National Transportation Safety Board

Office of Aviation Safety
Washington, D.C. 20594-2000
July 23, 2015

WEATHER STUDY

GAA15CA172

A. Accident

Location: Silver Springs, Nevada
Date: July 8, 2015
Time: about 1500 Pacific daylight time (about 2200 UTC[1])
Aircraft: Schweizer SGS1-26B; N5839V

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 daylight time (PDT) for July 8, 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).

Accident location: Silver Springs Airport (SPZ) in Silver Springs, Nevada (39.4030556° North latitude, 119.2511944° West longitude, elevation of 4,265 feet)

[1] UTC – abbreviation for Coordinated Universal Time

Surface Observations

Some data from the automated hourly observations[2] taken by the SPZ SuperAWOS for the times surrounding the accident time are presented here. At 1455 PDT, the Super AWOS reported a temperature of 24° Celsius (C), a dew point temperature of 6°C, a wind from 220° true, an average wind of 34 knots with gusts to 47 knots. The average and gust wind calculation methodologies as well as calibration and maintenance standards and overall data quality for this instrument are unknown.

Time	Temp	D_Temp	W_Dir	W_Mag	G_Mag
1155	25	11	070°	0	0
1255	26	9	070°	0	0
1355	27	9	090°	5	0
1455	**24**	**6**	**220°**	**34**	**47**
1555	22	8	230°	28	37

Meteorological reporting station STGNV (Nevada Department of Transportation) was located about 3.5 miles west-southwest of the accident site at an altitude of 4,501 feet. Calibration and maintenance standards of this instrument, as well as the overall quality of the data, are not known. Some reports[3] from STGNV during the times surrounding the accident time are presented here:

Time	Temp	D_Temp	RH	W_Mag	W_Dir	G_Mag
1406	26.7	7.7	30	7.0	107°	12.2
1417	27.2	7.1	28	7.8	124°	11.3
1428	26.7	7.2	29	1.7	109°	3.5
1439	24.4	4.7	28	25.3	230°	37.3
1450	21.7	5.6	35	26.0	241°	33.8
1501	21.1	6.2	38	24.3	234°	29.5
1512	20.0	6.3	41	20.0	227°	24.3

Meteorological reporting station E1922 (APRSWXNET/Citizen Weather Observer Program) was located about 6 miles west-southwest of the accident site at an altitude of 4,311 feet. Calibration and maintenance standards of this instrument, as well as the overall quality of the data, are not known. Some reports[3] from E1922 during the times surrounding the accident time are presented here:

Time	Temp	D_Temp	RH	W_Mag	W_Dir	G_Mag
1348	26.7	10.3	36	1.7	049°	9.5
1403	26.7	10.3	36	2.5	108°	11.3
1418	27.8	10.0	33	0.8	041°	5.2
1433	26.1	8.1	32	15.6	260°	28.8

[2] Temp=temperature(°C); D_Temp=dew point temperature (°C); W_Mag=average wind magnitude(kts); W_Dir=average wind direction(true); G_Mag=Gust wind magnitude(kts)

[3] Temp=temperature(°C); D_Temp=dew point temperature (°C); RH=relative humidity(%); W_Mag=average wind magnitude(kts); W_Dir=average wind direction(true); G_Mag=Gust wind magnitude(kts)

1448	20.6	7.6	43	14.0	225°	30.3
1503	19.4	8.2	48	14.0	255°	22.5
1518	18.9	8.5	51	12.2	186°	20.8

Upper Air Sounding

A North American Mesoscale (NAM) model sounding (figure 1) for the accident location at 1400 PDT was retrieved from the National Oceanic and Atmospheric Administration's Air Resources Laboratory. The most-unstable Convective Available Potential Energy (CAPE)[4] parameter was 1,493 Joules/kilogram (from the surface). Downdraft CAPE (DCAPE)[5] was measured at 863 Joules/kilogram. The T2Gust ("Severe Weather Gust Potential") and WindEx ("Microburst Gust Potential") parameters were 49 knots and 57 knots, respectively.

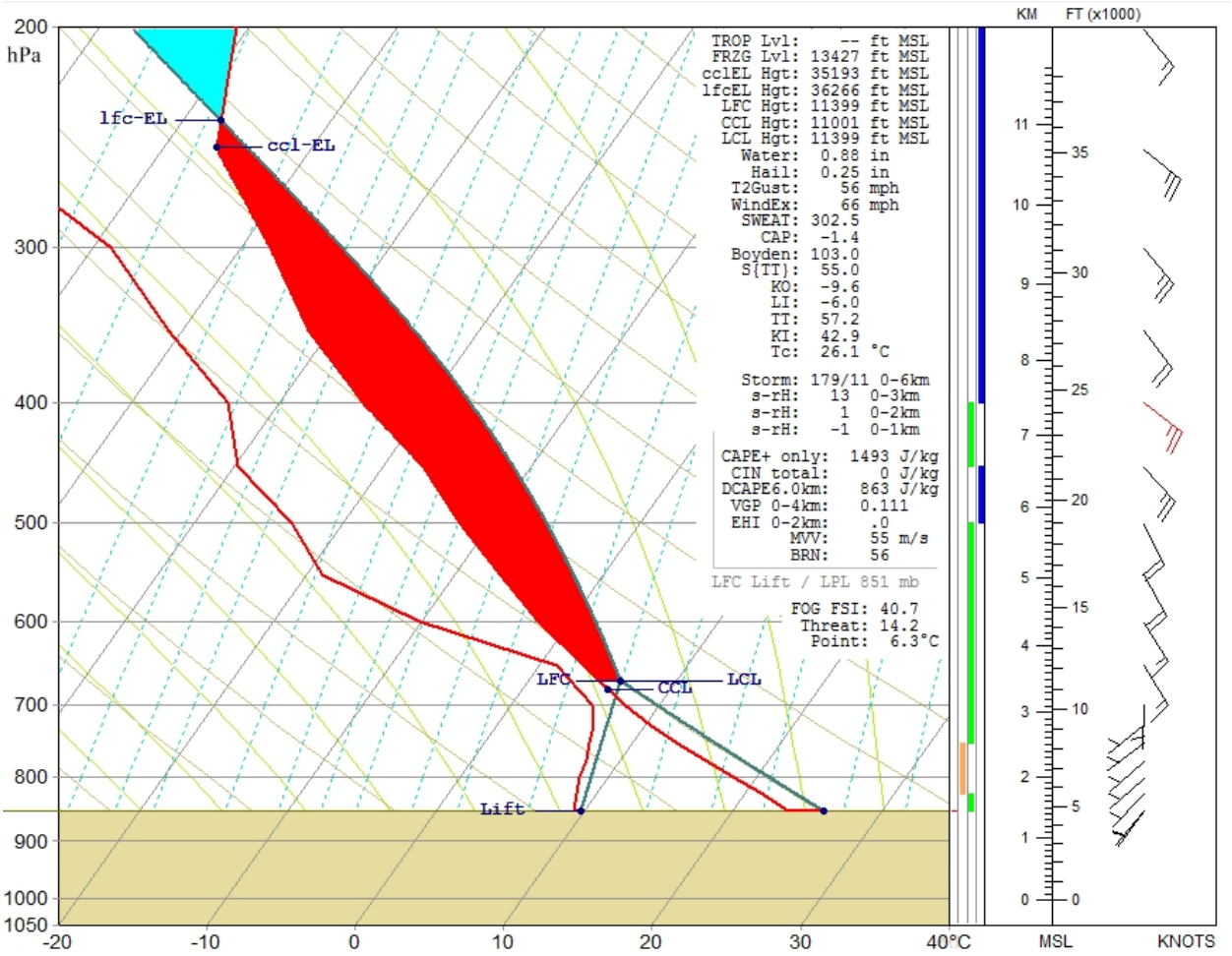

Figure 1 – NAM model sounding data in SkewT/LogP format for 1400 PDT, surface to 200 hPa.

[4] Convective Available Potential Energy - A measure of the amount of energy available for convection. CAPE is directly related to the maximum potential vertical speed within an updraft; thus, higher values indicate greater potential for severe weather. 1493 Joules/kilogram would be considered a moderate value.

[5] The DCAPE can be used to estimate the potential strength of rain-cooled downdrafts within thunderstorm convection, and is similar to CAPE. Larger DCAPE values are associated with stronger downdrafts. 863 Joules/kilogram would be considered a moderate value.

Pilot Reports

The following publically disseminated pilot report[6] was made about 45 minutes prior to the accident: At 1415 PDT at Boeing 737 aircraft over Reno/Tahoe International Airport (RNO) reported low-level wind shear (gain of 15 knots) between 400 and 1,200 feet agl and a 9 knot tailwind during its decent to runway 16R at RNO.

> RNO UUA /OV RNO /TM 2115 /FL012 /TP B737 /RM LLWS +15KT 1200FT-400FT DURD RY16R RNO 9 KT TAILWIND=

Aviation Section of the Area Forecast Discussion

An Area Forecast Discussion (AFD) was issued at 1321 PDT by the NWS Weather Forecast Office in Reno, Nevada (KREV). The aviation portion of the AFD is presented here:

> FXUS65 KREV 082021
> AFDREV
> AREA FORECAST DISCUSSION
> NATIONAL WEATHER SERVICE RENO NV
> 121 PM PDT WED JUL 8 2015
> .SYNOPSIS...
> SHOWERS AND THUNDERSTORMS AND MILD TEMPERATURES WILL CONTINUE THROUGH FRIDAY AS AN UPPER LOW MOVES ACROSS THE AREA. LOCALLY HEAVY RAIN ALONG WITH HAIL AND GUSTY OUTFLOW WINDS ARE STILL POSSIBLE THIS EVENING. AS A DRIER AIRMASS WORKS INTO THE REGION THIS WEEKEND AND EARLY NEXT WEEK, SHOWERS WILL END WITH TEMPERATURES SLOWLY WARMING BACK TO NORMAL LEVELS.
>
> .AVIATION...
> THUNDERSTORMS WILL CONTINUE TO FIRE THROUGH EARLY THIS EVENING WITH HEAVY RAIN, HAIL TO ONE INCH AND WIND GUSTS TO 60 MPH WITH STRONGER STORMS. STORMS HAVE ALREADY IMPACTED SIERRA TAF SITES WHERE AIRMASS STABILIZATION IS ANTICIPATED BY LATE AFTERNOON. FOR WESTERN NV AIRPORTS, THUNDERSTORM THREAT WILL BE CLOSER TO THE 21Z-02Z TIME WINDOW WHEN THE GREATEST THREAT FOR OUTFLOW WINDS WILL BE PRESENT GIVEN TEMPERATURES WILL STILL BE IN THE 80S. AFTER THIS EVENING, THERE WILL BE A MORE GENERAL THREAT FOR SHOWERS WITH THUNDERSTORMS MORE ISOLATED THU-FRI. HOHMANN

[6] Only pilot reports with the WMO header UBNV** were considered.

