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AIRCRAFT ACCIDENT REPORT

SIERRA PACIFIC AIRLINES, INC.

CONVAIR 340/440, N4819C

NEAR BISHOP, CALIFORNIA

MARCH 13, 1974

ADOPTED: JANUARY 10, 1975

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C. 20591

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16. Abstract <p>About 2028 on March 13, 1974, Sierra Pacific Airlines, Inc., Charter Flight 802, a Convair 340/440, crashed near Bishop, California. The 36 occupants--32 passengers and 4 crewmembers--were killed. The aircraft was destroyed.</p> <p>The last recorded transmission from the flight was at 2024 when the crew advised the Tonapah Flight Service Station that they had departed Bishop and were climbing under visual flight rules. The aircraft crashed at the 6,100-foot level into a foothill of the White Mountains, about 5.2 miles southeast of the Bishop Airport.</p> <p>The National Transportation Safety Board is unable to determine the probable cause of this accident. The reason why the flightcrew did not maintain a safe distance from hazardous terrain during night visual flight conditions could not be established.</p>					
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TABLE OF CONTENTS

	Page
Synopsis	1
1. Investigation	1
1.1 History of Flight	1
1.2 Injuries to Persons	4
1.3 Damage to Aircraft	5
1.4 Other Damage	5
1.5 Crew Information	5
1.6 Aircraft Information	5
1.7 Meteorological Information	6
1.8 Aids to Navigation	6
1.9 Communications	7
1.10 Aerodrome and Ground Facilities	7
1.11 Flight Recorders	8
1.12 Aircraft Wreckage	8
1.13 Medical and Pathological Information	11
1.14 Fire	11
1.15 Survival Aspects	11
1.16 Tests and Research	11
1.17 Other Information	13
2. Analysis and Conclusions	13
2.1 Analysis	13
2.2 Conclusions	17
(a) Findings	17
(b) Pro'bable Cause	18
3. Recommendations	18
Appendices	
Appendix A - Investigation and Hearing	19
Appendix B - Crew Information	20
Appendix C - Aircraft Information	22
Appendix D - Approach Chart	24
Appendix E - Wreckage Distribution Chart	25
Appendix F - Recommendations	29

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SYNOPSIS

About 2028 P. d. t. on March 13, 1974, Sierra Pacific Airlines, Inc., Charter Flight 802, a Convair 340/440, crashed into a foothill of the White Mountains near Bishop, California. The 36 occupants--32 passengers and 4 crewmembers--were killed. The aircraft was destroyed.

The flight had been chartered by Wolper Productions, Inc., to transport a movie production crew from Bishop to Burbank, California. The last recorded transmission from the flight was at 2024 when the crew advised the Tonopah Flight Service Station that they had departed Bishop and were climbing under visual flight rules. The aircraft crashed at the 6,100-foot level into a foothill of the White Mountains, about 5.2 miles southeast of the Bishop Airport.

The National Transportation Safety Board is unable to determine the probable cause of this accident. The reason why the flightcrew did not maintain a safe distance from hazardous terrain during night visual flight conditions could not be established. ✓

As a result of this accident, the Safety Board has submitted three recommendations to the Federal Aviation Administration.

I. INVESTIGATION

1.1 History of Flight

On March 13, 1974, Sierra Pacific Airlines, Inc., charter Flight 802, a Convair 340/440, N4819C, was chartered by the Wolper Productions, Inc., to transport a movie production crew from Mammoth Lakes Airport, California, to Burbank, California.

Originally, N4819C was to be used on a regularly scheduled passenger flight to Mammoth, which was scheduled to depart Burbank at 1545. ^{1/} The return from Mammoth was charter Flight 802. However, because of a maintenance problem on N4819C, the flight was cancelled, and its passengers were dispatched on another Sierra Pacific flight. At 1730, the maintenance problem on aircraft N4819C was corrected. However, because of the late hour, a night takeoff would have been necessary from Mammoth Lakes Airport, and since the airport is restricted to daylight visual flight rules (VFR) operations only, Flight 802 was rescheduled to pick up the Wolper Production crew at the Bishop, California, Airport. This airport is located about 45 miles south of Mammoth Lakes. The airline arranged bus transportation for the production crew from Mammoth Lakes to Bishop.

