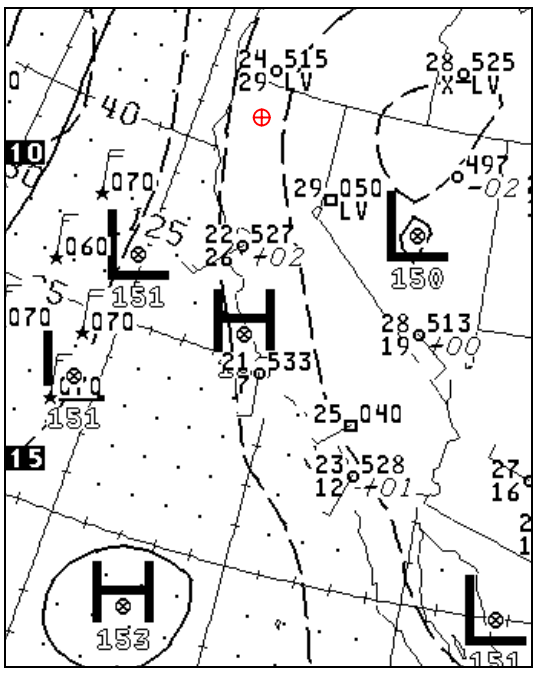

Figure 2 – 850-hPa for 1700 PDT

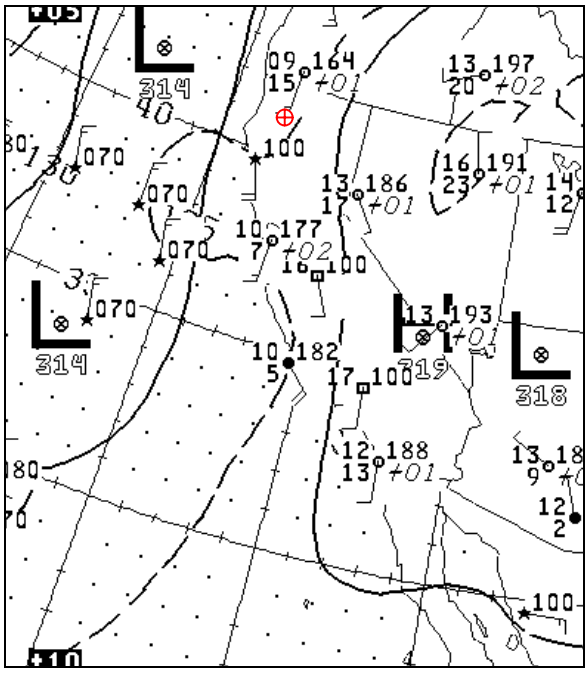

Figure 3 – 700-hPa for 1700 PDT

2.0 Surface Observations

No weather observations were available at the H44 landing zone other than a crude wind indicator consisting of ribbons tied to several trees at approximately 5 to 6 feet above the ground near the landing zone. Therefore the surrounding area was documented utilizing official NWS Meteorological Aerodrome Reports (METARs) and United States Forest Service (USFS) Remote Automatic Weather Station (RAWS) reports. Cloud heights are reported above ground level (agl).

2.0.1 Redding Municipal Airport (KRDD), Redding, California

The closest weather reporting facility to the accident site was from Redding Municipal Airport (KRDD), Redding, California, located approximately 50 miles east-southeast of the accident site at an elevation of 505 feet msl. The airport was equipped with an Automated Surface Observation System (ASOS) and reported the following conditions surrounding the period:

KRDD 052353Z 17009KT 10SM CLR 37/M04 A2983 RMK AO2 SLP095 T03671039 10372 20306 56016
KRDD 060053Z 16013KT 10SM CLR 36/M05 A2982 RMK AO2 SLP092 T03561050
KRDD 060153Z 16009KT 10SM SCT170 34/M02 A2982 RMK AO2 SLP092 T03441022
KRDD 060253Z 15007KT 10SM BKN170 33/02 A2983 RMK A02 SLP096 T03330017 53001
KRDD 060353Z 15007KT 10SM CLR 32/06 A2984 RMK AO2 SLP099 T03170056
KRDD 060453Z AUTO 12007KT 10SM SCT160 28/06 A2987 RMK AO2 SLP108 T02830056

The closest observation to the time of the accident from KRDD was at 1953 PDT (0253Z), and indicated winds from 150° at 7 knots, visibility 10 statute miles, ceiling broken at 17,000 feet agl, temperature 33° C, dew point 2° C, altimeter 29.83 inches of Hg. Remarks: automated observation system, sea level pressure 1009.6-hPa, temperature 33.3° C, dew point 1.7° C, and 3-hour pressure tendency increasing 0.1-hPa.

2.0.2 Backbone Ridge (BABC1)

The USFS RAWS site at Backbone (BABC1) was located on the top of Backbone Ridge at an elevation of 4,700 feet msl, located near China Springs, California, approximately 6 miles east-southeast of the accident site. The RAWS network typically provides hourly values of air temperature, dew point, relative humidity, wind speed, wind direction, precipitation, fuel temperature, and fuel moisture. The RAWS reported the following conditions surrounding the period:

Backbone	Time (PDT)	Temp (°F)	Dew (°F)	Wet Bulb (°F)	RH (%)	Wind (dir/mph)
	1649	87.0	30.2	56.1	13	SSE 6G16
	1749	86.0	31.2	56.0	14	ESE 3G15
	1849	82.0	29.8	54.1	15	SSE 5G13
	1949	77.0	28.8	51.9	17	SSE 6G12
	2049	72.0	33.2	51.3	24	SSE 9G13

* High temperature reported for the 24-hour period 87° degrees F.