SIGMETs

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

A Convective SIGMET (figure 2) was issued at 1355 PDT advising of a line of severe thunderstorms 30 miles wide to the west of the accident site. The storms were moving from the south at 10 knots with tops to FL440, hail up to one inch, and wind gusts to 50 knots possible.

WSUS33 KKCI 082055
SIGW
_MKCW WST 082055

CONVECTIVE SIGMET 49W
VALID UNTIL 2255Z
NV CA OR
FROM 70ESE LKV-50NE RBL-40SW OAL-60NNE EHF
LINE SEV TS 30 NM WIDE MOV FROM 18010KT. TOPS TO FL440. HAIL TO 1 IN...WIND GUSTS TO 50KT POSS.

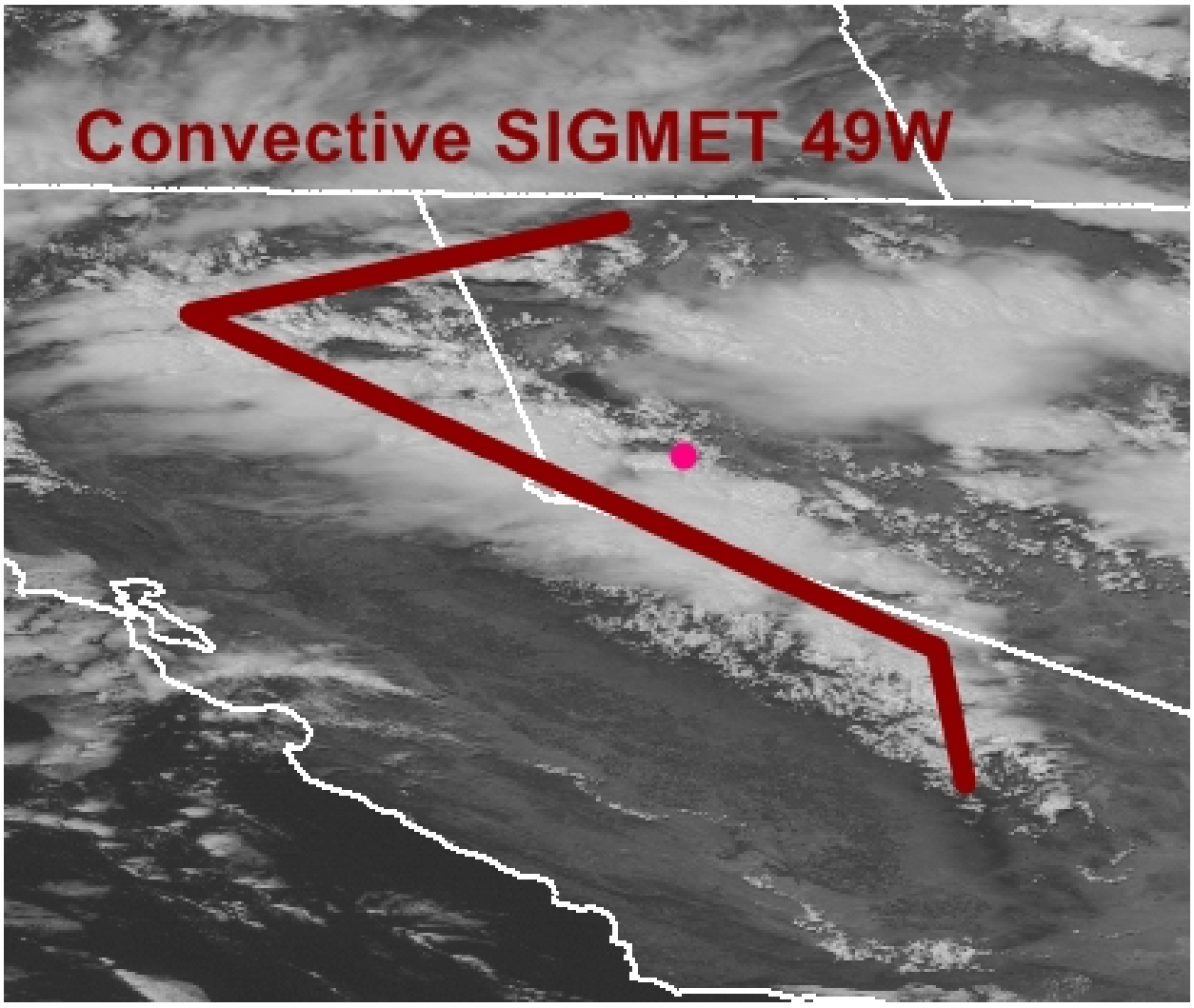

Figure 2 – Convective SIGMET 49W. Accident location denoted by pink dot.

KREV Products

A Special Weather Statement issued by KREV at 1405 PDT and applicable to Silver Springs, Nevada, advised of strong outflow gusts up to 50 miles per hour possible.

WWUS85 KREV 082105
SPSREV
SPECIAL WEATHER STATEMENT
NATIONAL WEATHER SERVICE RENO NV
205 PM PDT WED JUL 8 2015

NVZ002>004-082145-
GREATER RENO-CARSON CITY-MINDEN AREA NV-GREATER LAKE TAHOE AREA NV- WESTERN NEVADA BASIN AND RANGE INCLUDING PYRAMID LAKE NV-
205 PM PDT WED JUL 8 2015
...STRONG WINDS FROM THUNDERSTORM OUTFLOW MOVING NORTH OUT OF DOUGLAS COUNTY...
AT 203 PM PDT...DOPPLER RADAR WAS TRACKING AN OUTFLOW BOUNDARY FROM A THUNDERSTORM NEAR CARSON CITY...OR NEAR DAYTON...MOVING NORTH AT 45 MPH.
WIND GUSTS UP TO 50 MPH WILL BE POSSIBLE WITH THIS BOUNDARY.
LOCATIONS IMPACTED INCLUDE...
CARSON CITY...VIRGINIA CITY...DAYTON...WASHOE CITY...PLEASANT VALLEY...STAGECOACH...CARSON CITY AIRPORT...GALENA...NEW WASHOE CITY...INCLINE VILLAGE-CRYSTAL BAY...SILVER SPRINGS...US 50 AT CARSON CITY-LYON CO LINE...LAKEVIEW...NV 341 AT WASHOE-STOREY CO LINE...GOLD HILL...DAVIS CREEK CAMPGROUND...DAYTON VALLEY AIRPARK...JUNCTION U.S 50 AND SIX MILE CANYON-FT CHURCHILL RD...JUNCTION U.S 50 AND NV 341 AND WASHOE LAKE CAMPGROUND.
PRECAUTIONARY/PREPAREDNESS ACTIONS...
THIS STORM WILL AFFECT TRAVELERS ON HIGHWAY 50 BETWEEN CARSON CITY AND STAGECOACH. DRIVERS SHOULD EXPECT STRONG GUSTY CROSS WINDS.
&&
LAT...LON 3915 11955 3921 11992 3942 11988 3940 11923
TIME...MOT...LOC 2103Z 192DEG 21KT 3928 11971
$$

Weather Radar

A WSR-88D regional radar composite reflectivity mosaic obtained from the National Mosaic and Multi-Sensor (NMQ) Project[7] for 1500 PDT is presented in figure 3.

[7]The 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.

WSR-88D Level-II weather radar base reflectivity imagery from Reno, Nevada (KRGX), is presented in figures 4-24. KRGX was located approximately 24 miles north-northwest of the accident site at an elevation of about 8,300 feet. Assuming standard refraction and considering the 0.95° beam width for the WSR-88D radar beam, the KRGX ~0.5° tilt would have "seen" altitudes between about 8,750 and 11,150 feet above msl at the accident location. The KRGX base reflectivity imagery depicted developing and dissipating convection just to the west of the accident location during the time period preceding the accident. No "fine line" was identified on the KRGX imagery.

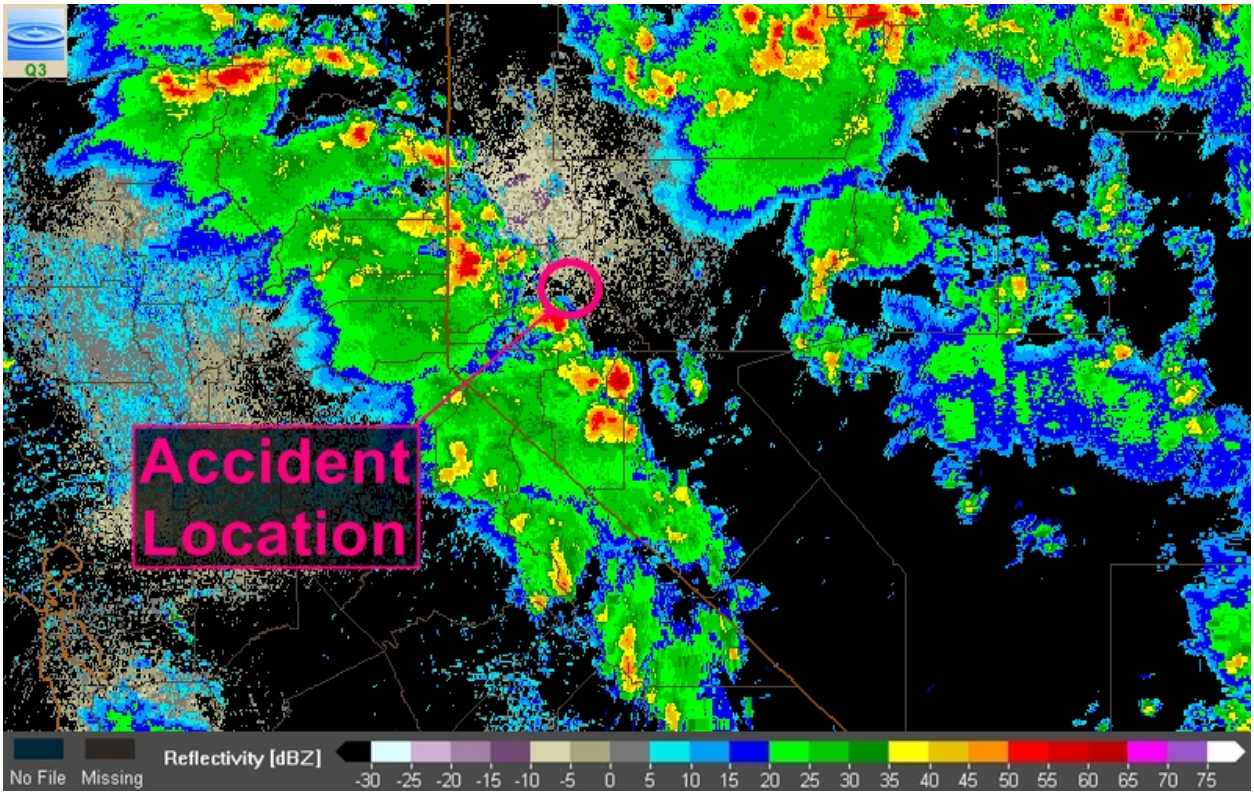

Figure 3 – NMQ NEXRAD composite reflectivity mosaic from 1500 PDT.