Flight 802 departed Hollywood-Burbank Airport at 1814. The flight-crew consisted of the captain, first officer, flight attendant, and an observer-pilot trainee. There were three nonrevenue passengers on board for the flight to Bishop.

The flight from Burbank to Bishop was conducted under VFR conditions and at 1910, when in the vicinity of Bishop, the crew contacted the Tonopah Flight Service Station (FSS) and cancelled their VFR flight plan. The crew then "air filed" an instrument flight rules (IFR) flight plan for the return trip from Bishop to Burbank. The proposed departure time from Bishop was 2000. The proposed routing was listed as, "VFR - direct Bishop (VOR), IFR - Bishop (VOR), direct Friant (VOR), V459 Lake Hughes (VOR), V165 Lang (VOR), direct. "

The flight then contacted the Bishop Airport Unicorn ^{2/} and requested traffic advisories and weather information. The aircraft landed at Bishop at 1920.

While at Bishop, the aircraft was fueled with 100 gallons of 100/130 aviation gasoline. No maintenance was performed on the aircraft.

During the stopover, the captain telephoned the airline's dispatcher in Burbank to report his "on" and "in" times. He reported no problems with the aircraft nor any other problems that would indicate other than a routine operation to this point.)

^{1/} All times herein are Pacific daylight time, based on the 24-hour clock.

^{2/} A common communication channel used by many airports without control towers. The standard Unicorn frequency is 122.8 MHz.

The baggage, motion picture production equipment, and film were loaded aboard the aircraft by a Sierra Pacific passenger agent and the system director of passenger service. The loading was supervised by the observer-pilot trainee. According to the Sierra Pacific personnel, this baggage and equipment was not weighed at Bishop, because Wolper Productions, Inc., assured them that the same items which were flown to Mammoth Lakes by a previous Sierra Pacific charter flight on March 11 were being returned to Burbank with no additions or deletions.

Flight 802 departed the gate at about 2020 with 36 persons on board, including a crew of 4. Before departure, the passenger agent noted that the captain was seated in the left seat, the first officer was seated in the right seat, and the observer-pilot was standing in the cockpit doorway behind the cockpit-observer seat.

The airport manager saw the aircraft taxi north toward runway 12. He then attempted to contact the flight on the Unicom frequency. After several unsuccessful attempts, he returned to the ramp area and saw the aircraft takeoff on runway 12. He stated that after the aircraft passed abeam of his position, a hangar blocked his view and that he neither saw nor heard the aircraft again.

Records of the Tonapah FSS show that at 2021, the crew of Flight 802 contacted the station and advised that they were taxiing for departure and requested that their IFR clearance be activated. At 2021:30, the FSS requested Flight 802's IFR clearance from the Oakland Air Route Traffic Control Center. The Center advised that they would have to call back with the clearance.

At 2024 Flight 802 again contacted the Tonapah FSS on the Bishop radio frequency, 122.6 MHz, and reported that they were off Bishop at 2020 and were, "climbing VFR over Bishop, awaiting clearance."

At 2028:40, after receiving the clearance from the Oakland Center, the Tonapah FSS specialist tried to radio the flight, but contact could not be established. Repeated attempts by the FSS specialist to contact the flight were not successful.

The specialist then contacted the Oakland Center and advised that Flight 802 had reported that it was climbing VFR over Bishop, but that he was unable to establish radio communications. He also reported that he had broadcast in the blind for the flight to contact the Center on 127.3 MHz.

At 2036, the manager of the Bishop Airport called Tonapah FSS and requested the status of Flight 802 and advised the FSS of an explosion and fire in the White Mountains east of the airport. In view of the circumstances, the FSS specialist assumed that an accident had occurred and initiated accident notification procedures.