2.0.3 Big Bar (BGBC1)

The NWS RAWS site at Big Bar (BGBC1) was located off highway 299, and near the Trinity River and Manzanita Creek at an elevation of 1,500 feet msl, located near Big Bar, California, approximately 10 miles south of the accident site. The RAWS reported the following conditions surrounding the period:

Big Bar	Time (PDT)	Temp (°F)	Dew (°F)	Wet Bulb (°F)	RH (%)	Wind
	1611	101.0	31.8	62.8	9	SW 2G14
	1711	98.0	32.1	61.8	10	ESE 3G17
	1811	92.0	39.3	61.7	16	WNW 6G12
	1911	88.0	40.5	60.7	19	W 5G18
	2011	84.0	41.0	59.4	22	WNW 2G19

* High temperature reported for the 24-hour period 101° F.

3.0 MesoWest Observations

The University of Utah's MesoWest site was reviewed and documented for 1900 and 2000 PDT on August 5, 2008, plotted on a topographical chart for the region as figures 4 and 5 respectively. The images include the RAWS observation sites with temperature (°F) and wind direction and speed (mph) and in the immediate vicinity of the accident site, which is approximated by a cross.

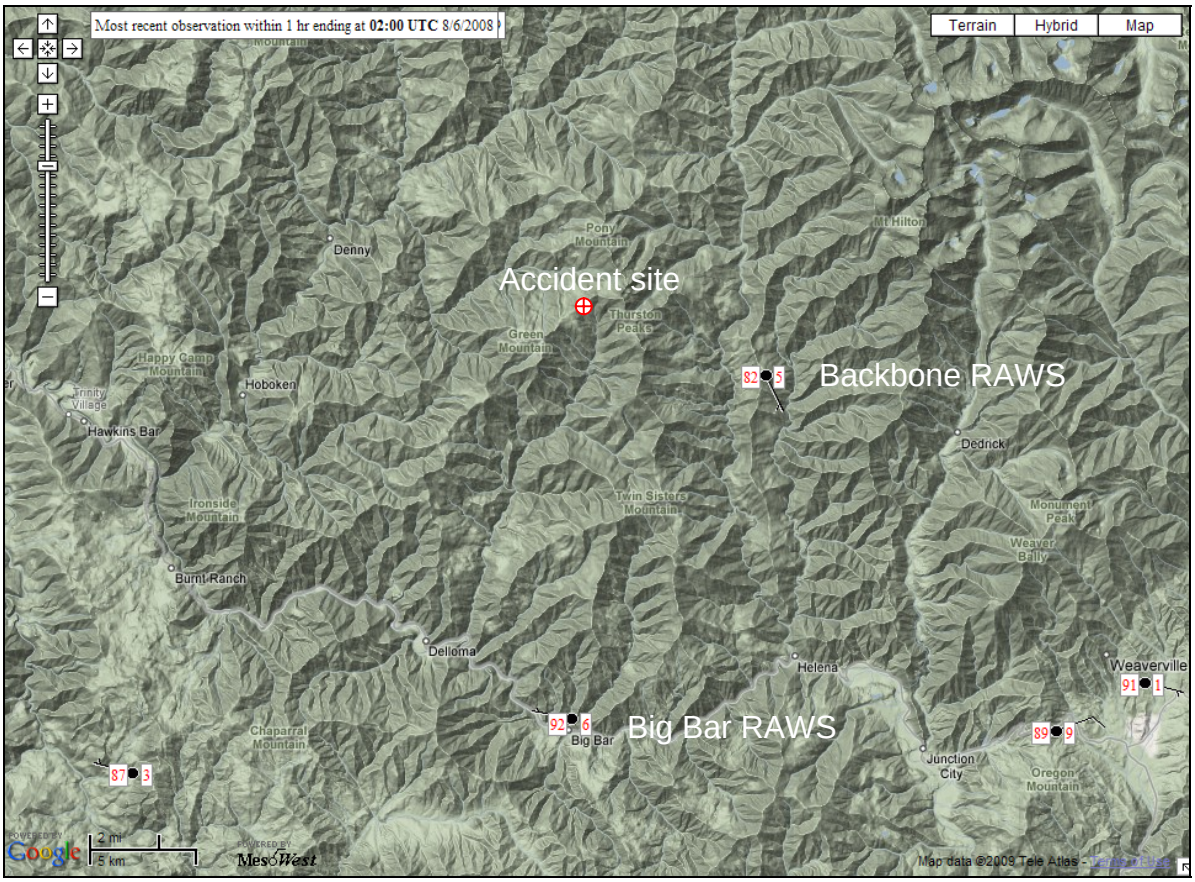

Figure 4 – MesoWest observations for 1900 PDT

The Backbone RAWS reported for 1900 PDT indicated southeast winds of 5 mph with a temperature of 82° F. Big Bar RAWS at this time reported winds from the west at 6 mph and a temperature of 92° F.