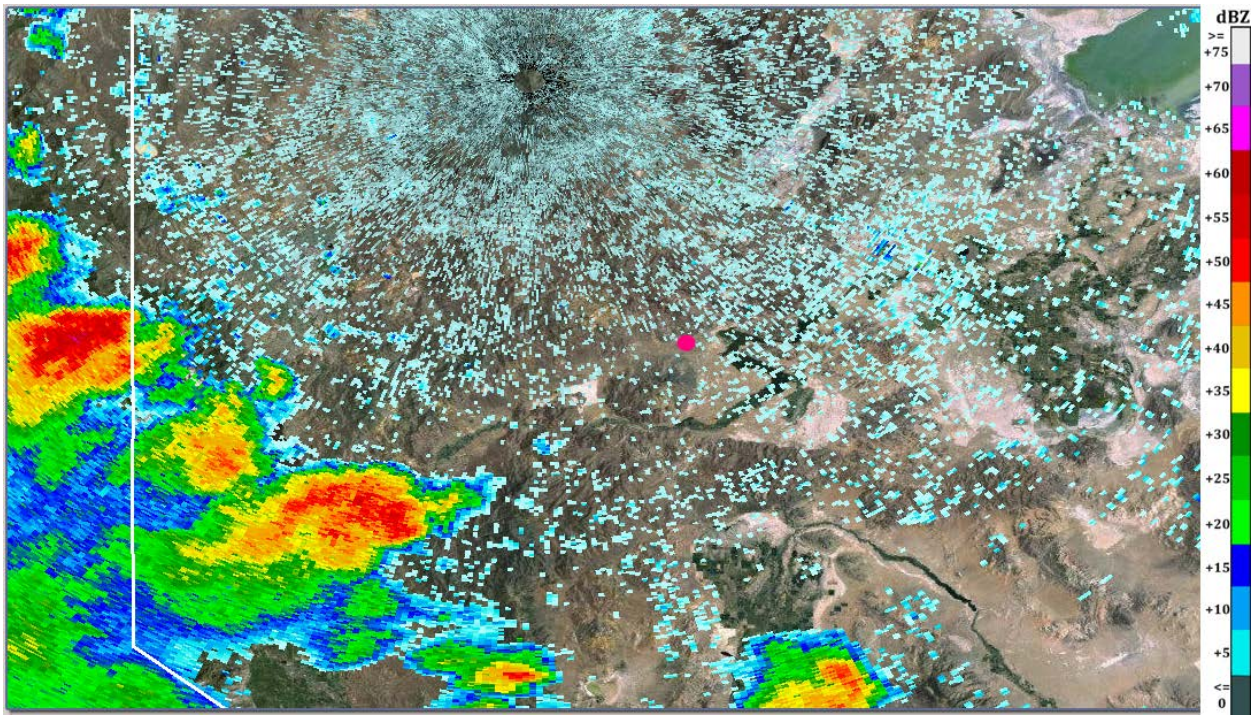

Figure 4 – KRGX ~0.5° Level-II reflectivity product from 1415:03 PDT. Accident site denoted by pink dot.

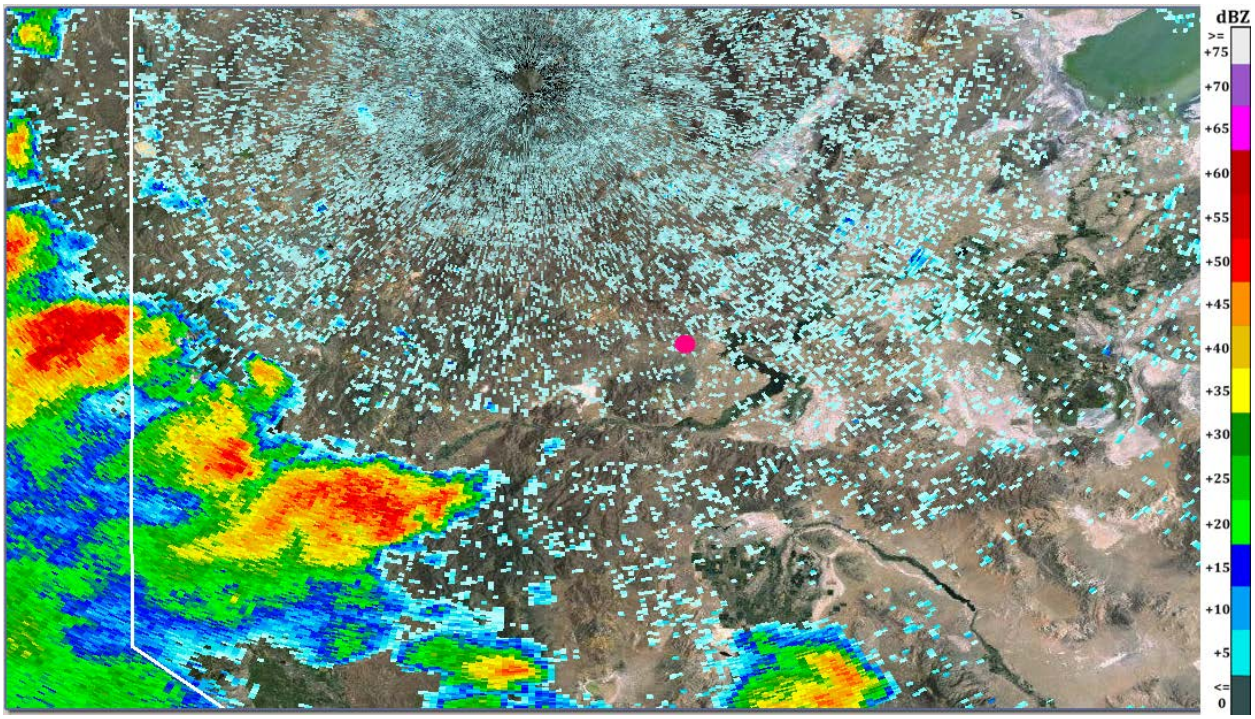

Figure 5 – KRGX ~0.5° Level-II reflectivity product from 1417:13 PDT. Accident site denoted by pink dot.

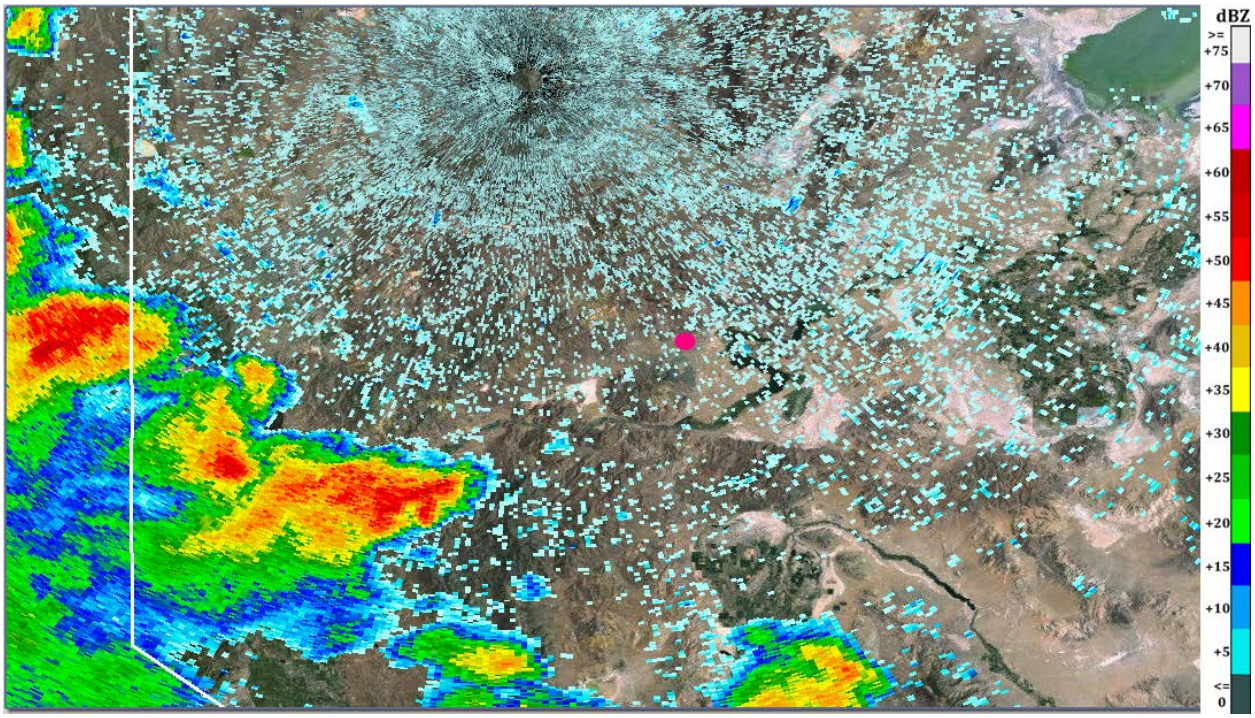

Figure 6 – KRGX ~0.5° Level-II reflectivity product from 1419:20 PDT. Accident site denoted by pink dot.