Several persons on the ground saw the aircraft during the last few moments before it crashed. Three of these persons, who were located near the base of the mountains to the east of the airport, stated that they saw the green and white lights of an aircraft proceeding in a southerly direction parallel to the mountain range. They then heard the engines of what they thought to be a large airplane. They stated that the engines maintained a strong, steady, and smooth sound and that the aircraft appeared to be in a gradual climb. They had observed the aircraft for about 1 minute when they saw a burst of flames and heard an explosion.

No witnesses were found who saw the aircraft immediately after takeoff or during the initial phase of the climbout. One witness, who was about 2 miles southwest of the airport, stated that he heard a large, twin engine aircraft pass nearly overhead just before the accident, but that he did not see the aircraft during this time. All of the witnesses agreed that it was an extremely dark night, and that there was no moon.

The aircraft struck a foothill in the White Mountain range, about 5.2 statute miles southeast of the Bishop Airport. The geographic coordinates of the accident site are 37° 19' 57" north latitude: 01801614'36" west longitude. At the point of impact, the elevation was

The pilot of a search and rescue helicopter, who flew to the scene shortly after the accident, stated that the night was quite dark with no moon and that the sky was partially cloud covered. Because of the darkness, neither he nor his passenger, was able to discern the mountains, ridges or the skyline either from the valley before departure, or enroute to the fire that marked the crash site.

1.2 Injuries to Persons

<u>Injuries</u>	<u>Crew</u>	<u>Passengers</u>	<u>Other</u>
Fatal	4	32	0
Nonfatal	0	0	0
None			

3/ All altitudes herein are mean sea level, unless otherwise indicated.

1.3 Damage to Aircraft

The aircraft was destroyed.

1.4 Other Damage

None.

1.5 Crew Information

The captain, first officer, and flight attendant were certificated and qualified for the flight.

The captain had flown into the Bishop Airport eight times during the 6-month period preceding the accident. Three of these flights were conducted at night and within 90 days of the accident.

✓ The first officer had flown into the Bishop Airport five times within the last 90 days, one of which was at night. It was reported that he had been ill and bedridden with a flu virus for 4 days before reporting for duty on the day of the accident.) (See Appendix B.)

The observer-pilot trainee was a pilot-in-command trainee for Sierra Pacific Airlines and had been assigned to the flight so that he could become familiar with the Mammoth Lakes and Bishop Airports.

1.6 Aircraft Information

N4819C, a Convair 340/440, was owned and operated by Sierra Pacific Airlines, Inc. It was certificated and maintained in accordance with approved company procedures and Federal Aviation Administration (FAA) regulations.

The No. 1 fuel tank compensator and the No. 1 engine generator had been replaced before the aircraft departed Burbank on March 13, 1974. The discrepancy was revealed during the preflight engine run-up when the No. 1 generator would not parallel properly during the electrical system check. (See Appendix C.)

The computed gross takeoff weight of the aircraft was 45,480 lbs. The maximum allowable takeoff weight for the flight was 47,000 lbs. Both the weight and the center of gravity (c. g.) were within prescribed limits.

The combined weight of the baggage and cargo was shown on the Sierra Pacific weight and balance form as 2, 950 lbs., since that was the amount shipped on March 11.

The aircraft departed Bishop with 575 gallons (3,450 lbs.) of 100/130 aviation gasoline.

1. 7 Meteorological Information

The last official surface weather observation taken at Bishop before the accident was recorded at 1956 and was, in part, as follows:

Estimated ceiling-25,000 feet broken, visibility-30 miles, temperature-59' F., dewpoint-25^o F., wind-160' at 11 kn., altimeter setting-30.03 in.

No pilot weather reports were available pertinent to the time and place of this accident.

Official sunset was recorded at 1905 and civil twilight at 1930. Astronomical twilight ended at 2026. The moon rose at 0104 on March 14, 1974.

