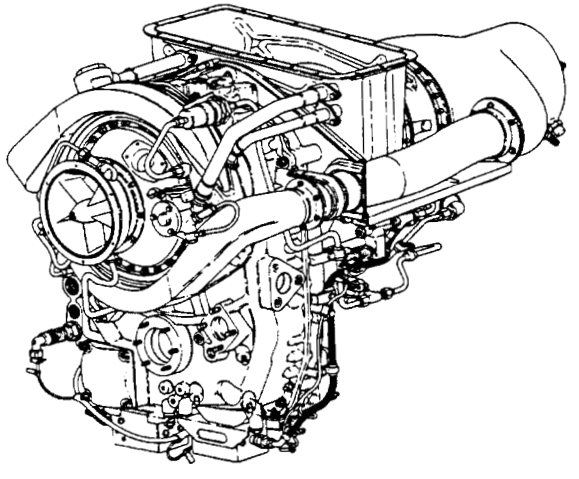
Rolls-Royce

Accident investigation

On-site investigation report

Rolls-Royce
Model 250-C30P
Engine CAE 895064



Rogers Helicopters
Montello, Nevada

Michael A. Weber

Michael A. Weber
Senior Accident Investigator

Accident date: August 3, 2000
On-Site date: August 5-6, 2000
Report date: August 10, 2000

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1. SYNOPSIS

On August 3, 2000, about 18:57 hours Pacific Standard Time, a Bell 206L-1 helicopter, N1084, with an Allison engine, model 250-C30P, S/N 895064, operated by Rogers Helicopters, was destroyed when the helicopter abruptly rolled to the right and impacted terrain during hover after liftoff. The mishap occurred near Montello, Nevada. The helicopter was operated under 14 CFR Part 91 in support of fire fighting activities as a public use aircraft by the United States Bureau of Land Management. Visual meteorological conditions prevailed and no flight plan was filed for the positioning flight that was planned for Wells, Nevada. The pilot received minor injuries, one passenger seated in the left front cockpit received serious injuries and the remaining passenger who was seated in the left rear cabin facing forward received fatal injuries during the accident sequence.

This report represents the findings of the on-site examination at the Montello, Nevada Helibase.

2. FACTUAL INFORMATION

2.1 History of Flight

The pilot reported that between 1500 and 1830 there were wind gusts of 50 – 60 knots associated with a thunderstorm that passed west of their location. He tied down the main and tail rotor blades before the windstorm, and by 1845, the weather was clear enough to return to Wells and the wind had decreased to 5 – 10 knots. He pre-flighted the helicopter and untied the rotors. He said that the start and pre-takeoff checks were normal. He performed a normal hydraulics off control check. He picked the helicopter up to a 3-foot hover height and glanced down at the engine torque gage. Suddenly, the helicopter did a "violent snap roll" to the right coming to rest upright. He estimated that the whole event only lasted about ¼ second. The pilot added that there was no yaw associated with the event, it was a pure roll, and the engine operated "fine" the entire time. The engine was still running after the accident and he had to shut it off manually. There was no change in audible tone prior to the roll. He did not recall any movement or abnormal feedback in the antitorque pedals or the cyclic and collective controls prior to the accident. The pilot emphasized the violent nature of the roll. It was the pilot's opinion that even an abrupt, full right cyclic input could not have produced the rare of roll that he experienced. The rotor blade tie down retention straps were found stowed inside the cabin after the accident.

2.2 Personnel Information

Pilot = Kenneth R. Carlton, age 52, commercial pilot license [redacted] issued 4/20/98. Ratings = Airplane single engine land & sea rotorcraft -helicopter, Instrument airplane and helicopter.

2.3 Injuries to Persons

The pilot received minor injuries, one passenger received serious injuries and one passenger received fatal injuries as a result of the accident sequence.

2.4 Aircraft Information

Model	Bell 206L-1
Serial Number	45434
Registration Number	N10864
Airframe Total Time	5532.2
Last Annual Inspection	03/27/2000
Last 300 hour Inspection	5333.4
Last 100 hour Inspection	5521.1
Engine Model	Allison 250-C30P
Rating:	650 Shaft Horsepower
Serial Number	CAE 895064
Engine Total Hours	5541.3
Last 100 Hour Inspection	5530.2

2.5 Meteorological Conditions

Reported observations from the National Weather Service in Boise, Idaho.

Weather at Latitude 41.65 North, Longitude 114.43 West was reported as follows: At 18:00, temperature was 86°F, relative humidity 25%, wind direction 190 at 8 mph with 15 mph gusts, precipitation 3.04.

2.6 Aids to Navigation

There were no known aids to Navigation. It was reported that the pilot was familiar with the local area/terrain.

2.7 Communications

N/A

2.8 Aerodrome Information

N/A

2.9 Flight Recorder

The aircraft was not equipped with either a flight data recorder or cockpit voice recorder

2.10 Wreckage and Impact Information

On-site examination of the aircraft revealed the following:

The mast and main rotor head was separated from the aircraft and was lying approximately 20 feet northeast of the wreckage. The aircraft windscreen was severely damaged. The left side forward and aft cabin doors were separated from the aircraft. The tail boom was fractured and resting inverted on the ground. The aircraft skid saddles were partially fractured. The tips of both main rotor blades were broken off and found 180° from each other. The main rotor blade tips were thrown approximately 450 feet from the wreckage. The flight control rods and linkage were broken and twisted at the mounting point areas. The flight control links to the main rotor and swash plate areas were removed by the Bell representative and sent to the NTSB laboratory for testing.
Location of the accident was Latitude 41° 16.71' North, Longitude 114° 12.58' West (GPS).