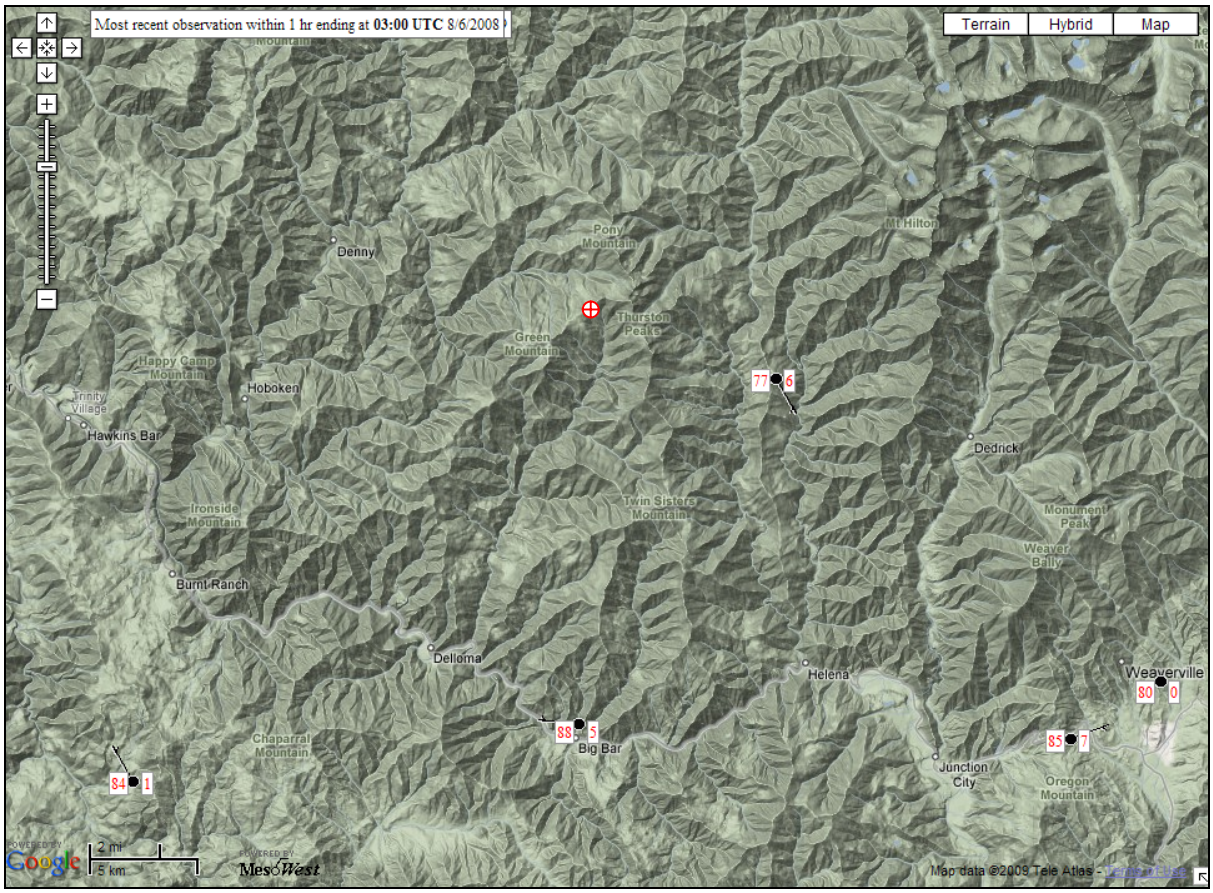

Figure 5 – MesoWest observations for 2000 PDT

The 2000 PDT plot indicated that Backbone RAWS reported southeast winds at 6 mph and a temperature of 77° F, and Big Bar RAWS winds from the west at 5 mph and a temperature of 88° F.

Both the 1900 and 2000 PDT MesoWest wind plots depict a cyclonic circulation in the immediate vicinity of the accident site consistent with a thermal low[2] or a warm core low pressure system associated with the fire.

4.0 Sounding Data

The closest upper air sounding or rawinsonde observation (RAOB) was from the NWS Medford (KMFR), Oregon, site number 72597, located approximately 90 miles north of the accident site at an elevation of 1,329 feet msl. The 1700 PDT sounding on August 5, 2008,

[2] Thermal low - Also known as heat low, it is an area of low pressure due to the high temperatures caused by intensive heating at the surface. It tends to remain stationary over its source area, with weak cyclonic circulation. There are no fronts associated with it. An example is the low that develops over southwestern United States and northwestern Mexico during the summer months.

from KMFR plotted on a standard Skew-T log P diagram[3] with the observed and derived stability parameters and is included as figure 6 from the surface to 500-hPa or 18,000 feet.