[The flight dispatch papers show that the crew received current weather information and forecasts for the Bishop Airport before leaving Burbank. The crew also received the latest weather for Bishop from the meteorological technician on the Bishop Unicorn frequency.—'

1. 8 Aids to Navigation

The Bishop VOR (BIH) is located on the Bishop Airport and transmits on a frequency of 108.6 MHz. Bishop Airport has one prescribed instrument approach procedure entitled VOR-A. There was no distance measuring equipment (DME) installed at Bishop. (See Appendix D.) The December 1, 1972, Jeppesen Approach Chart, which was current at the time of the accident, showed the airport elevation as 4, 120 feet. Circling minimums, which applied to all categories of aircraft, were: Ceiling-8, 000 feet and visibility-2 miles. To land, an arriving flight must establish visual contact with the airport before it reaches 8, 000 feet and must make a visual descent to the runway if the visibility is 2 miles or better. The missed approach procedure is, "Pull Up: Climb southeast bound on BIH VOR R-140 climbing to 10,000 feet, turn left, proceed BIH VOR via inbound R-140 climbing to 13,000 feet and hold southeast. ¹¹

The air carrier takeoff minimums are 2 miles visibility. The applicable IFR departure procedure is outlined on the approach chart as follows:

"Climb visually within 2 NM of Bishop Airport to cross BIH VOR at or above 8,000', climb southeast and on R-140 to 10,000', turn left, proceed to BIH VOR continuing climb in a one minute holding pattern on R-140 (320° inbound), right turns to the following MCA's: Northwest and direct to Nichols Int, 13,000'; north bnd direct to OAL VOR, 15,500'; southwest bnd direct to FRA VOR 15,000'."

Monitor equipment for the BIH VOR is located in the operations office at the Bishop Airport. Operations personnel are responsible for monitoring the operations of the VOR. On the monitor equipment, NAVAID malfunction is indicated by an aural alarm or visual alarm, or both. If an alarm is seen or heard, BIH operations personnel must notify the Tonapah FSS personnel.

According to the airport manager, who was in the operations office at various times during the departure of Flight 802, no alarms were seen or heard by him nor were any reported to him before or after Flight 802 departed.

The BIH VOR was flight checked by the FAA following the accident. All components were found to be operating within prescribed tolerances. There was a slight out-of-tolerance condition found on the ground reference check point located on the airport; however, all other phases of the facility ground check were satisfactory.

The postaccident flight check report also shows that the BIH radio communication frequency 122.6 MHz and the Unicorn frequency 122.8 MHz were operating satisfactorily.

1.9 Communications

There were no reported problems associated with communications between the flight and the involved air route traffic control facilities.

1.10 Aerodrome and Ground Facilities

Bishop Airport is located 2 miles east of Bishop, California, at an elevation of 4,120 feet. There are three operational runways: Runway 07/25 is 4,560 feet long, runway 12/30 is 7,500 feet long, and runway 16/34 is 5,600 feet long. The runways are 150 feet wide. Runway 16/34 is equipped with medium intensity runway lights which

operate from dusk until dawn. Runway 12 has runway lights installed but these were not operable. There is no control tower at the airport, but weather and traffic advisories are available on the 122.8 MHz Unicorn frequency. Bishop Radio, 122.6 MHz, is controlled by the Tonapah FSS via a remote transmitter/receiver which is located on the Bishop Airport.

Bishop Airport lies in a deep funnel-shaped valley bounded on the west by the Sierra Nevada Mountains and on the east by the White Mountains. The valley to the south of Bishop is about 7 miles wide. At Bishop, and to the north, the valley widens to about 12 miles. The terrain to the east of the airport begins to rise rapidly at about 3 1/2 miles and to the west of the airport, at about 8 miles. The valley floor at Bishop and to the south, is flat with an average elevation of about 4,100 feet. The floor to the north is composed of volcanic tableland that rises slowly in elevation. The highest terrain near the airport is the range of foothills and mountains to the east.

1.11 Flight Recorders

There were no flight recorders installed on this aircraft nor were they required.