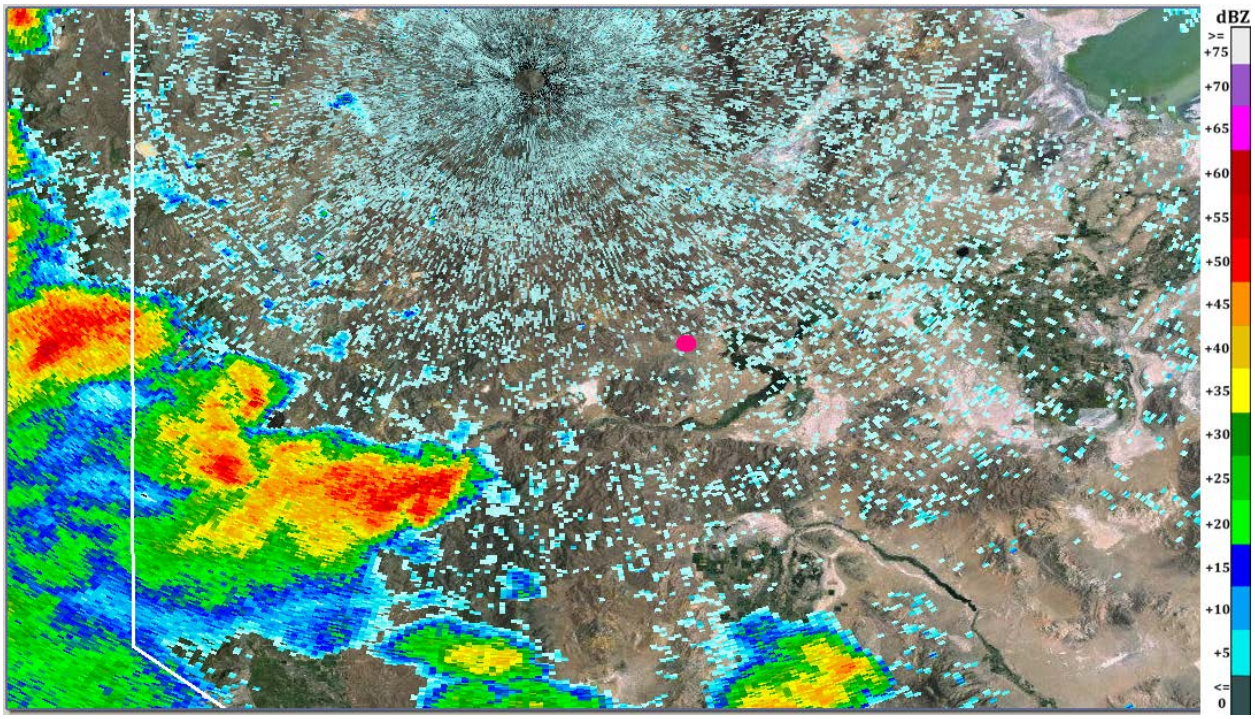

Figure 7 – KRGX ~0.5° Level-II reflectivity product from 1421:29 PDT. Accident site denoted by pink dot.

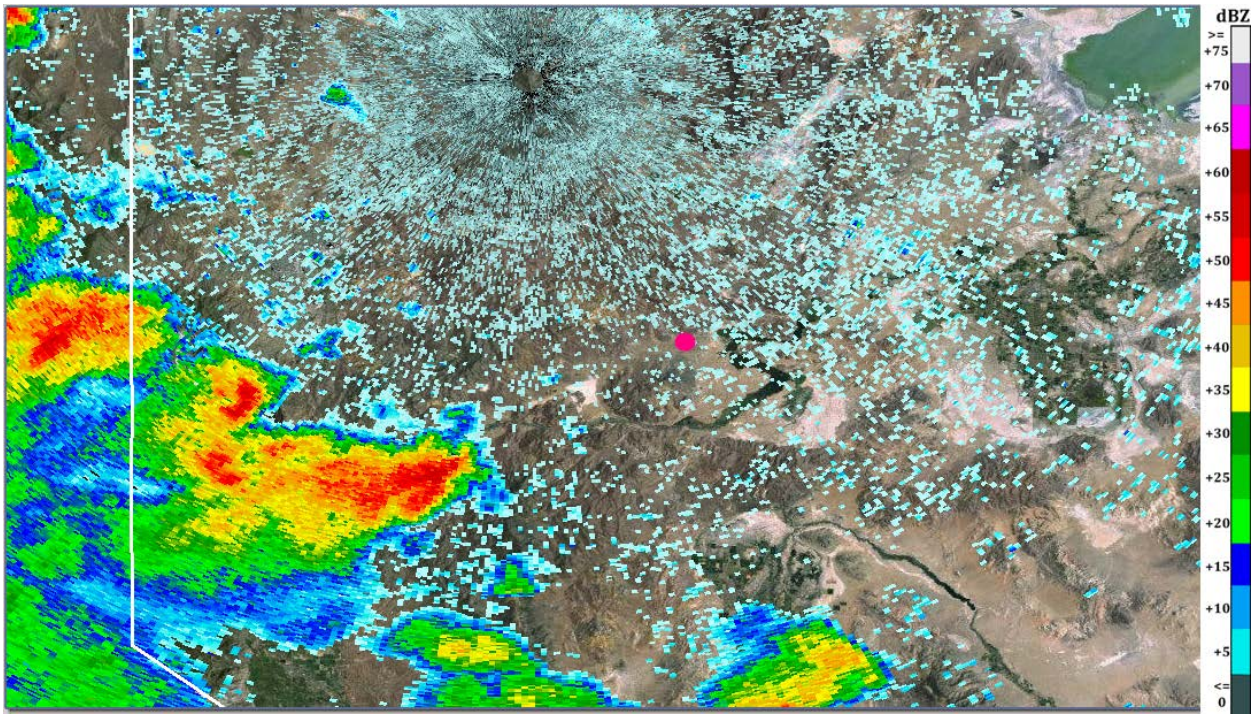

Figure 8 – KRGX ~0.5° Level-II reflectivity product from 1423:50 PDT. Accident site denoted by pink dot.

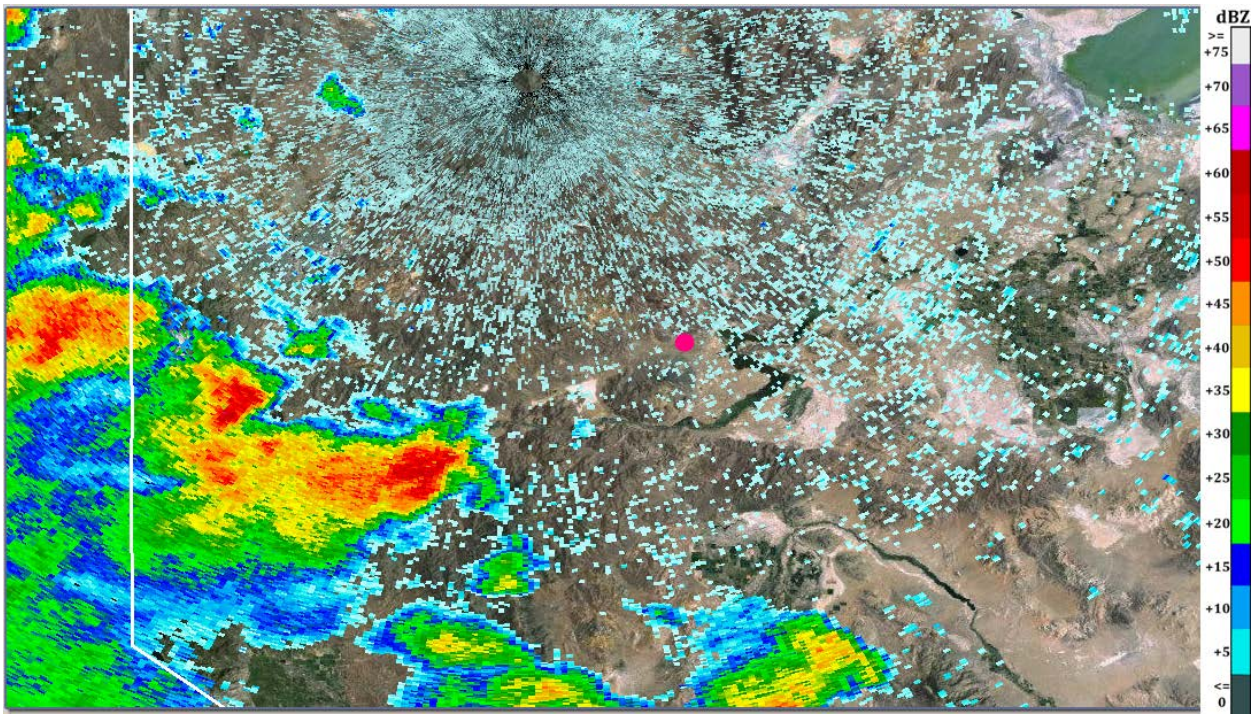

Figure 9 – KRGX ~0.5° Level-II reflectivity product from 1425:59 PDT. Accident site denoted by pink dot.

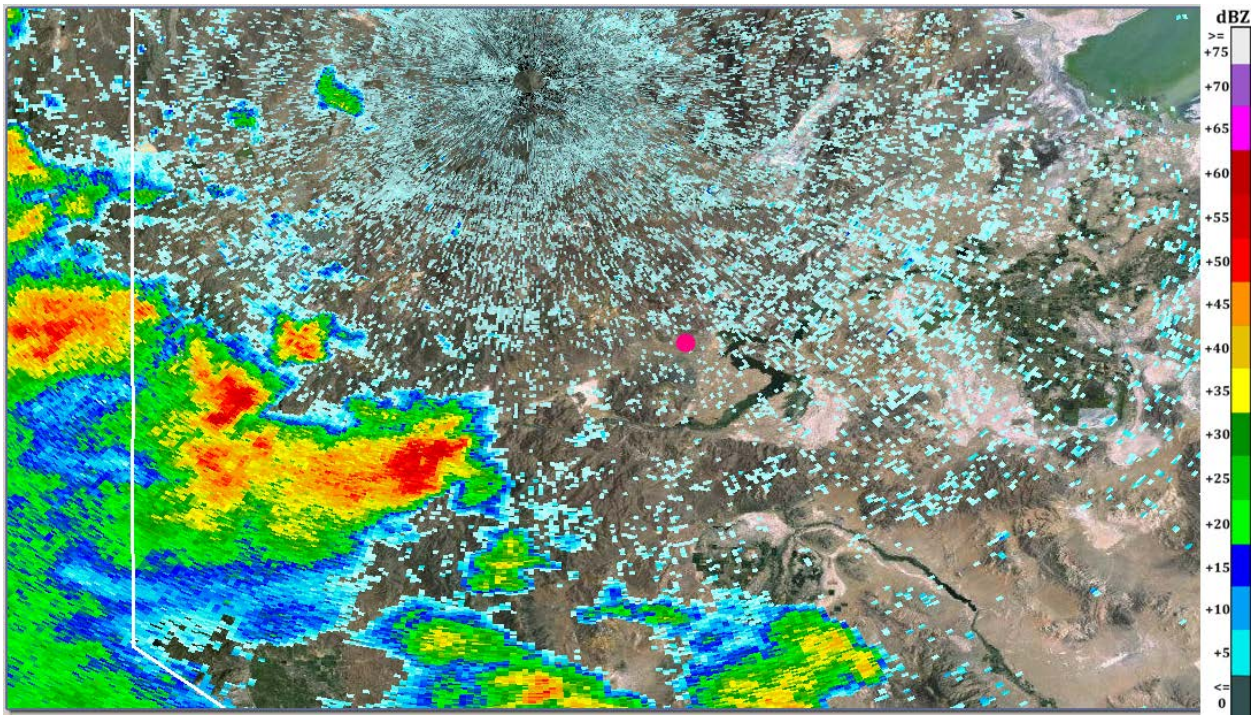

Figure 10 – KRGX ~0.5° Level-II reflectivity product from 1428:34 PDT. Accident site denoted by pink dot.