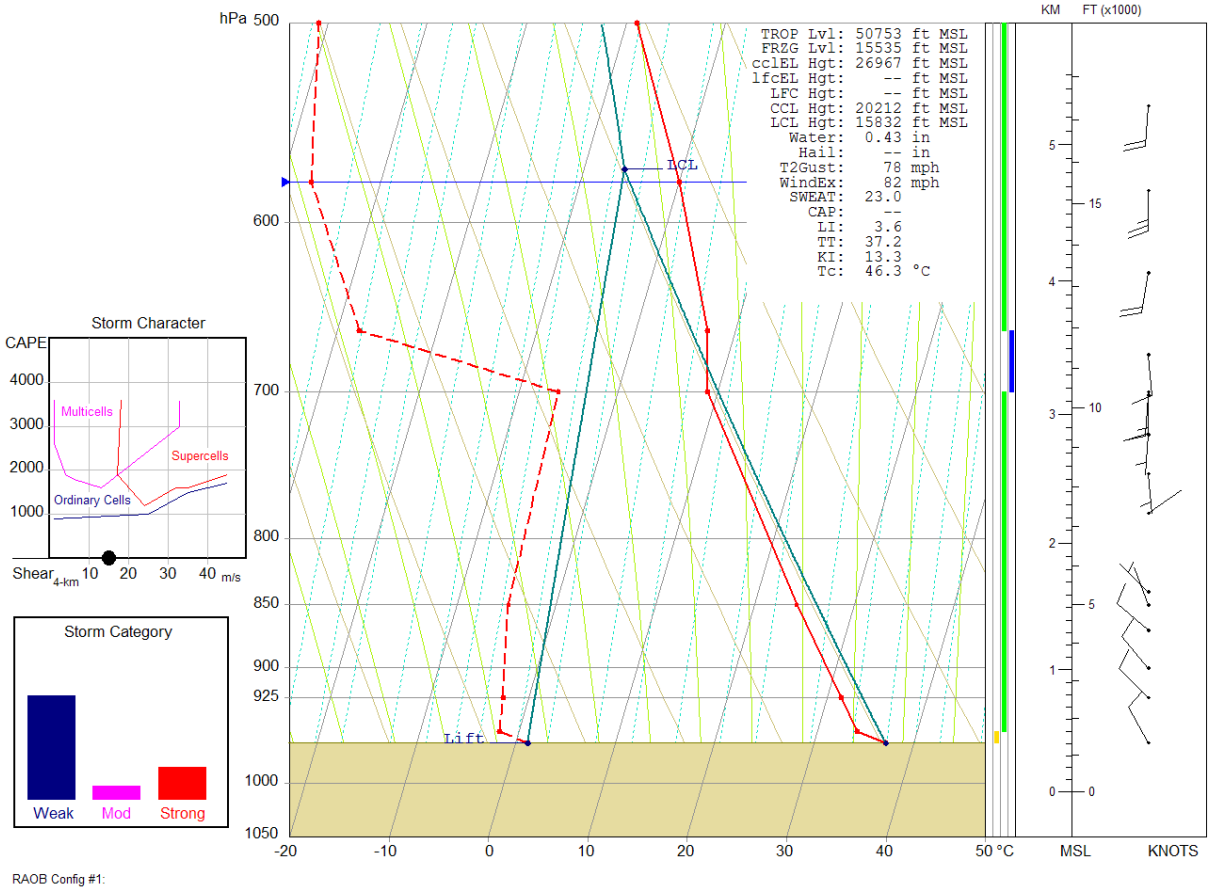

Figure 6 – Medford, Oregon sounding at 1700 PDT

The KMFD sounding depicted a surface temperature of 37.2° C, with a dry low-level environment with a lifted condensation level (LCL)[4] at 571-hPa or at 14,503 feet agl, and a convective condensation level (CCL)[5] at 482-hPa or 18,883 feet agl. No defined temperature inversions were identified below 18,000 feet; however, an isothermal layer, where temperature remained constant with height was identified between 9,500 and 12,000 feet. This was the only stable layer identified. The stability parameters indicated a Lifted Index

[3] Skew T log P diagram – is a standard meteorological plot using temperature and the logarithmic of pressure as coordinates, used to display winds, temperature, dew point, and various indices used to define the vertical structure of the atmosphere.

[4] Lifting Condensation Level (LCL) - The height at which a parcel of moist air becomes saturated when it is lifted dry adiabatically.

[5] Convective Condensation Level (CCL) - The height to which a parcel of air, if heated sufficiently from below, will rise adiabatically until condensation starts. This is typically used to identify the base of cumuliform clouds, which are normally produced from surface heating and thermal convection.

(LI) [6] of 3.6 indicating a conditionally unstable atmosphere, and a K-Index[7] of 13.3, limiting convective activity. Stability is also displayed on the right hand portion of the chart with yellow indicating an unstable layer, green indicates conditionally unstable, and blue indicates stable layers. The tropopause was identified at 50,753 feet.

The sounding wind profile indicated a surface wind from 330° at 9 knots with little directional variation with height through 5,000 feet, and with wind speed less than 10 knots. Above 8,000 feet the winds shifted to the south and increased to 20 knots above 13,000 feet. The mean steering wind was from 190° at 10 knots. The level of maximum wind was identified at 37,000 feet from 200° at 64 knots. No large vertical wind shears were identified in the sounding below 18,000 feet.

5.0 Model Sounding

The NOAA Air Resources Laboratory (ARL) North American Model (NAM) sounding for 2000 PDT (0300Z on August 6, 2008) over the accident site is included as figure 7.

[6] Lifted Index (LI) - A common measure of atmospheric instability. The lifted index is obtained by lifting a parcel of air from near the surface to 500-hPa or 18,000 feet, and comparing the lifted parcels temperature to the environmental temperature at that level. Negative values indicate instability - the more negative, the more unstable the air is, and the stronger the updrafts are likely to be with any developing thunderstorms.

[7] K-Index - The measure of thunderstorm potential based on the vertical temperature lapse rate, the moisture content of the lower atmosphere and the vertical extent of the moist layer. The higher the K-Index, the greater the probability of air mass type thunderstorms development.

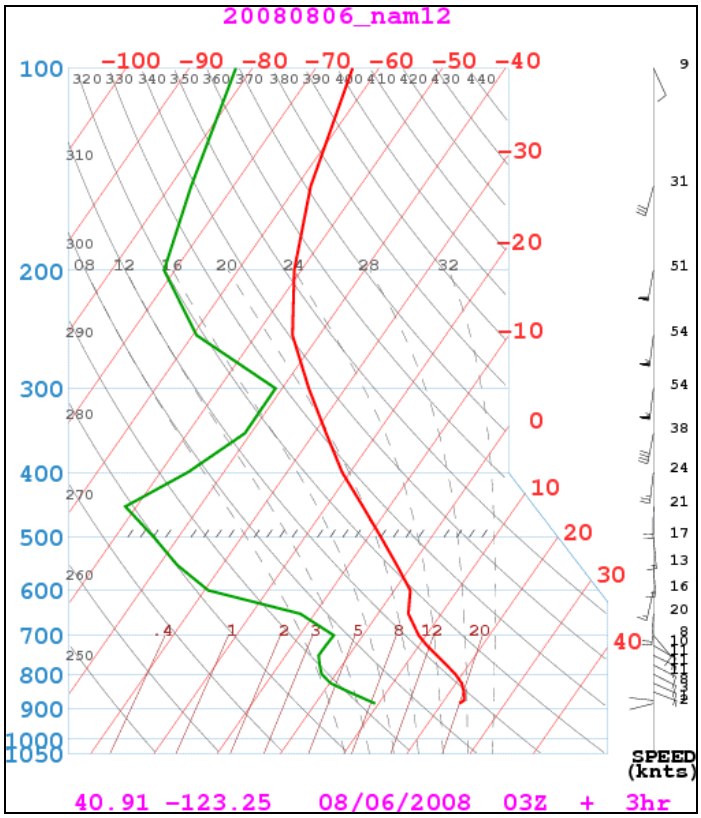

Figure 7 – ARL Forecast sounding over accident site for 2000 PDT

The ARL model sounding data is included on the following table, with heights rounded to the nearest 10 feet, wind to the nearest 10° and speed converted to knots. Due to the model resolution and model terrain, it should be noted that the lowest heights are below the accident elevation. The maximum temperature in the lowest levels was 23.2° C with winds calm or under 3 knots. At 850-hPa or at 4,950 feet msl, a temperature of 22.2° C and winds from 110° at 4 knots were predicted.