1.12 Aircraft Wreckage

The aircraft struck the north slope of a mountain ridge about 5.2 statute miles southeast of the Bishop Airport and at an elevation of 6,100 feet. The top of the ridge, which runs generally east to west, is 6,280 feet. Depressions in the earth made by the right wing leading edge and the right propeller and engine showed that, at impact, the aircraft was on a heading of 175° magnetic and in a 25° right wing-down attitude. The wreckage was scattered over an area 1,083 feet long and 120 feet wide. Parts of all major sections of the aircraft structure and flight control surfaces were found in the wreckage area. (See Appendix E.)

The breakup of the aircraft was extensive in all wing and fuselage areas. Portions of the fuselage main body, center wing section, and cockpit were consumed by ground fire.

The empennage had separated from the main fuselage body and had come to rest about 40 feet upslope from the initial impact point. The rudder was deflected to the right about 14 inches, and the trim tab was deflected to the right about 1 1/4 inches. The flight tab was in the neutral position. Both elevators were deflected upward about 6 inches. The left servo tab was deflected upward 7/8 inches; the right servo tab was faired.

Ekamination of the available control system surfaces disclosed no evidence of preimpact failure or malfunction. The landing gear and the wing flaps were in the retracted position at impact.

The examination of the right engine DC generator disclosed no signs of any internal operating distress: however, there was evidence of rotational damage. The left engine DC generator was damaged severely by ground fire and no information was obtained as to its pre-impact operating condition.

The two AC inverters were severely damaged by impact and ground fire, but displayed no evidence of internal operating distress. (One of the inverter cooling fan assemblies showed rotational damage.)

Light bulbs were recovered from the white and red empennage lights and the right wingtip light. Ekamination of the bulbs filaments showed that these bulbs were lighted at impact. One wing landing light was recovered; its actuator was in the retracted position.

The engine fire extinguisher control panel, which was mounted on the cockpit glare shield, was recovered in the main wreckage area. The left and right engine firewall shutoff handles were in the open position and the safety wire was intact. The fire extinguishing system selector switch was in the center (off) position. The two fire extinguishing system discharge switches were in the off and guarded position.

Two VOR navigation receivers were recovered: however, their positions could not be determined. One was tuned to frequency 108.6 MHz (Bishop VOR), the other was tuned to frequency 108. (tenths missing) MHz.

The No. 1 DME receiver was set at Channel 23 which is the paired frequency of the Bishop VOR. One VHR radio transmitter (position undetermined) was set at 121.6 MHz.

Imprint marks found on the dials of the two master direction indicators (C-2 compass) correlated to a heading of between 170° and 172° on both instruments.

One course indicator was recovered. Examination revealed a pointer imprint on the compass face between 170° and 180°

Only one of the two altimeters was recovered from the wreckage. Ekamination of the instrument at the manufacturer's facilities showed that the barometric dial was set at 30.05 inches. The dial face was

examined for marks using a 30-power binocular microscope. A small inverted "v" was noted on the inner dial element at a position between the "E" and the "T" of the "10,000 FEET" label. This corresponded to a small pointer (10,000 feet scale) position of 6,200 feet. Smudge marks from the 1,000-foot pointer were found on the instrument face corresponding to pointer positions of 6,200 feet and 8,200 feet. No marks were found on the outer dial that would correlate to the 100-foot pointer position.

Inspection of the altimeter mechanism revealed no evidence of preimpact internal distress.

Both engines were separated from their wing mountings and were damaged severely by impact and ground fire. Examination of the engines revealed no evidence of failure or malfunction before impact.

The propellers had separated from their respective engines and were recovered in the wreckage area. One propeller blade remained attached to each hub. The tips and leading edges of these blades were severely nicked and gouged. The remaining two blades of each propeller were broken off at the hub; however, only two of these blades were found in the wreckage area. These blades had incurred numerous deep nicks and gouges, and the tips were missing. Several fragments of propeller blade were also found scattered throughout the wreckage site.