2.11 Engine Examination

On-Site engine examination revealed the following:

There was no indication of external damages to the engine. The right and left side engine mounts were broken as a result of the accident sequence. N1 rotates and checked continuous to the compressor and starter. N2 rotates and is continuous to the 4^{th} stage turbine wheel and the PTO shaft. All pneumatic plumbing was is good condition. There was no damage to the Fuel control, PTG, Fuel pump assembly, or compressor bleed valve assembly. A fuel control system rigging check was completed and no anomalies were noted. The oil tank and oil cooler blower was damaged as a result of the accident sequence. The accident investigation team, consisting of the NTSB IIC, the Bell Helicopter representative and the author decided not to remove the engine for further examination. The engine was producing power.

2.12 Engine Maintenance and Records

Component	Serial Number	Part Number	TSO	Total Time
Engine	895064	23004545	N/A	5541.3
Gearbox	CAG 95064	23005655	N/A	5541.3
Compressor	CAC 90737	23005250	N/A	5541.3
Turbine	CAT 95064	23031925	941.0	5541.3
Fuel Control	BR 52406	23065147	173.0	5541.3
Governor	27539	2524692-11	281.5	5541.3
Fuel Pump	T-200008	6896843	2730.2	5541.3
Fuel Nozzle	AG-83408	6899001	1036.0	5541.3

2.13 Additional Information

None

3. FINDINGS & CONCLUSIONS.

1. The engine was operating during the crash and after final impact.

2. On-Site examination of the engine and accessories did not reveal any evidence of pre-impact mechanical failure.

3. Evidence of engine operation at the time of impact were observed as follows:

   - The main rotor head was separated from the aircraft.
   - The main rotor blade tips were thrown approximately 450 feet after they made contact with the ground.

5. APPENDICES

Appendix A.

Photographs

Photo #1 – Left side of the aircraft.

Photo # 2 – Right side of the aircraft.

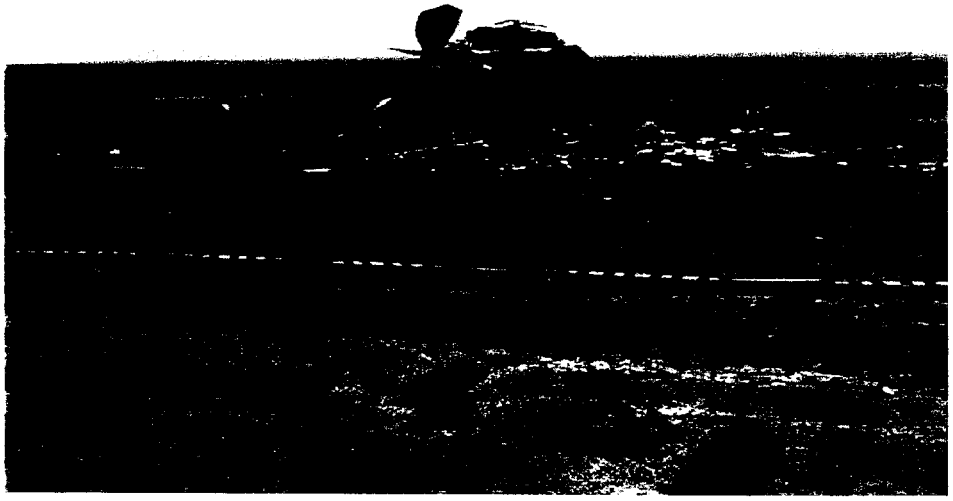


Photo # 3 – Front of the aircraft.

Photo # 4 – Rear of the aircraft.

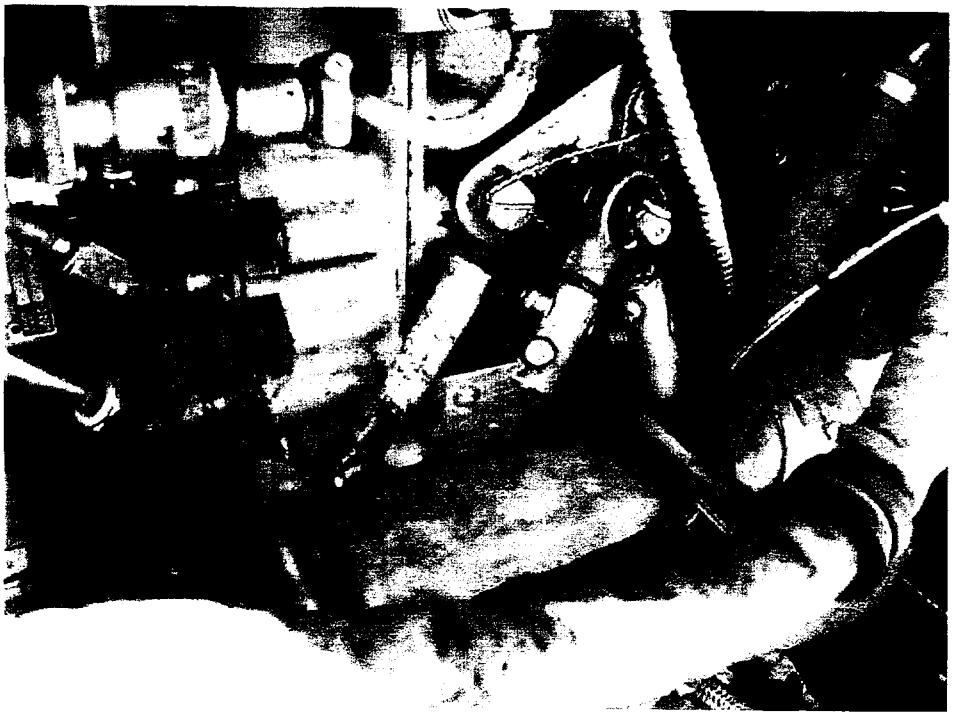


Photo # 5 – Right engine mount broken.