Pressure (hPa)	Height (msl)	Temperature (°C)	Dewpoint (°C)	Wind (Dir/KT)	RH (%)
884	3,840	22.8	9.4	calm	40
875	4,120	23.2	8.0	calm	38
850	4,950	22.2	4.0	110° 4	31
825	5,800	20.9	0.2	110° 8	25
800	6,670	18.9	-2.2	110° 12	24
775	7,560	16.5	-3.6	110° 12	25
750	8,460	13.9	-4.8	110° 12	27
725	9,400	11.3	-4.7	110° 10	33
700	10,350	8.8	-4.6	130° 10	39

6.0 Satellite Data

The Geostationary Operations Environmental Satellite number 11 (GOES-11) data was obtained from the National Climatic Data Center (NCDC) and displayed on the National Transportation Safety Board's Man-computer Interactive Data Access System (McIDAS) workstation. Both visible and infrared imagery was obtained surrounding the time of the accident. The infrared imagery (band 4) at a wavelength of 10.7 microns (μm) provided a 4-kilometer (km) resolution with radiative cloud top temperatures. The visible imagery (band 1) at a wavelength of 0.65 μm provided a resolution of 1 km. The satellite imagery surrounding the time of the accident were reviewed and the closest images documented below.

Figure 7 is the GOES-11 infrared band 4 image at 1930 PDT (0230Z) at 4X magnification with a standard MB temperature enhancement curve applied to highlight the higher and colder cloud tops associated with deep convection. The image depicted scattered cumulus clouds over interior northern California with smoke plumes, with an extensive layer of low stratiform clouds over the Pacific Ocean and along the immediate coastal sections to the west and southwest of the accident site. No cumulonimbus and cumulus congestus clouds that may have produced precipitation or any strong outflow boundaries or wind gusts in the vicinity of the accident site.

Figure 8 is the GOES-11 visible band 1 image at 1930 PDT at 2X magnification. Smoke plumes are observed dissipating to the north-northwest