The two propeller hub and dome assemblies were transported to a propeller overhaul facility for disassembly and examination. Propeller blade shim-plate measurements corresponded to the following blade-angle settings at impact:

<u>No. 1 Propeller</u>	<u>No. 2 Propeller</u>
Blade No. 1 - 39°	Blade No. 1 - 39°
Blade No. 2 - 45°	Blade No. 2 - 45°
Blade No. 3 - 46°	Blade No. 3 - 40°

The propeller dome cam assembly positions corresponded to blade angles of 46° for the left propeller and 40° for the right propeller.

Measurements were taken between the stop motor head assembly mounting surface and the rack spring seat surface for each of the two propeller governors. The No. 1 propeller governor was found at a measurement which corresponded to a governor speed of 2,390 RPM and an engine speed of 2,479 RPM. The No. 2 governor was found at a measurement which corresponded to a governor speed of 2,420 RPM and an engine speed of 2,510 RPM.

Based on the propeller blade-angle data and the engine RPM, the engine power being developed at impact was computed to be between 1,700 and 1,800 brake horsepower (bhp). This bhp range corresponds to the maximum continuous power setting as outlined in the company's engine performance data. Both governor RPM speeds correspond to an RPM setting that would be associated with the alternate (high) climb power setting set forth in company engine performance procedures.

1.13 Medical and Pathological Information

All occupants of the aircraft died as a result of traumatic injuries.

Post-mortem examinations were conducted on the captain, first officer, and the pilot-observer trainee. Toxicological tests on these crewmembers revealed no evidence of drugs, carbon monoxide, or alcohol. The first officer's stomach was empty.

1.14 Fire

Post impact ground fire consumed portions of the fuselage main body, center wing section, cockpit, and nose structures.

1.15 Survival Aspects

(This accident was not survivable)

1.16 Tests and Research

Flight Tests

After the accident, flight tests were flown in a Piper Navajo aircraft in an attempt to simulate a possible flightpath from the Bishop Airport to the crash site. The test aircraft maintained an average climb speed of 145 KIAS and an average climb rate 600 feet per minute.

The tests showed that the following series of maneuvers would result in an altitude of 7,000 feet after takeoff from runway 12:

A climb straight ahead to 500 feet, a climbing turn in either direction to come back over the Bishop VOR, then continuing the climb to the crash site. The entire sequence took between 6 and 7 1/2 minutes, depending on the radius of the turn after takeoff to proceed back over the VOR.

Aircraft Simulator Test

The Safety Board used a Convair 340/440 simulator to reproduce the possible operational conditions of Flight 802. The primary objectives of the study were to:

1. Determine a probable flightpath which would fit within the assumed time parameters and aircraft performance capabilities for this flight.
2. Examine aircraft performance under various engine power settings.
3. Examine aircraft performance for various turn radii.

The simulated conditions were: Gross takeoff weight-46, 000 lbs. , flaps-15⁰; c. g. - 28 percent MAC; wind-160' at 11 kn.

The following engine power settings were used during the segments of climb.

Takeoff	2, 800 RPM	57. 0 inHg
Maximum continuous	2, 600 RPM	46. 5 inHg
Alternate climb	2,400 RPM	39. 0 inHg
Climb	2,300 RPM	38. 5 inHg

Programed tests flown in the simulator produced various flight tracks, altitude differentials, and required-time parameters. The pre-dominant findings of the tests were as follows:

1. After takeoff, a climb straight ahead to 500 feet, then a climbing right turn, using a 20⁰ angle of bank, direct to the BIH VOR; then a heading of 120⁰ to the accident site met the time and track requirements of the accident flight.
2. The climb performance of the CV 340/440 over the assumed time (6 minutes) and flightpath, using standard operating procedures, would place the aircraft more than 1,000 feet higher than the impact elevation.

1. 17 Other Information

Sierra Pacific Airline Flight Procedures

[No specific procedures are set forth in the Sierra Pacific Airlines' Operation Manual for a climbout from the Bishop Airport.