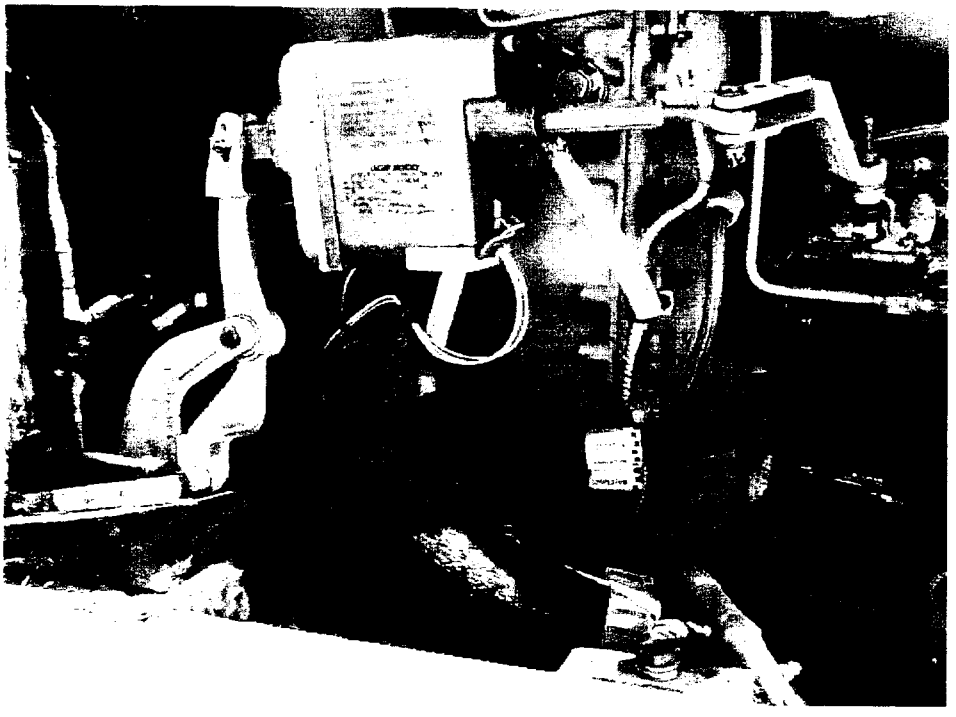


Photo # 6 – Left engine mount broken.

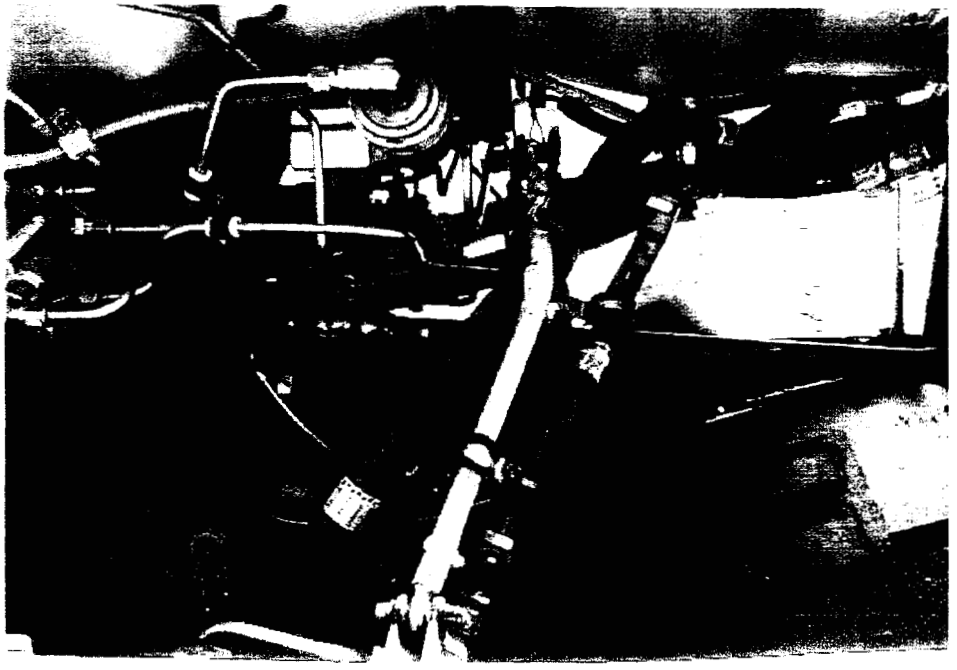


Photo # 7 – Rear engine mount bent.

Photo # 8 – Main rotor blade system.

Photo # 9 – Red main rotor blade tip.

Photo # 10 – White main rotor blade tip.