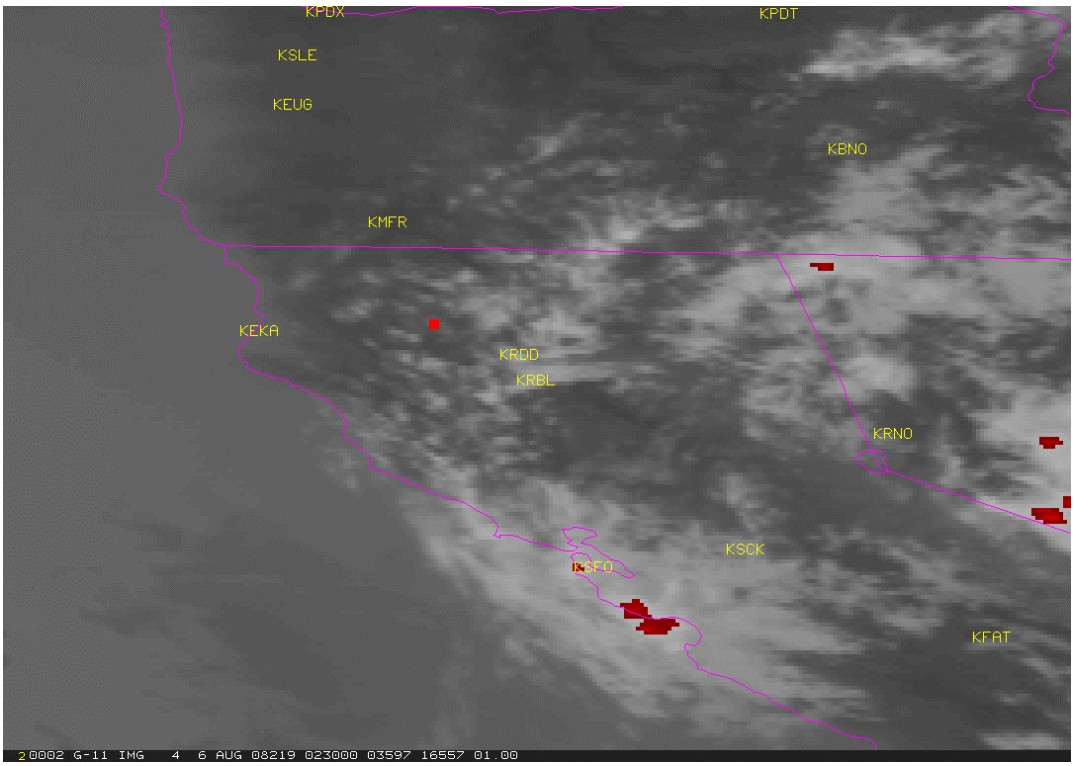

Figure 7 – GOES-11 infrared image at 1930 PDT

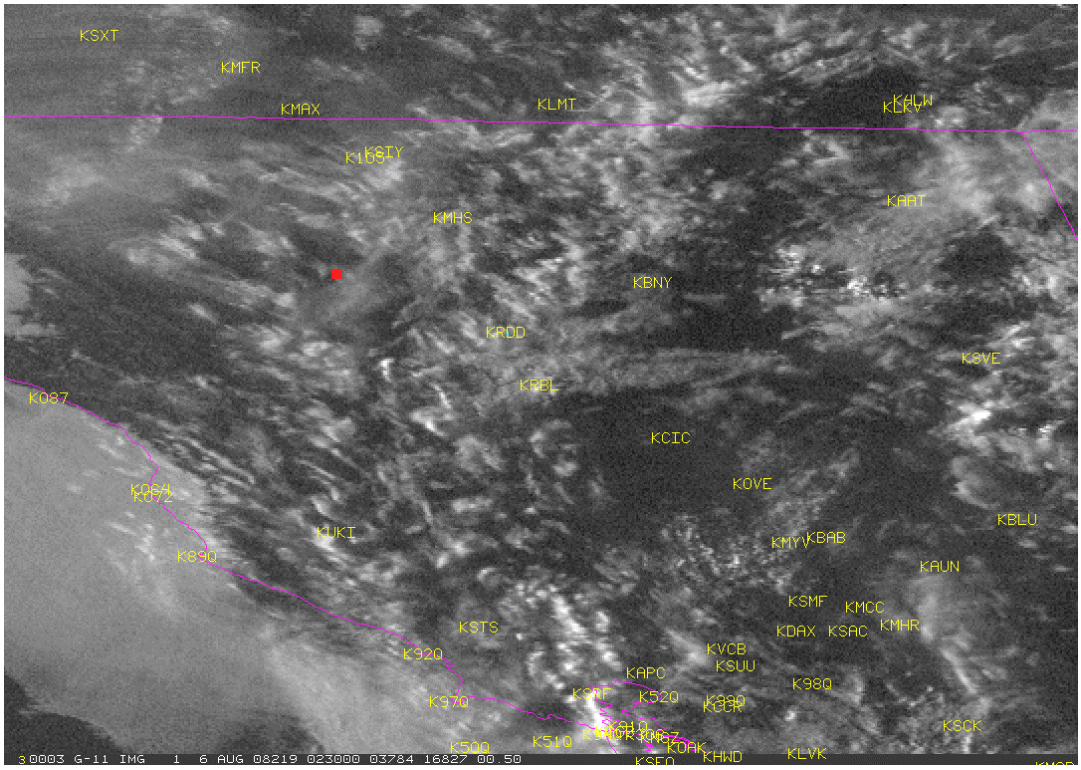

Figure 8 – GOES-11 visible image at 1930 PDT

The Moderate Resolution Imaging Spectroradiometer (MODIS) satellite imagery was also reviewed for details over the area. The MODIS imagery is available on the National Aeronautics and Space Agency (NASA) Aqua and Terra polar orbiting satellites as part of the NASA-centered international Earth Observing System. Both satellites orbit the Earth from pole to pole, seeing most of the globe every day. Onboard Terra, MODIS sees the Earth during the morning, while Aqua MODIS orbits the Earth in the afternoon. Figure 9 is the MODIS afternoon image from Aqua at 250-meter resolution obtained from the University of Wisconsin-Madison's Space Science and Engineering Center (SSEC) with the approximate accident site marked taken several hours prior to the accident. The image shows several areas of fire across northern California with the smoke plumes drifting northward under the prevailing upper level winds.

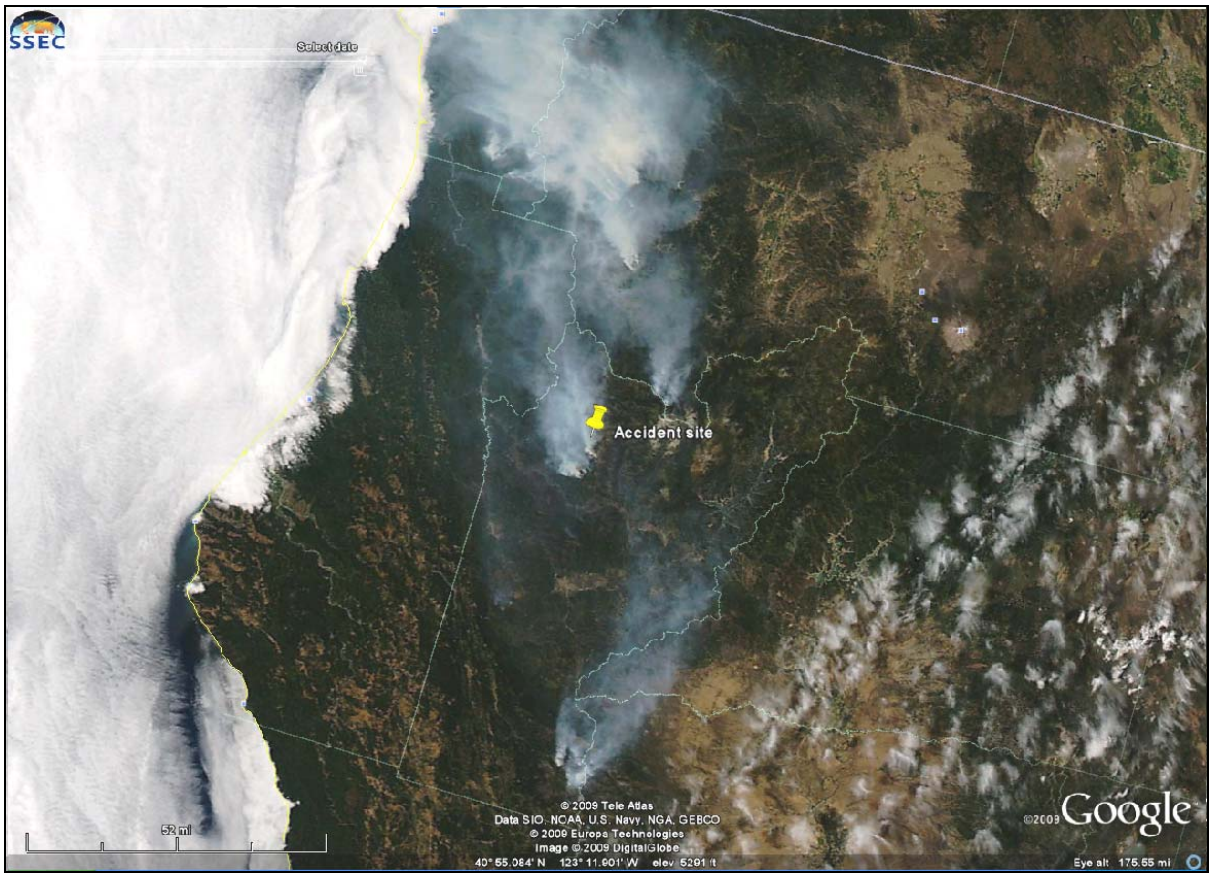

Figure 9 – MODIS image over northern California on the afternoon of August 5, 2008