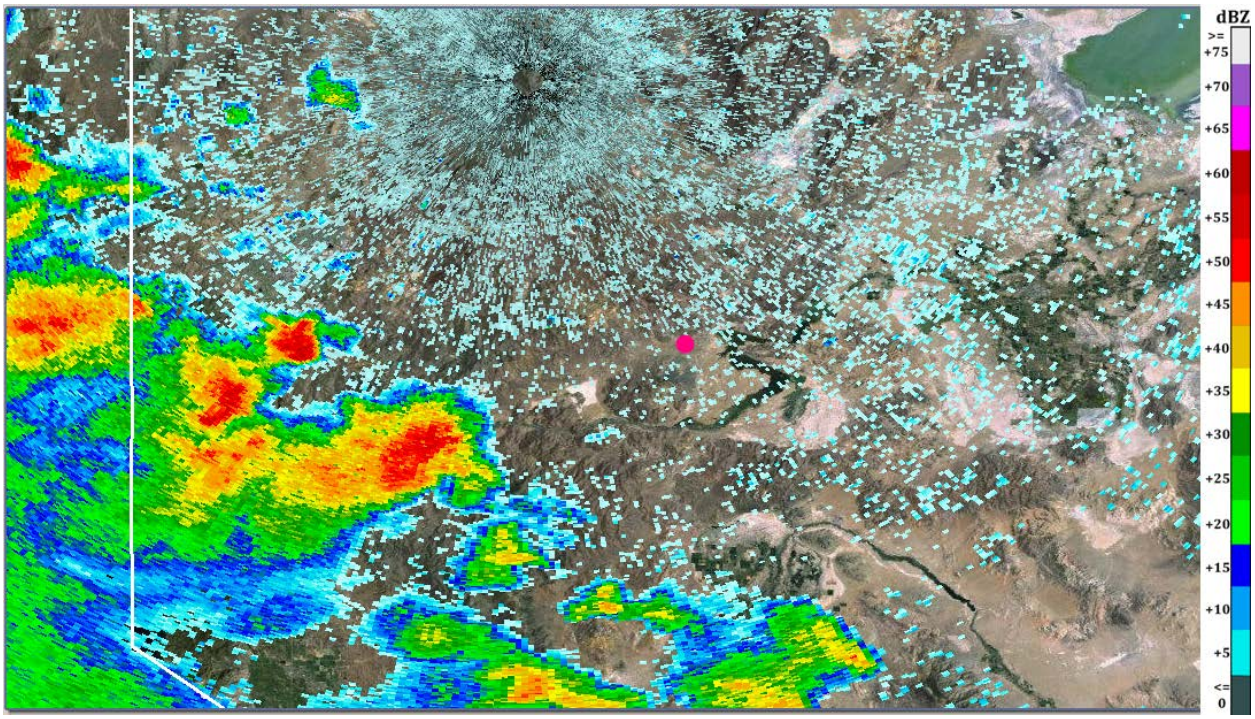

Figure 11 – KRGX ~0.5° Level-II reflectivity product from 1430:59 PDT. Accident site denoted by pink dot.

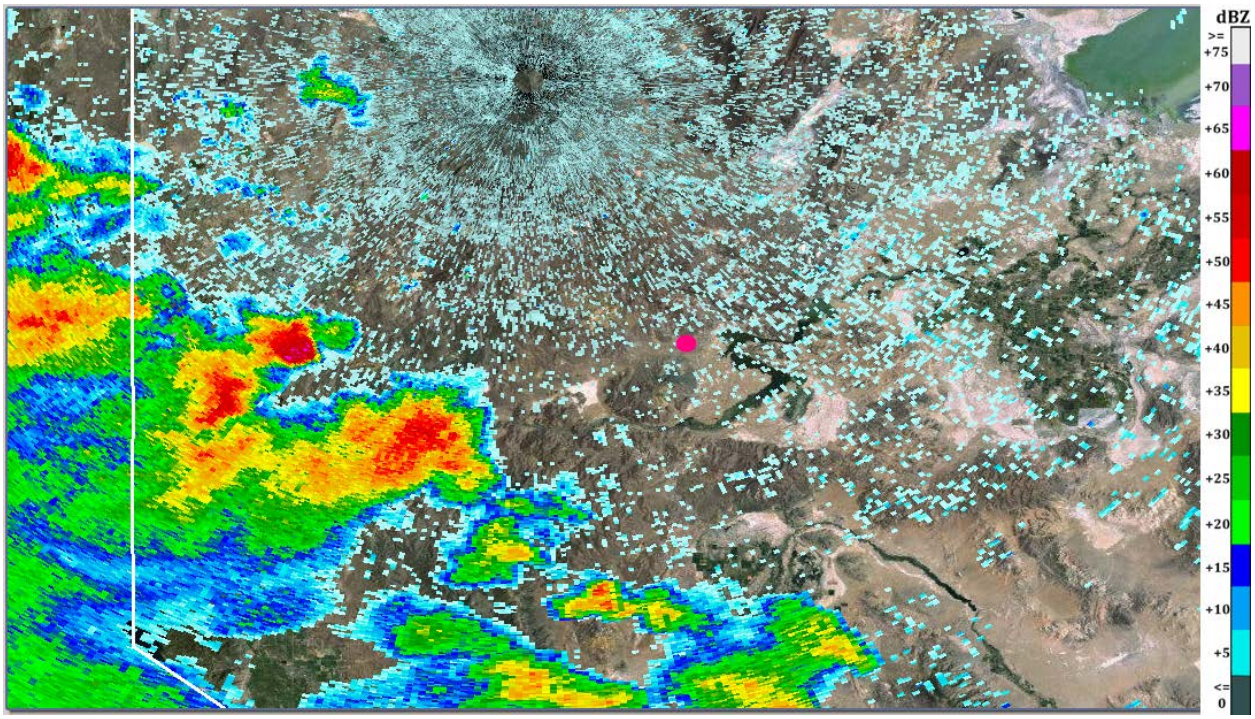

Figure 12 – KRGX ~0.5° Level-II reflectivity product from 1433:04 PDT. Accident site denoted by pink dot.

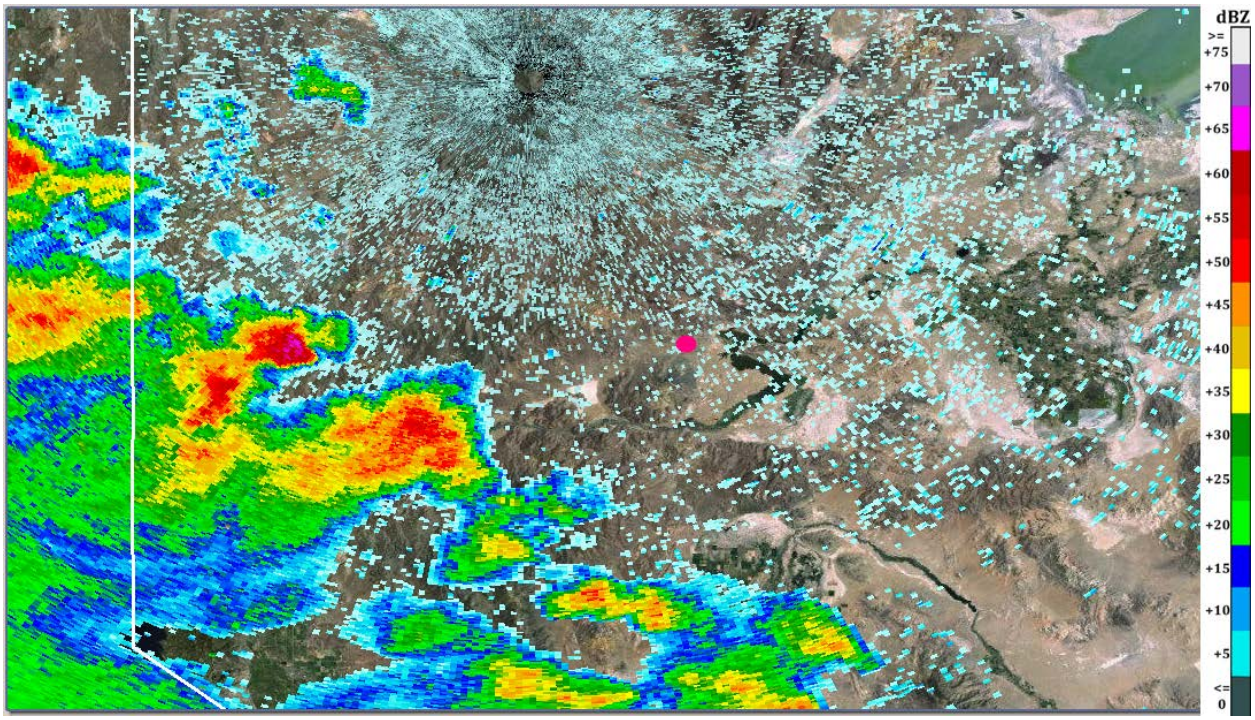

Figure 13 – KRGX ~0.5° Level-II reflectivity product from 1435:15 PDT. Accident site denoted by pink dot.