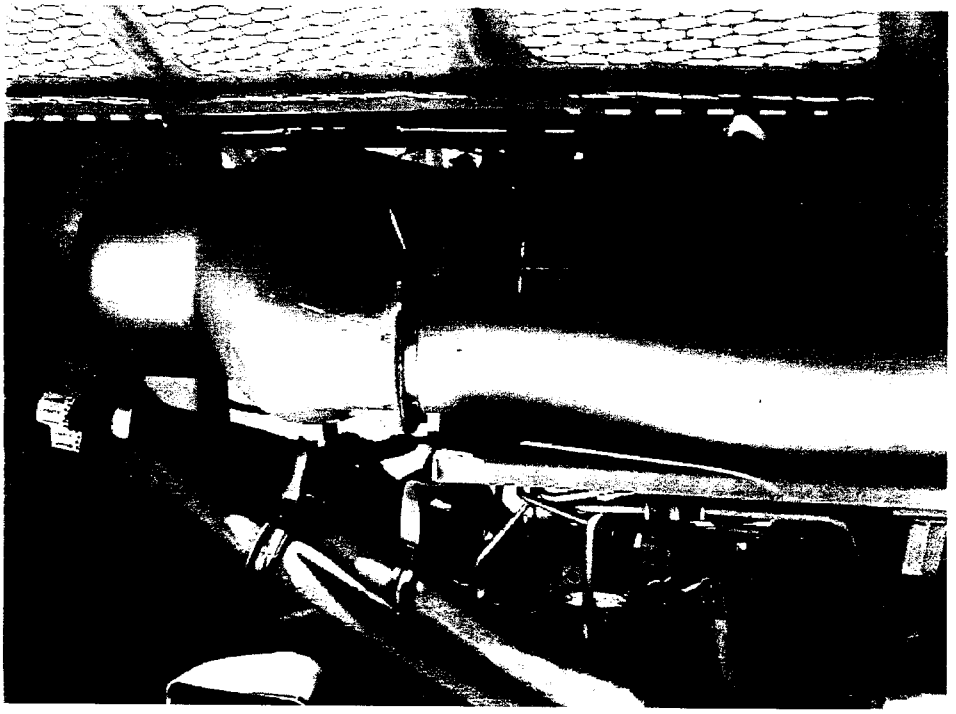


Photo # 11 – Right side of the engine.

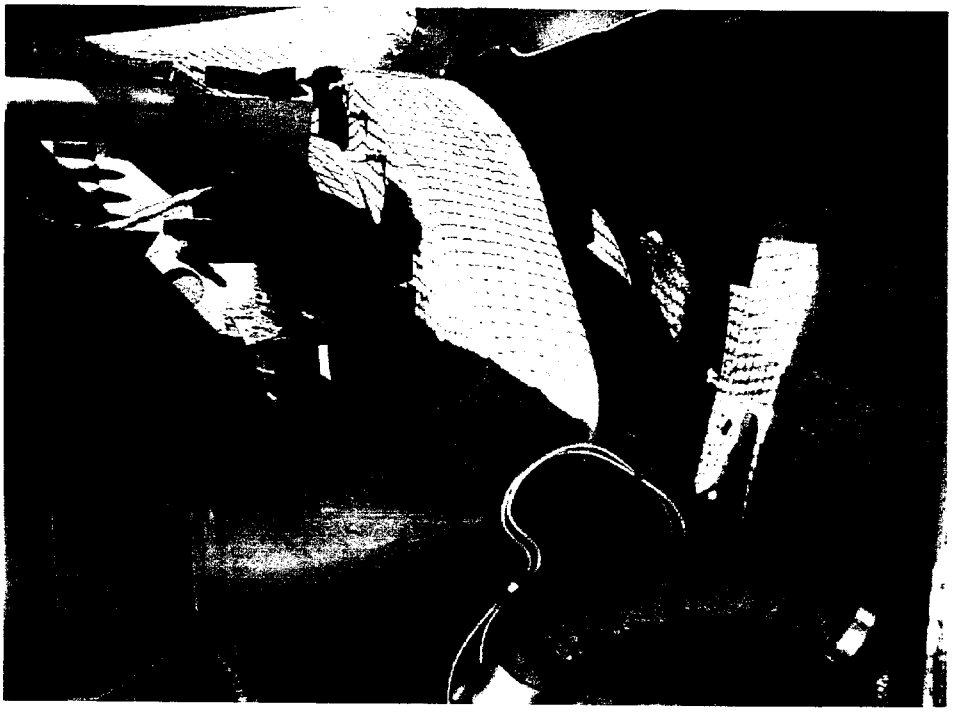


Photo # 12 – Right front of engine.

Photo # 13 – Front of compressor.

Photo # 14 – 3rd Stage Power Turbine wheel.

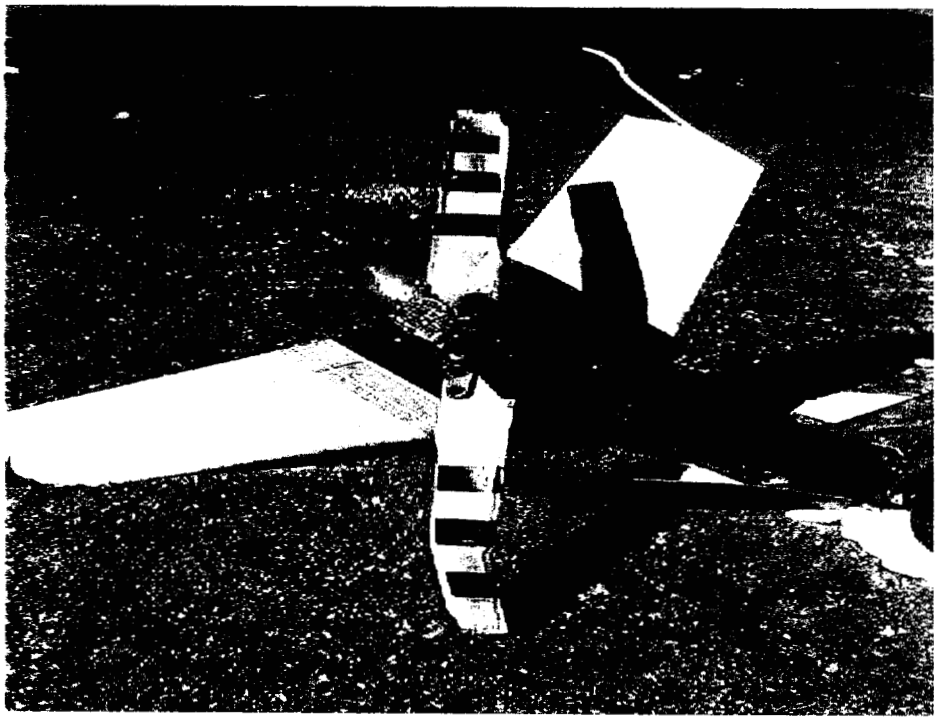


Photo # 15 – Tail rotor system.