7.0 Terminal Forecast (TAF)

The closest NWS Terminal Aerodrome Forecast (TAF) to the accident site was from (KRDD) located approximately 50 miles east-southeast of the accident site. The forecast current at the time of the accident was issued at 1629 PDT and valid for a 24-hour period beginning at 1700 PDT. The forecast is as follows:

KRDD 052329Z 060024 16010G15KT P6SM SCT200
FM0200 17008KT P6SM SCT200
FM0400 VRB04KT P6SM SCT200
FM2100 18007KT P6SM SCT150=

The forecast expected winds from 160 at 10 knots gusting to 15 knots, visibility better than 6 miles, scattered clouds at 20,000 feet agl. From 1900 to 2100 PDT the winds were expected to be from 170 at 8 knots, and from 2100 through 1400 PDT winds variable at 4 knots.

8.0 NWS Fire Forecast

The NWS Storm Prediction Center (SPC) Fire Weather program is to provide a national fire weather guidance product for use by the National Weather Service, as well as other federal, state, and local government agencies. The product is intended to delineate areas of the contiguous U. S. where the pre-existing fuel conditions, combined with forecast weather conditions for the upcoming 24- to 48-hour period, will result in a significant threat for wildfires. The following bulletin was issued for August 5, 2008.

FNUS21 KWNS 050734
DAY 1 FIRE WEATHER OUTLOOK
NWS STORM PREDICTION CENTER NORMAN OK
0234 AM CDT TUE AUG 05 2008
VALID 051200Z - 061200Z

...NO CRITICAL AREAS...

...SYNOPSIS...
AN UPPER RIDGE WILL BUILD OVER THE WRN STATES...AND WILL EXTEND EWD ACROSS THE PLAINS INTO THE SE WITH HOT TEMPERATURES. MONSOONAL MOISTURE WILL SPREAD NWD INTO THE GREAT BASIN...WITH SCATTERED THUNDERSTORMS MAINLY ACROSS THE FOUR CORNERS STATES. TO THE E...AN UPPER SHORTWAVE TROUGH WILL MOVE SEWD ACROSS THE GREAT LAKES WITH THUNDERSTORMS ALONG A COLD FRONT. A LOW PRESSURE TROUGH WILL FORM ACROSS THE MID ATLANTIC...WITH VERY WARM AFTERNOON TEMPERATURES AND LOW HUMIDITY.

...N CNTRL CA...
A FEW MODELS INDICATE SOME MID LEVEL MOISTURE WILL MAKE ITS WAY NWD TO NEAR THE BAY AREA INTO THE SACRAMENTO VALLEY. ENOUGH INSTABILITY MAY BE PRESENT BY LATE IN THE AFTERNOON FOR AN ISOLATED DRY THUNDERSTORM...WITH THE HIGHEST THREAT BEING OVER THE SRN SIERRA. IT WILL REMAIN VERY HOT AND DRY IN THE LOW LEVELS...THUS IF ISOLATED STRIKES DO OCCUR...THEY COULD EASILY START A FIRE.
HOWEVER...COVERAGE OF ANY LIGHTNING SHOULD REMAIN QUITE LOW.

..JEWELL.. 08/05/2008

9.0 Astronomical Data

The United States naval Observatory reported the following astronomical data for August 5, 2008, for Weaverville, Trinity County, California:

SUN	
Begin civil twilight	0542 PDT
Sunrise	0613 PDT
Sun transit	1318 PDT
Elevation of Sun	6.6° above the horizon at 1941 PDT
Azimuth of Sun	286°

Sunset	2022 PDT
End civil twilight	2052 PDT

MOON

Moonrise	1103 PDT
Moonset	2223 PDT
Phase of the Moon	waxing crescent with 22% of the disk illuminated

10.0 Photograph Evidence

Figure 10 is a photograph taken approximately 3 to 4 minutes after the accident by Michael Reid, who was flying in N420RL enroute to the H44 site to pick up 2 helitack crewmembers. The picture shows a nearly vertical smoke plume at low levels, which gradually begins to dissipate downstream to the north. The smoke plume indicates calm surface winds, with light southerly winds above the boundary level. The mountains in the background are obscured by smoke from the surrounding fires that were being during the period, but are still identifiable.

Figure 10 – Smoke plume from accident site

11.0 Witness Statements

A review of the witness statements and interviews were also reviewed for their comments on the weather conditions surrounding the time of the accident. The following comments were noted:

Matthew Vassel – on arrival at 1630 PDT northwest winds at 3 to 5 knots, which shifted to the southeast by 1800 PDT, with winds calm at the time of arrival of the S-61.
David Gomez – wind calm, visibility good.
Brian Buchner – light winds out of the southeast.
Ulf Peters – light winds, with possible headwind of 0 to 5 mph.
Scott Posner – winds calm.
Alex Rhea – wind 3 to 7 mph from the south-southeast
Bill Coultas – temperature 22° C

12.0 Density Altitude Calculations

As previously stated no formal weather reporting existed at the accident site. To help determine performance of the helicopter, the pressure and density altitude were examined for several areas during the period.