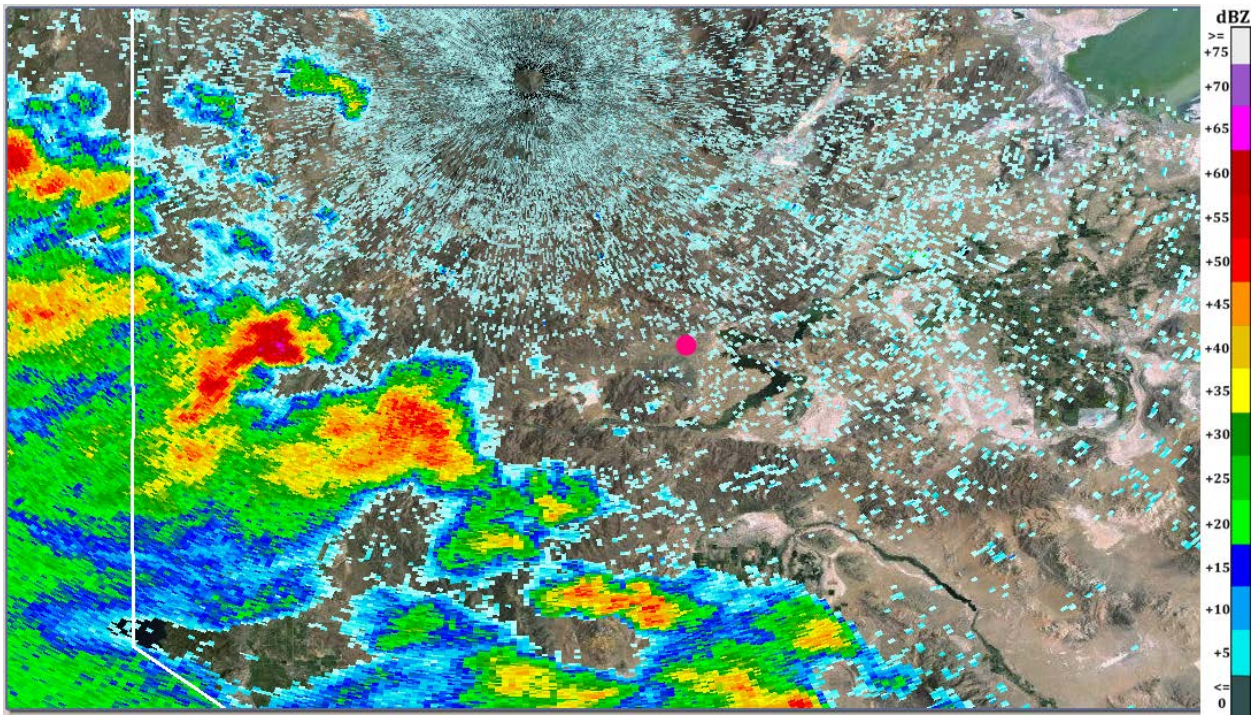

Figure 14 – KRGX ~0.5° Level-II reflectivity product from 1437:49 PDT. Accident site denoted by pink dot.

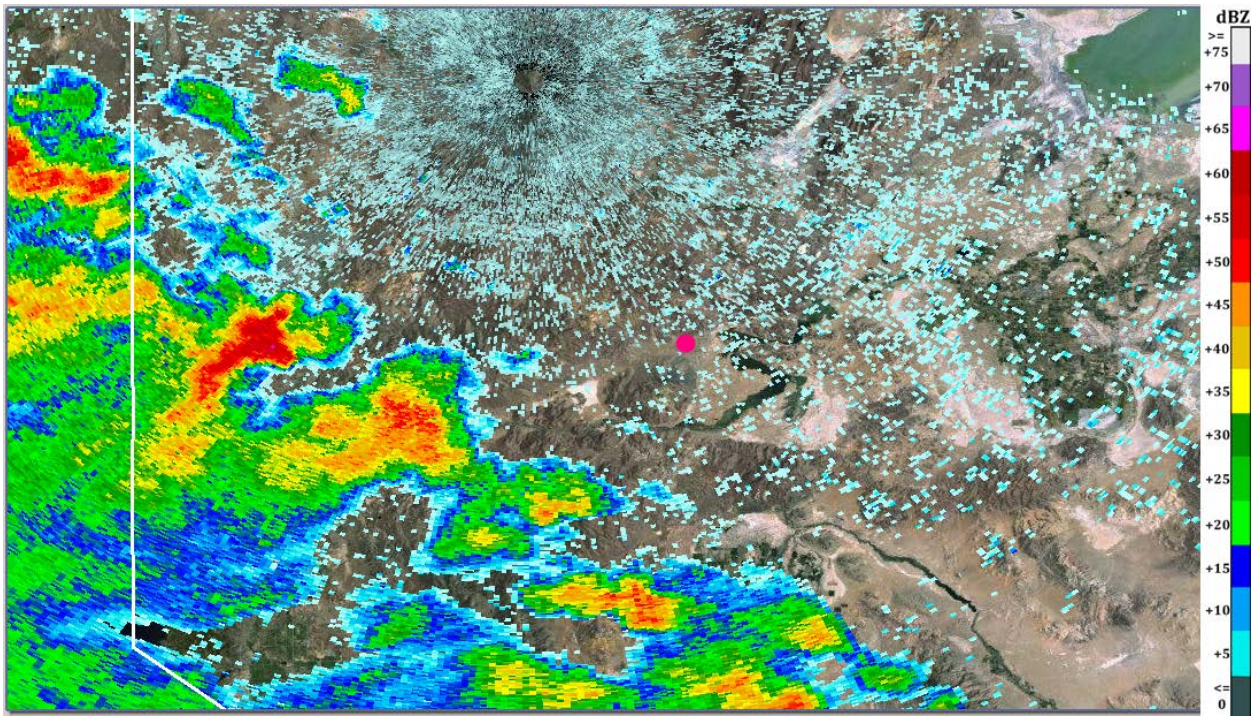

Figure 15 – KRGX ~0.5° Level-II reflectivity product from 1440:14 PDT. Accident site denoted by pink dot.

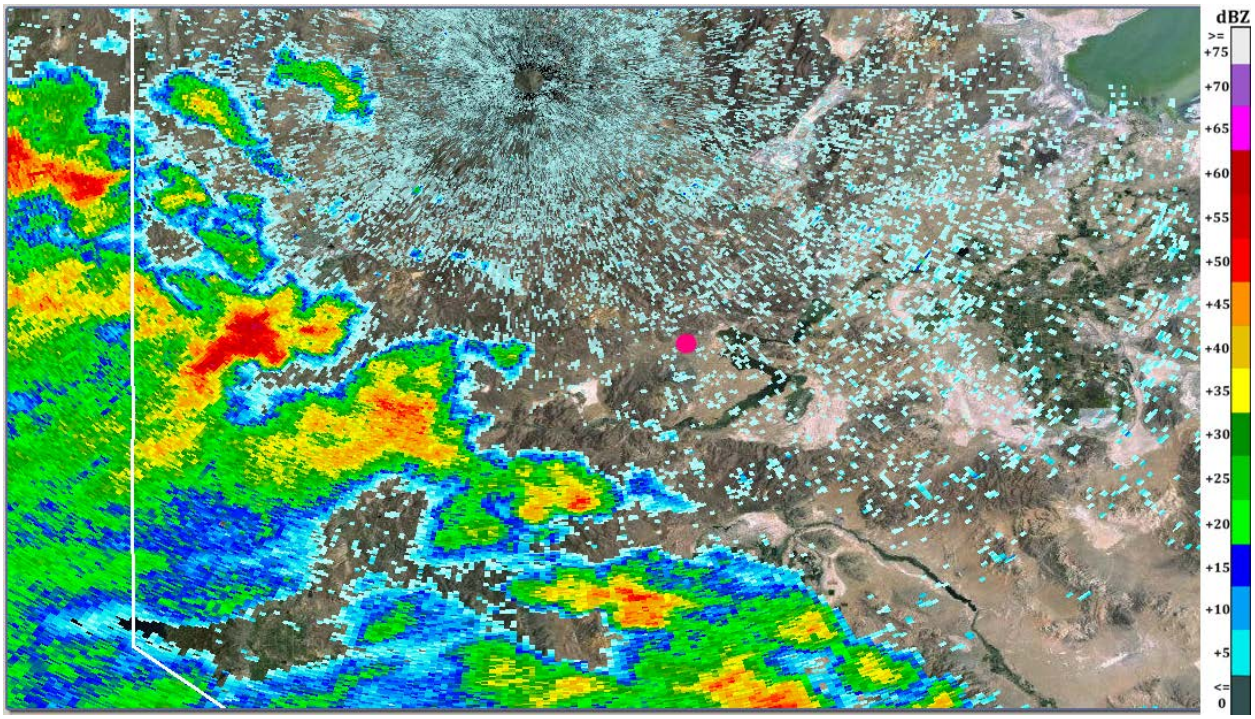

Figure 16 – KRGX ~0.5° Level-II reflectivity product from 1442:48 PDT. Accident site denoted by pink dot.

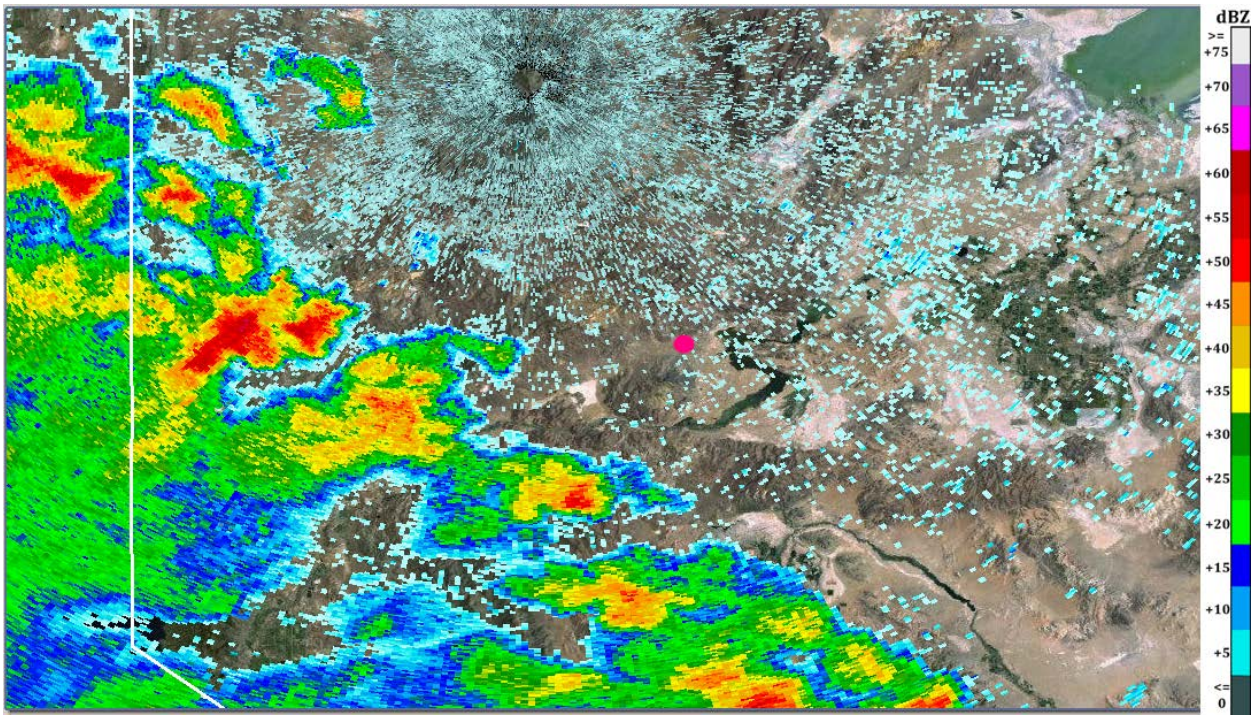

Figure 17 – KRGX ~0.5° Level-II reflectivity product from 1445:13 PDT. Accident site denoted by pink dot.