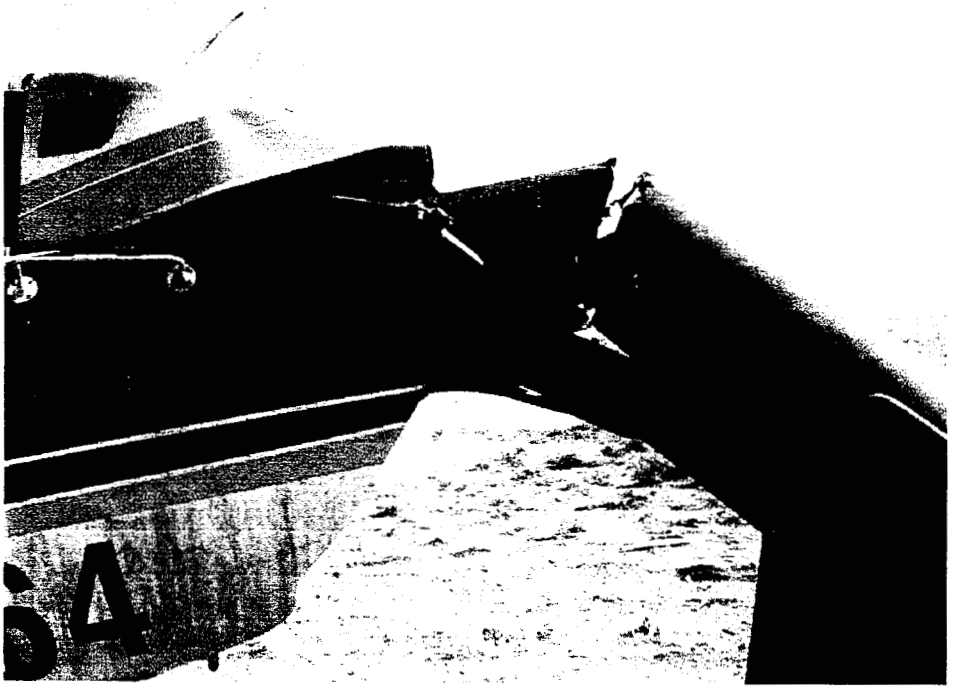


Photo # 16 – Tail boom/Tail rotor drive shaft.

Appendix B.

Investigation Participants

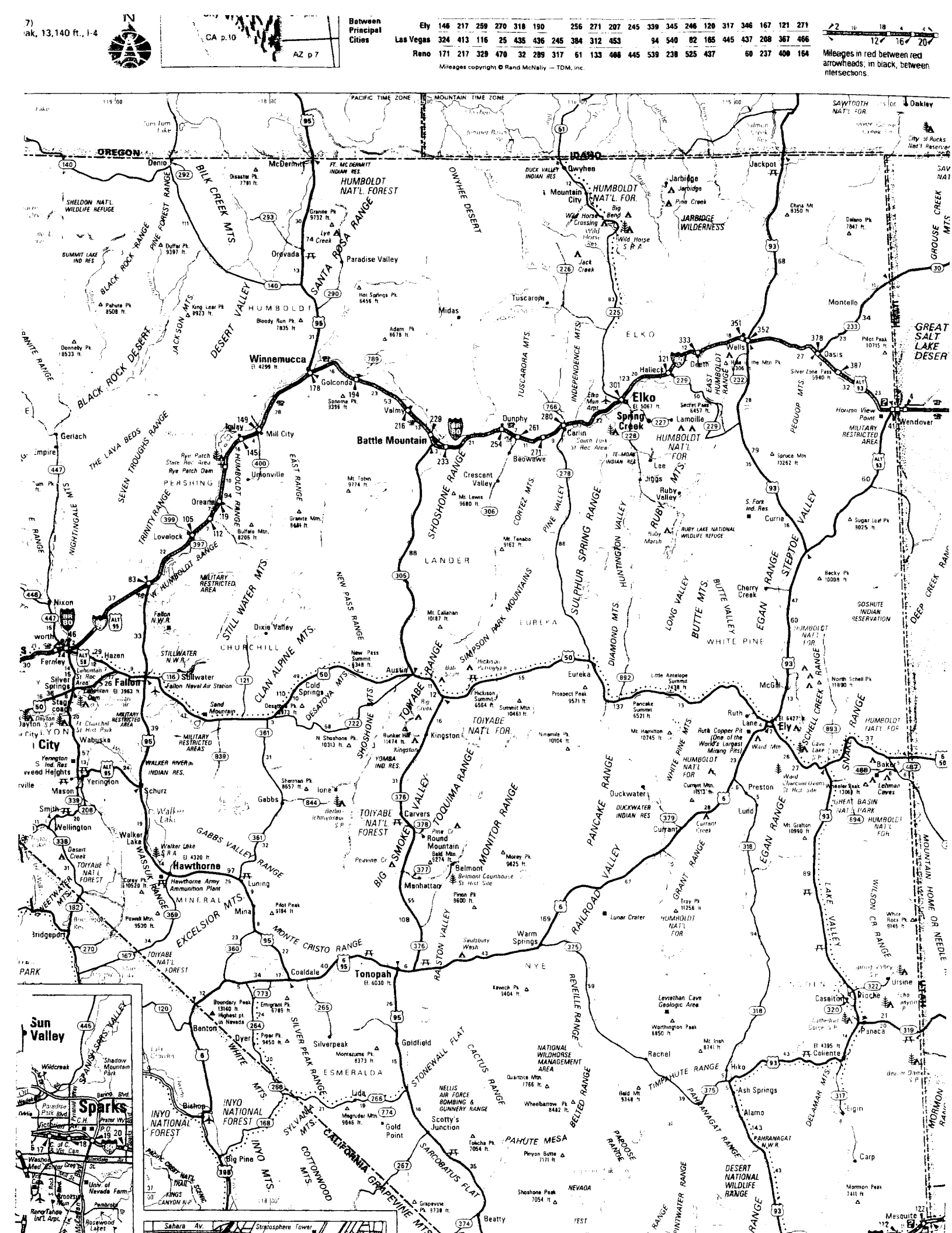
Appendix B --- Investigation Participants.