Density altitude is defined as the altitude in the International Standard Atmosphere (ISA) at which the air density would be equal to the air density at the place of observation. "Density Altitude" is the pressure altitude adjusted for non-standard temperature. Both an increase in temperature and humidity will cause a reduction in air density. Thus, in hot and humid conditions, the density altitude at a particular location may be significantly higher than the true altitude. Aviation typically uses the following density altitude computation chart (figure 11) or can be approximated from presure altitude[8] by the following equation, where OAT is the Outside Air Temperature, and ISA temperature equals 15 °C - (1.98 °C/1000 ft × pressure altitude in feet)[9]:

Density altitude in feet = pressure altitude in feet + (120 x (OAT – ISA temperature))

[8] Pressure altitude - is the indicated altitude when an altimeter is set to an agreed baseline pressure setting. This setting 1013.25-hPa or 29.92 inches Hg, is equivalent to the air pressure at msl in the International Standard Atmosphere. Pressure altitude is primarily used in aircraft performance calculations and in high-altitude flight.

[9] Standard lapse rate is 1.98° C/1,000 feet.

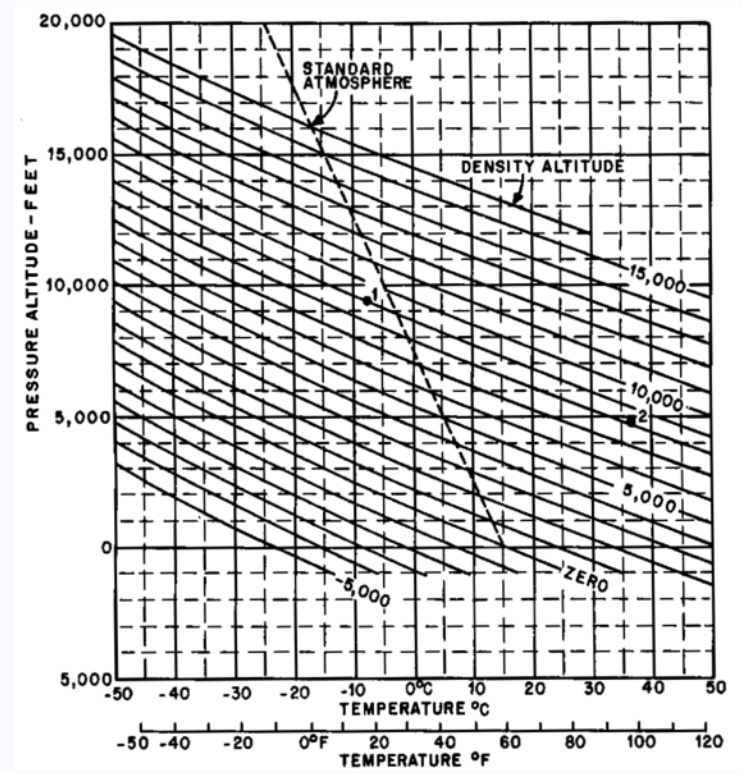

Figure 11 – Density Altitude Computation Chart

Most webbased calculators perform the required caliculations from the airports elevation, temperature, altimeter setting, and dew point. To determine the local altimeter setting or pressure altitude, station pressure[10] is required. The closest weather reporting site that had that information available was KRDD ASOS at an elevation of 485 feet msl and Trinity Base RAWS at an elevation of 3,207 feet msl, located 22 miles east-southeast of the accident site. The following table provides the details for the two qualtity controlled sites:

Station	Time (PDT)	T (°C)	Td (°C)	RH (%)	Wind (KT)	STA PRE	SLP	ALT	P Alt	D Alt
KRDD	1650	34.4	-2.2	9	SSE 8	29.28	29.80	29.82	598 ft	2,980 ft
	1750	33.3	1.7	13	SSE 6	29.29	29.81	29.83	589 ft	2,871 ft
	1850	31.7	5.6	19	SSE 6	29.30	29.82	29.84	579 ft	2,712 ft
	1950	28.3	5.6	24	SE 6	29.33	29.85	29.87	551 ft	2,301 ft
Trinity Camp	1650	30	-4	11	ESE10-24	26.65	29.72	29.97	3,168 ft	5,636 ft
	1750	30	-5	10	E 7-10	26.65	29.72	29.97	3,168 ft	5,657 ft
	1850	28	-7	10	ESE 6-12	26.65	29.73	29.96	3,168 ft	5,417 ft
	1950	27	-5	12	SE 3-10	26.65	29.75	29.97	3,168 ft	5,354 ft

[10] Station pressure - the absolute air pressure at a given reporting station. The air pressure is directly proportional to the combined weight of all air in the atmosphere located in a column directly above the reporting site. Consequently, the station pressure may vary tremendously from one location to another in mountainous regions due to the strong variation of atmospheric pressure with height. Vertical variations of pressure range up to 150 hPa per mile whereas horizontal variations are usually less than .1 hPa per mile.

The following table is the derived data for the accident helicopter's flight based on streamline analysis of the Mesowest data surrounding the period:

Site	Time (PDT)	Temp (°C)	Wind	Pressure Altitude	Density Altitude
Trinity Base	1707	30	ESE 8KT	3,168 FT	5,657 FT
Trinity Base	1751	27	SE 2KT	3,168 FT	5,354 FT
H36	1751	34	WNW 5-10KT	1,500 FT	4,000 FT
H44	1814	29	Calm[11]	6,105 FT	9,072 FT
H36	1829	33	WNW 5-10KT	1,500 FT	3,950 FT
H44	1843	27	Calm	6,106 FT	8,840 FT
H36	1854	31	W 3-10KT	1,500 FT	3,800 FT
Trinity	1923	27	SE 2-8KT	3,168 FT	5,354 FT
H44	1940	23	Calm	6,106 FT	8,476 FT

If the temperature at H44 was as low as 20° C, the density altitude would still have exceeded 7,900 feet at the time of the accident.

Donald E. Eick
NTSB Senior Meteorologist

[11] Calm – is defined as no motion of air is detected. In ASOS reports the wind is reported as "calm" when the average 2-minute wind is 2 knots or less.