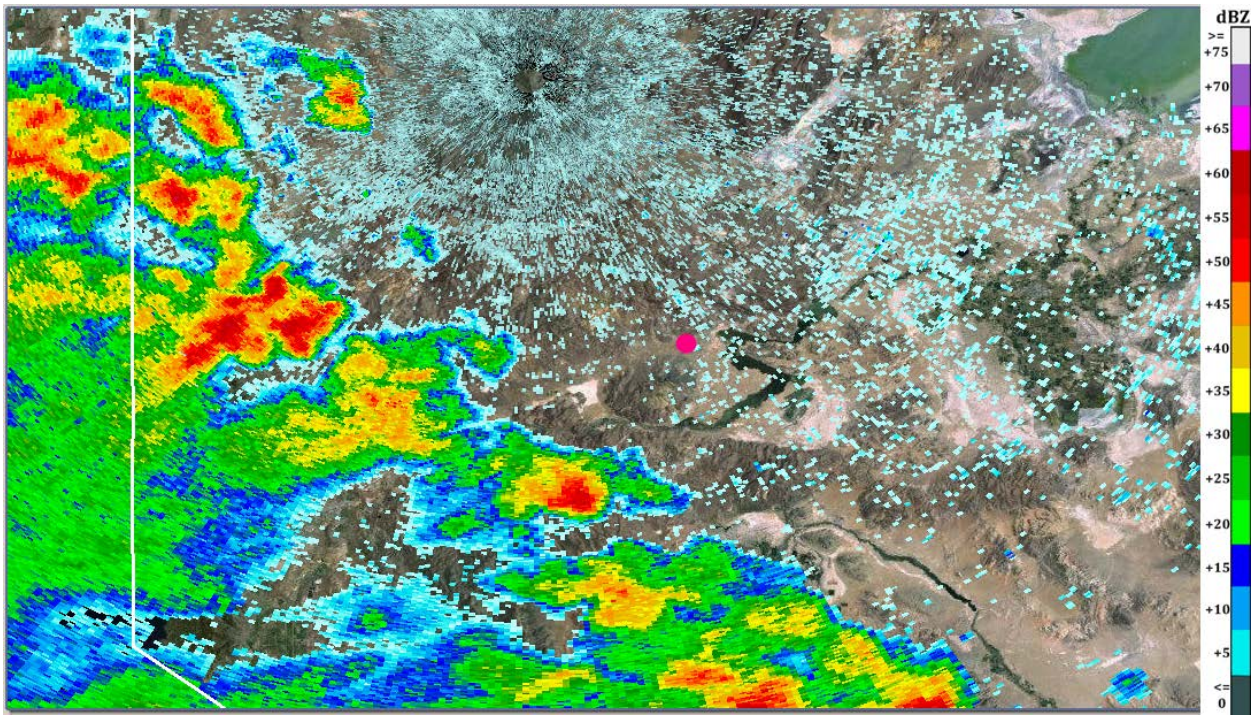

Figure 18 – KRGX ~0.5° Level-II reflectivity product from 1447:48 PDT. Accident site denoted by pink dot.

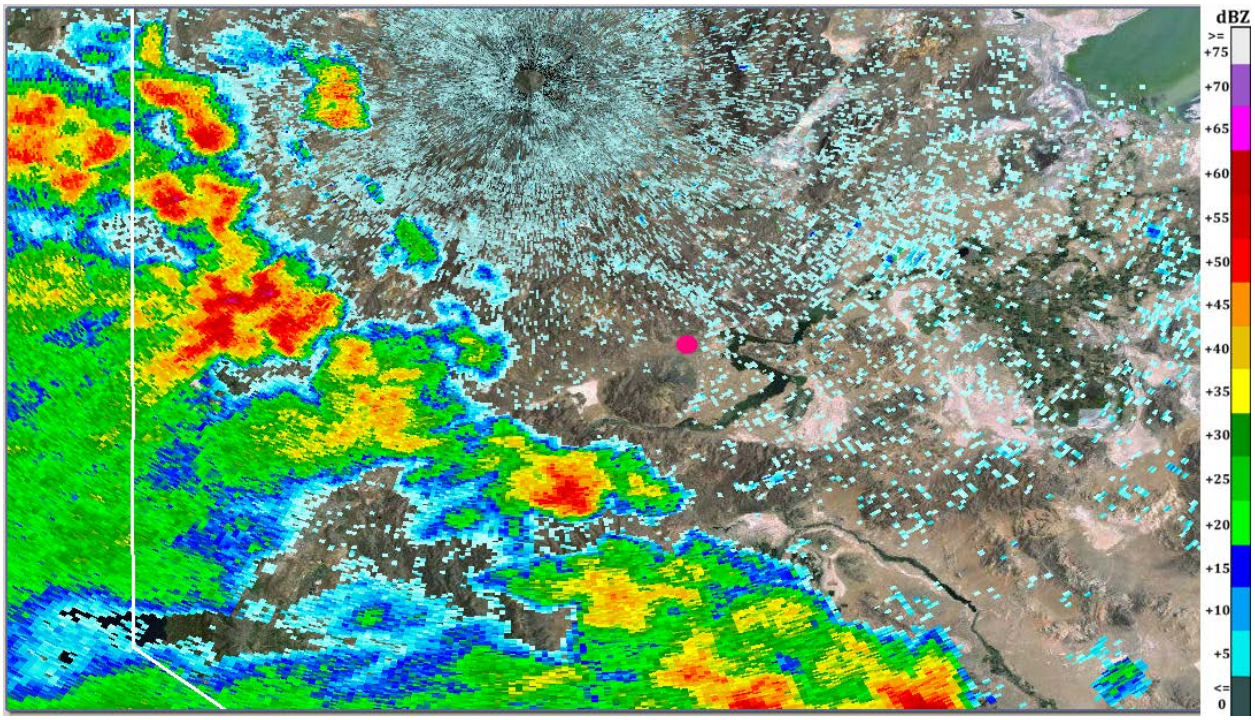

Figure 19 – KRGX ~0.5° Level-II reflectivity product from 1450:12 PDT. Accident site denoted by pink dot.

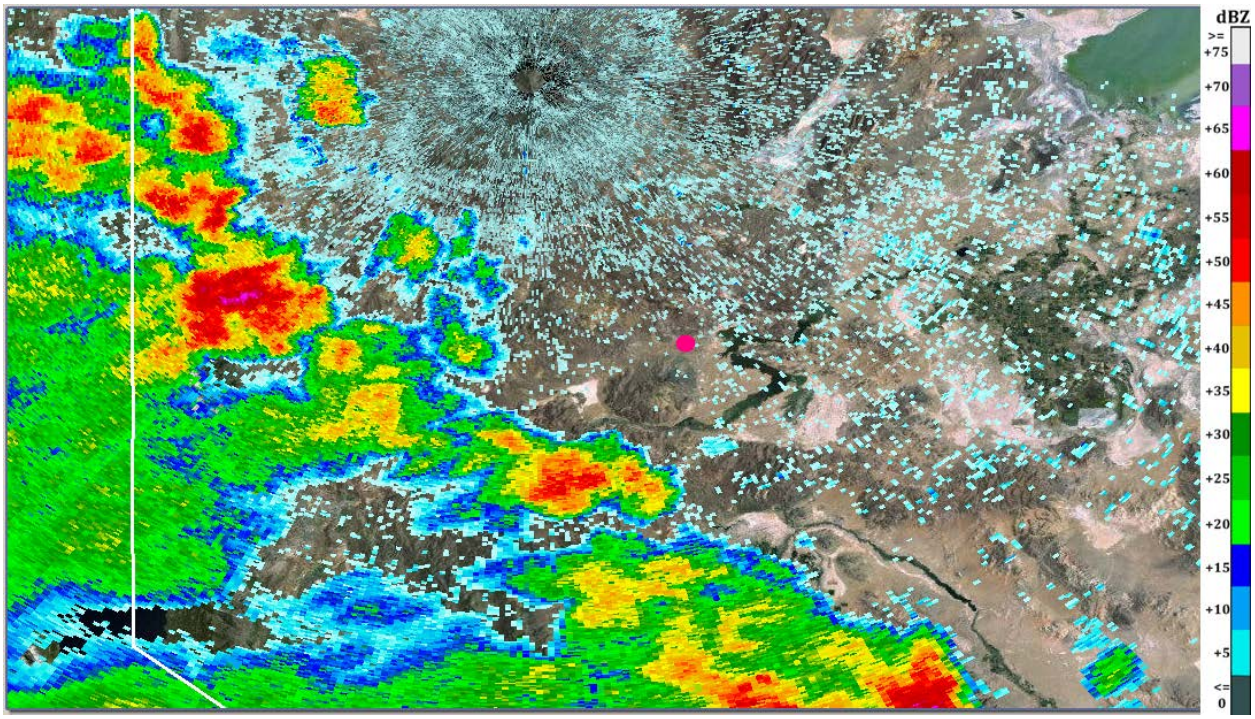

Figure 20 – KRGX ~0.5° Level-II reflectivity product from 1452:46 PDT. Accident site denoted by pink dot.