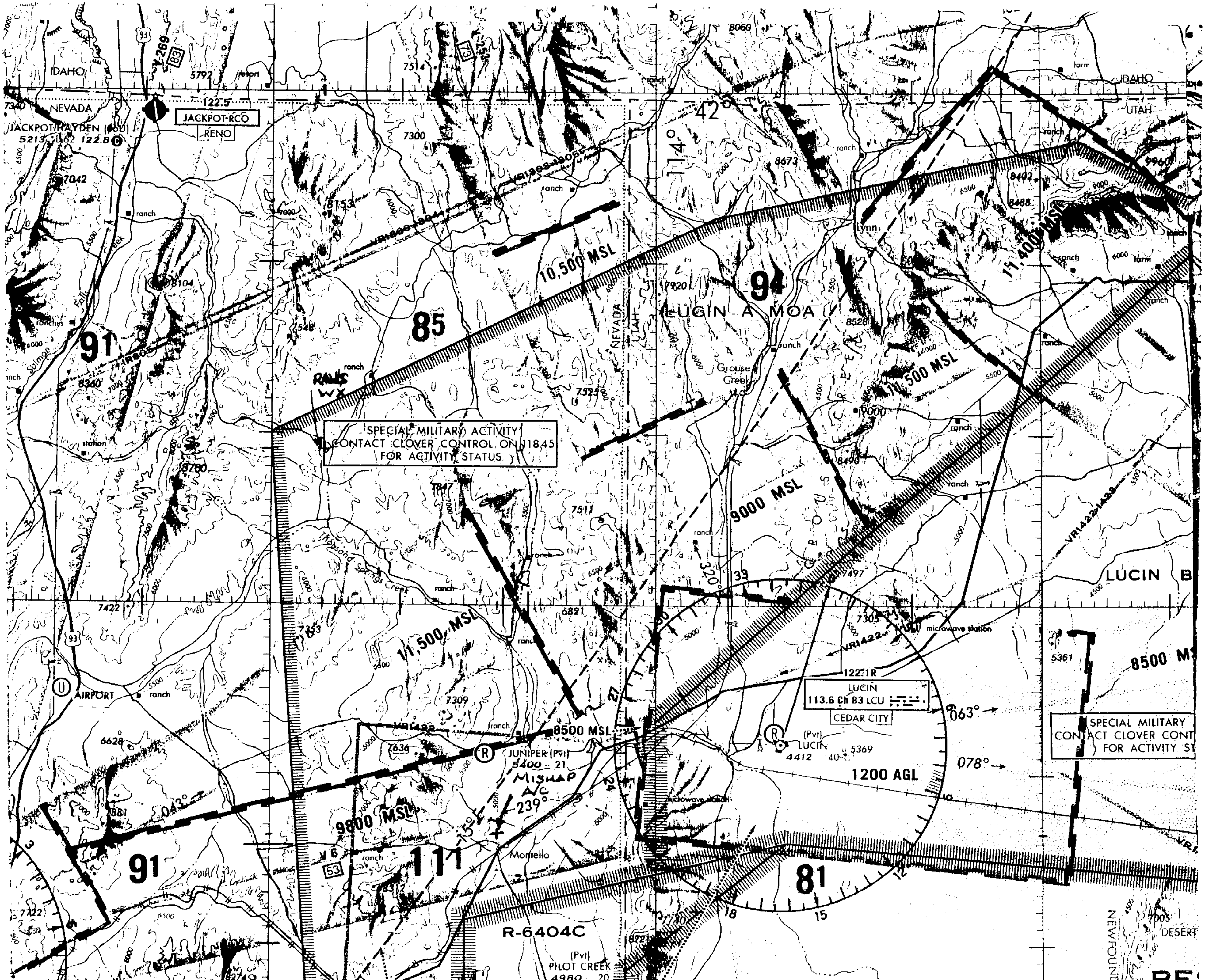
The subject personnel were in attendance for the on-site investigation at Montello, Nevada.

Mr. Richard Parker	NTSB	IIC	[redacted]
Mr. Matt Rigsby	Bell Helicopter	Party	[redacted]
Mr. Bob Galloway	Office of Aircraft Services U.S. Department of the Interior	Party	[redacted]
Mr. Steve Rauch	Office of Aircraft Services U.S. Department of the Interior	Party	[redacted]
Mr. Mike Weber	Rolls Royce	Party	[redacted]

Appendix C.