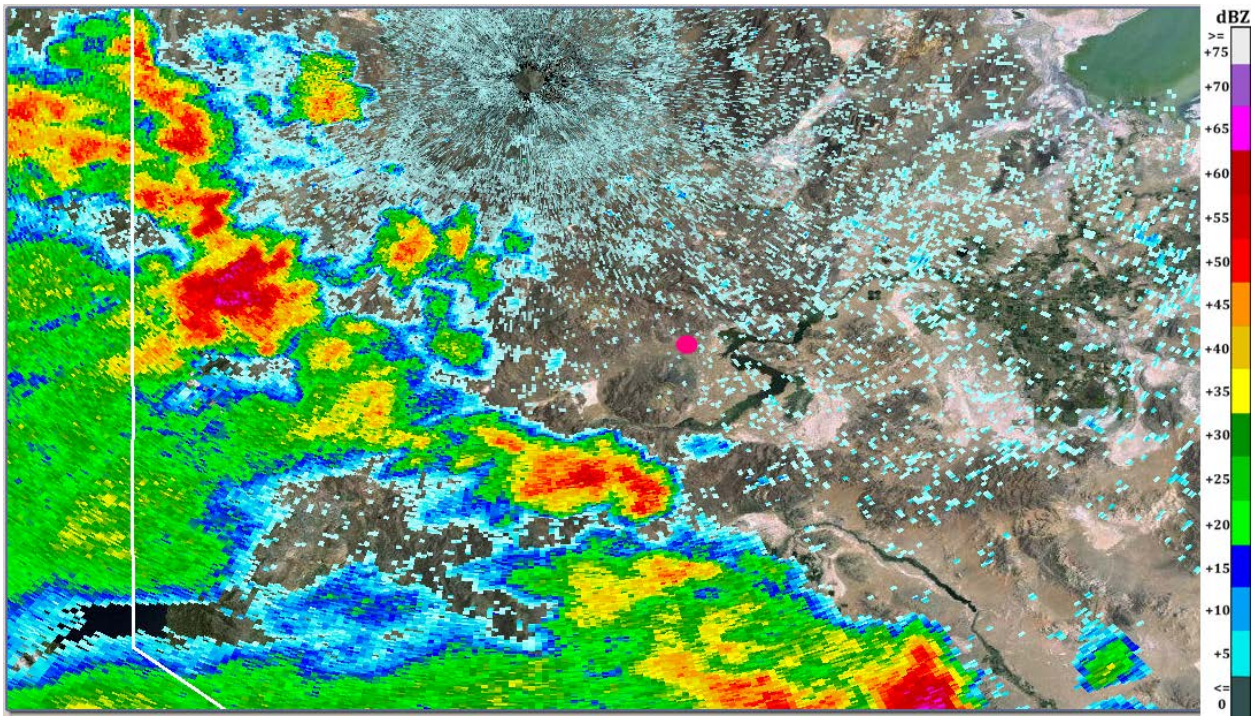

Figure 21 – KRGX ~0.5° Level-II reflectivity product from 1455:11 PDT. Accident site denoted by pink dot.

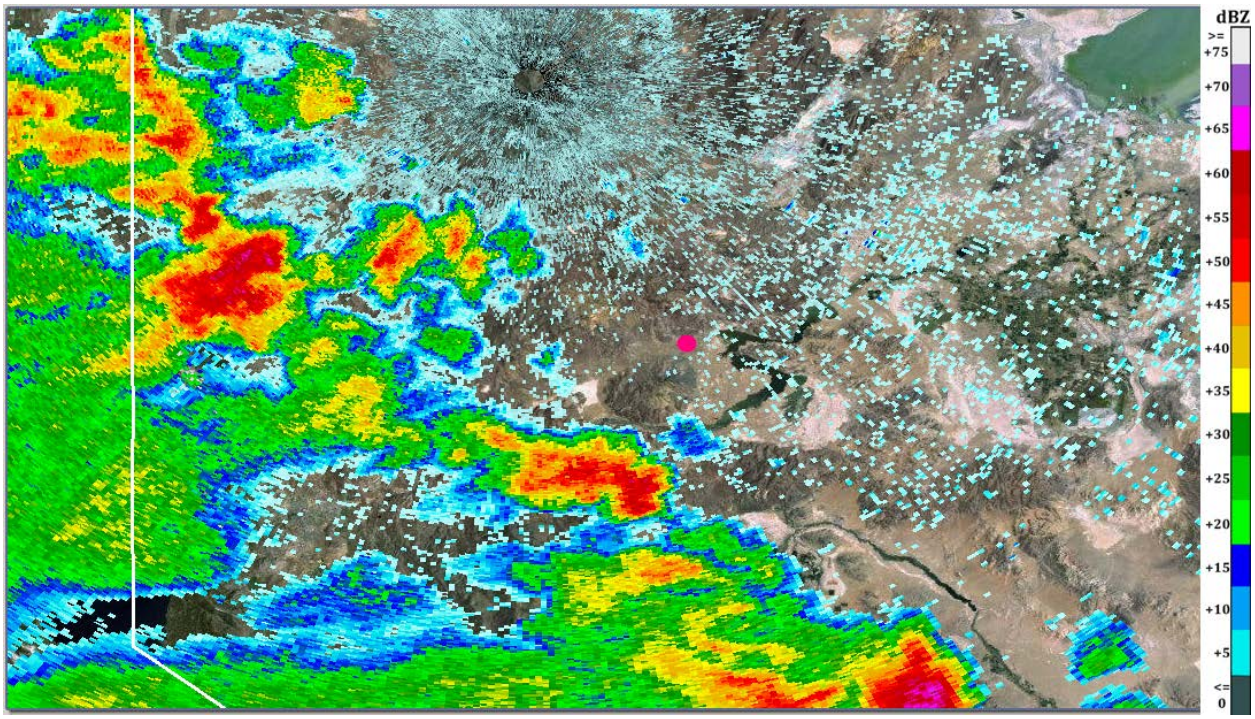

Figure 22 – KRGX ~0.5° Level-II reflectivity product from 1457:45 PDT. Accident site denoted by pink dot.

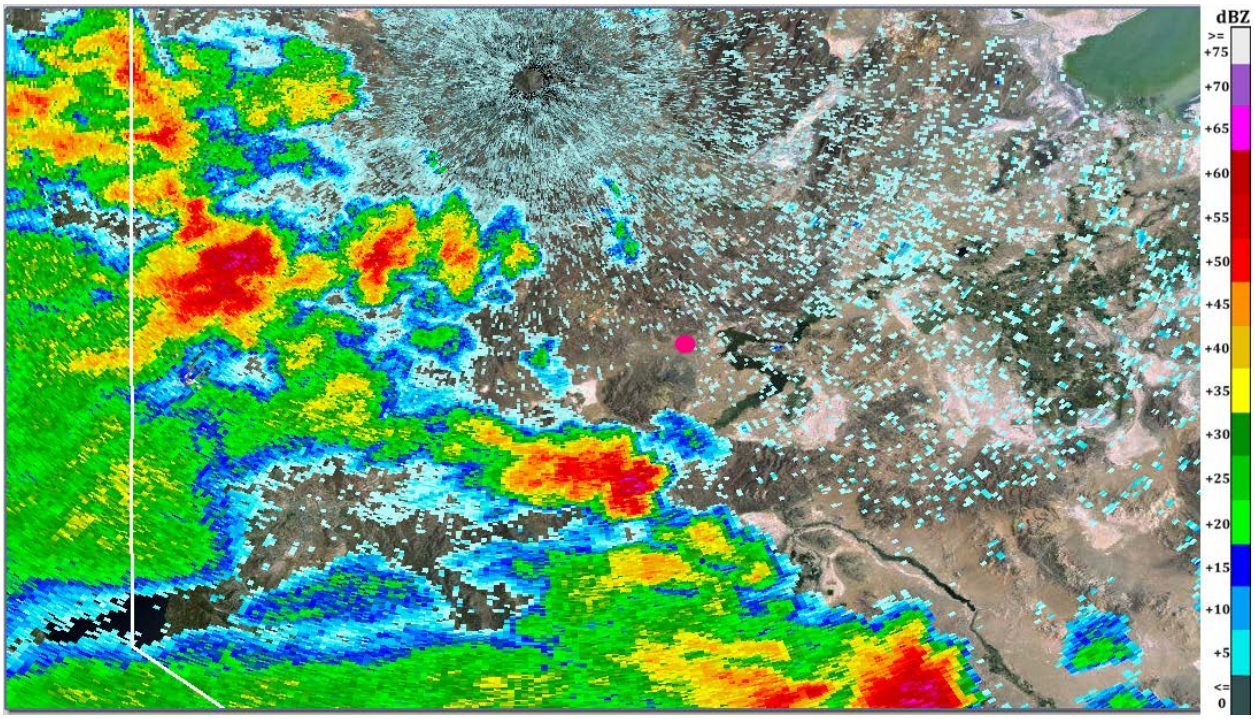

Figure 23 – KRGX ~0.5° Level-II reflectivity product from 1500:10 PDT. Accident site denoted by pink dot.

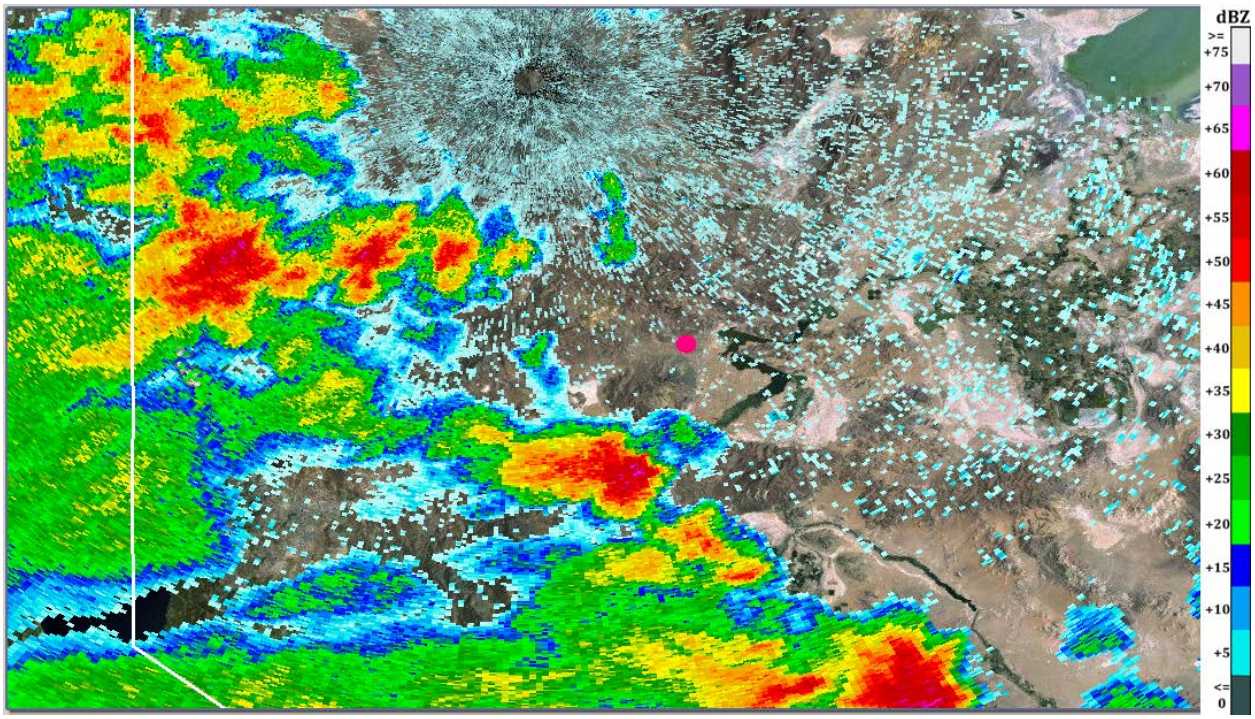

Figure 24 – KRGX ~0.5° Level-II reflectivity product from 1502:45 PDT. Accident site denoted by pink dot.

Submitted by: Mike Richards
NTSB, AS-30