Map of the Vicinity


7)
ak, 13,140 ft., I-4
CA p.10
AZ p.7
Between Principal Cities
Ely 146 217 259 270 318 190 256 271 207 245 339 345 246 120 317 346 167 121 271
Las Vegas 324 413 116 25 435 436 245 384 312 453 94 540 82 165 445 437 208 367 466
Reno 171 217 329 470 32 289 317 61 133 488 445 539 238 525 437 60 237 409 164
Mileages copyright © Rand McNally — TDM, inc.
Mileages in red between red arrowheads; in black, between intersections.
PACIFIC TIME ZONE
MOUNTAIN TIME ZONE
OREGON
IDAHO
Denio
McDermitt
Owyhee
Jackpot
Oakley
Jarbidge
Mountain City
HUMBOLDT NAT'L FOR.
JARBIDGE WILDERNESS
SHELDON NAT'L WILDLIFE REFUGE
BILK CREEK MTS.
SANTA ROSA RANGE
OWYHEE DESERT
PINE FOREST RANGE
BLACK ROCK RANGE
SAWTOOTH NAT'L FOR
GROUSE CREEK MTS
Orovada
Paradise Valley
Midas
Tuscarora
Montello
GREAT SALT LAKE DESER
BLACK ROCK DESERT
JACKSON MTS.
DESERT VALLEY
HUMBOLDT
Winnemucca
Golconda
Valmy
TUSCARORA MTS.
INDEPENDENCE MTS.
ELKO
Wells
Oasis
Pilot Peak 10715 ft.
Halleck
Deeth
Elko
Spring Creek
Lamoille
Wendover
GRANITE RANGE
Donnelly Pk. 8533 ft.
Pahute Pk. 8508 ft.
King Lear Pk. 8923 ft.
Bloody Run Pk. 7835 ft.
Adam Pk. 8678 ft.
Hot Springs Pk. 8456 ft.
Grande Pk. 9732 ft.
Lye Creek
Dufer Pk. 9397 ft.
SUMMIT LAKE IND. RES.
Jack Creek
Big Wild Horse Creek
Wild Horse S.R.A.
Wild Horse Res.
Duck Valley Indian Res
Jarbidge
Pine Creek
Chinn Mt. 8350 ft.
Delano Pk. 7847 ft.
Silver Zone Pass 5940 ft.
Horton View Point
MILITARY RESTRICTED AREA
Secret Pass 6457 ft.
Elko Mun. Arpt.
Geriach
Empire
Rye Patch State Rec. Area
Rye Patch Dam
Humboldt Range
East Range
Mill City
Battle Mountain
Dunphy
Carlin
South Fork St. Rec. Area
Beowawe
Crescent Valley
Mt. Lewis 9680 ft.
Mt. Tobin 9774 ft.
Buffalo Mtn. 8205 ft.
Granite Mtn. 8684 ft.
Mt. Tenabo 9162 ft.
Te-Moak Indian Res
Lee
Jiggs
Ruby Valley
Ruby Marsh
RUBY LAKE NATIONAL WILDLIFE REFUGE
S. Fork Ind. Res
Currie
Spruce Mtn 10262 ft.
Sugar Loaf Pk 8025 ft.
SEVEN TROUGHS RANGE
THE LAVA BEDS
NIGHTINGALE MTS.
PERSHING
Lovelock
Oreana
Unionville
TRINITY RANGE
SHOSHONE RANGE
CORTEZ MTS.
PINE VALLEY
SULPHUR SPRING RANGE
HUNTINGTON VALLEY
RUBY MTS.
PEQUOP MTS.
STEPTOE VALLEY
LANDER
Nixon
Fallon N.W.R.
Dixie Valley
Still Water Mts.
New Pass Range
Mt. Callahan 10187 ft.
Simpson Park Mountains
EUREKA
Austin
Eureka
Cherry Creek
Becky Pk 10098 ft.
SOSHUTE INDIAN RESERVATION
DEEP CREEK RANGE
LONG VALLEY
BUTTE MTS.
BUTTE VALLEY
EGAN RANGE
WHITE PINE
DIAMOND MTS.
Little Antelope Summit 7438 ft.
Pancake Summit 6521 ft.
North Schell Pk 11890 ft.
McGill
Ruth
Ely
Lane
Ward Mtn
Ruth Copper Pit (One of the World's Largest Mining Pits)
SCHELL CREEK RANGE
Fernley
Hazen
Fallon
Silver Springs
Stillwater
Fallon Naval Air Station
Lahontan Dam
Lahontan St. Rec. Area
STILLWATER N.W.R.
CHURCHILL
CLAN ALPINE MTS.
Cold Springs
Sand Mountain
Desatoya Pk. 9973 ft.
DESATOYA MTS.
Stagecoach
Dayton S.P.
Ft. Churchill St. Hist. Park
MILITARY RESTRICTED AREA
LYON
City
Wabuska
Yerington
Yerington Ind. Res
Weed Heights
WALKER RIVER INDIAN RES.
Mason
Smith
Wellington
Walker Lake
Desert Creek
TOIYABE NAT'L FOREST
Hawthorne
Hawthorne Army Ammunition Plant
MINERAL
Corey Pk. 10520 ft.
Powell Mtn. 9530 ft.
Mina
Luning
Pilot Peak 9184 ft.
EXCELSIOR MTS.
WASSUK RANGE
GABBS VALLEY RANGE
Schurz
Gabbs
Sherman Pk. 8657 ft.
Iona
Berlin-Ichthyosaur S.P.
Kingston
Kingston Canyon
YOMBA IND. RES.
N. Shoshone Pk. 10313 ft.
Bunker Hill 11474 ft.
SHOSHONE MTS.
TOWABE RANGE
TOIYABE NAT'L FOR.
Hickison Summit 6564 ft.
Summit Mtn 10461 ft.
Prospect Peak 9571 ft.
Ninemile Pk 10104 ft.
Mt. Hamilton 10745 ft.
Ruth Copper Pit
Ward Charcoal Ovens St. Hist. Site
Cave Lake S.P.
Bakers
Wheeler Peak 13063 ft.
Lehman Caves
GREAT BASIN NAT'L PARK
HUMBOLDT NAT'L FOR
SNAKE RANGE
Carvers
Round Mountain
Bald Mtn. 8274 ft.
Pine Cr.
Peavine Cr.
Belmont
Belmont Courthouse St. Hist. Site
Manhattan
Pinon Pk 8600 ft.
TOIYABE NAT'L FOREST
BIG SMOKY VALLEY
TOQUIMA RANGE
MONITOR RANGE
WHITE PINE MTS.
PANCAKE RANGE
RAILROAD VALLEY
Duckwater
DUCKWATER INDIAN RES
Currant
Currant Mtn. 11513 ft.
Currant Creek
Preston
Lund
Mt. Grafton 10990 ft.
EGAN RANGE
GRANT RANGE
Tray Pk 11256 ft.
Lunar Crater
HUMBOLDT NAT'L FOR
MOUNTAIN HOME OR NEEDLE
Bridgeport
Coaldale
Tonopah
El. 6030 ft.
Warm Springs
Saulsbury Wash
RALSTON VALLEY
MONTE CRISTO RANGE
NYE
REVEILLE RANGE
Kawich Pk 9404 ft.
Leviathan Cave Geologic Area
Warthington Peak 8850 ft.
Mt. Irish 8741 ft.
Rachel
Hiko
Ash Springs
Alamo
Pahranagat N.W.R.
Carp
Ursine
Crystal Springs
Casa Diablo Hot Springs
Casa Diablo
Benton
Dyer
Piper Pk. 9450 ft.
Boundary Peak 13140 ft. Highest pt. in Nevada
Emigrant Pk. 6789 ft.
SILVER PEAK RANGE
Silverpeak
Montezuma Pk. 8373 ft.
Goldfield
ESMERALDA
STONEWALL FLAT
CACTUS RANGE
NELLIS AIR FORCE BOMBING & GUNNERY RANGE
NATIONAL WILDHORSE MANAGEMENT AREA
Quartzite Mtn. 7766 ft.
Wheelbarrow Pk. 8482 ft.
BELTED RANGE
TIMPAHUTE RANGE
PAHRANAGAT RANGE
DELAMAR MTS.
MORMON RANGE
Caliente
Panaca
Elgin
Desert National Wildlife Range
Marmon Peak 7411 ft.
Mesquite
Lida
Bishop
Big Pine
INYO NATIONAL FOREST
INYO MTS.
SYLVANIA MTS.
COTTONWOOD MTS.
CALIFORNIA
Scotty's Junction
Gold Point
Tolicha Pk. 7054 ft.
PAHUTE MESA
Pinyon Butte 7131 ft.
Shoshone Peak 7054 ft.
NEVADA
SARCOBATUS FLAT
Grapevine Pk. 9738 ft.
GRAPEVINE MTS.
Beatty
Death Valley Junction
Amargosa
Sun Valley
Wildcreek
Shadow Mountain Park
Spanish Springs Valley
Sparks
Reno
Reno/Tahoe Int'l. Arpt.
Washoe Med.
Center Creek
Victorian Ave.
Prater Way
P.O.
C.H.
C. of C.
Vis. Cen.
Union of Nevada Farm
Brooktree Mun.
Pembroke
Rosewood Lakes
Parkside Park Blvd.
Baring Blvd.
Pacific Crest Natl. Scenic Trail
Kings Canyon N.P.
Sahara Av.
Stratosphere Tower
Las Vegas
Boulder City
Hoover Dam
Lake Mead N.R.A.
Lake Mead
Overton
Valley of Fire S.P.
Logandale
Glendale
Moapa
Moapa Ind. Res.
Virgin Valley
Virgin Valley Ind. Res.
Mormon Mesa
Riverside
Mesquite
Bunkerville
Virgin R.
Littlefield
Beaver Dam Wash
Beaver Dam Mts.
Beaver Dam S.P.
Utah
Arizona


IDAHO
NEVADA
UTAH
JACKPOT-RCO
RENO
122.5
JACKPOT/HAYDEN (Pvt)
5213 - 62 122.8
LUCIN A MOA
LUCIN B
10,500 MSL
11,400 MSL
11,500 MSL
9000 MSL
8500 MSL
9800 MSL
1200 AGL
SPECIAL MILITARY ACTIVITY
CONTACT CLOVER CONTROL ON 118.45
FOR ACTIVITY STATUS
LUCIN
113.6 Ch 83 LCU
CEDAR CITY
122.1R
(Pvt) LUCIN
4412 - 40
JUNIPER (Pvt)
5400 - 21
MISHAP A/C
239°
043°
063°
078°
320°
R-6404C
(Pvt)
PILOT CREEK
4980 - 20
Montello
Grouse Creek
AIRPORT
microwave station
85
91
94
111
81
VR1422
VR1300
VR1303
VR1304
NEWFOUND
DESERT