The Safety Board questioned a number of company pilots about the procedures that they used when operating out of the Bishop Airport. It was the consensus of these crews that an initial right turn toward the town of Bishop would be made after takeoff regardless of the runway used for takeoff. 3

2. ANALYSIS AND CONCLUSIONS

2. 1 Analysis

There was no evidence of any failure or malfunction of aircraft structure, systems, or components. Examination of the powerplants showed that they were developing high power at impact.

The crewmembers were certificated properly and were qualified for the flight.

According to the Tonapah FSS records, the crew of Flight 802 called that station at approximately 2024 and reported that they had departed Bishop at 2020 and were climbing VFR. However, at 2021 the crew had called the FSS and indicated that the flight was taxiing for takeoff. Based on this information, the Safety Board believes that the flight departed between 2022 and 2023. The records further show that the FSS specialist acknowledged receipt of Flight 802's IFR clearance from Oakland Center at 2028:40 and then tried to contact the flight. Since the specialist was unable to contact the flight at that time, and in the absence of any firm evidence to confirm the time of the crash, it is reasonable to assume that the accident occurred before the specialist attempted to contact the flight at 2028. Thus, the aircraft could have been airborne for no more than 6 minutes (2022 to 2028). The minimum time, allowing for the aircraft to proceed directly to the crash site, would have been about 2 minutes (2024 to 2026).

Assuming a 1,000-foot/min. rate of climb, 2 minutes would have allowed just enough time for the aircraft to takeoff, climb on the approximate runway heading, start a right turn, and crash at the accident site. However, this assumed flightpath is not compatible with witnesses' observations that, first, place the aircraft over the western edge of

Bishop and, second, have the aircraft proceeding parallel to the mountain range for about 1 minute before the crash. Thus, considering all factors, the Safety Board believes that the flight made a turn to the right and skirted the western edge of the town of Bishop. Based on the aircraft performance data and the time parameter of the flight, the Safety Board further believes that a climbing right turn was continued so that the flight circled back over, or near, the BIH VOR and then proceeded outbound in an east-southeasterly direction. Several witnesses saw the aircraft head in a southerly direction and parallel the mountain range shortly before the crash. The imprint marks at the accident site indicate that the aircraft was on a heading of about 175° magnetic and in an approximate 25° bank to the right at impact.

Both master direction indicators read between 170° and 174° magnetic at impact, which indicates that the crew was receiving reliable compass information. Imprint marks found on the altimeter face show a reading of about 6,200 feet, which corresponds closely to the impact elevation.

Propeller blade angle measurements and governor settings indicated that both engines were developing power in excess of rated climb power at the time of impact. Performance data calculated for the Convair 340/440 show that the aircraft, when operating in this engine power range, is capable of climbing more than the 2,000 feet that was gained during this flight. Since the airspeed and corresponding rate of climb that were maintained are not known, and because the duration of the flight could not be defined precisely, the exact altitude that the aircraft could have attained in this climbout cannot be determined.

Therefore, it is difficult to conceive of any problem with the aircraft that would have caused the flight to deviate from a safe flightpath over the valley and into the mountainous area where it crashed. In fact, it is difficult to envision any type of an aircraft emergency, other than a complete loss of control, ~~that would have precluded the crew from turning toward the 'town of Bishop and the lower terrain of the valley.~~

The mountains, which are 3 miles east of the Bishop Airport, are about 1,000 feet above the airport elevation. Beyond 3 miles, the terrain rises rapidly to 11,000 feet. It is, therefore, difficult to understand why the flight would have been so far to the east and in the mountainous area. This terrain, for all practical purposes, is void of ground lights, especially beyond 2 nmi from the airport. Although the actual visibility was 30 miles, witnesses reported that it was an extremely dark, moonless night and ~~that the mountains to the east could not be seen against the sky.~~

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(Thus, unless a pilot was thoroughly familiar with the terrain features in the area, he would not be able to see the mountains or to determine his proximity to them even at close range.)

The prescribed IFR departure procedure requires that an aircraft climb to 8,000 feet while remaining within 2 nmi of the Bishop Airport. The 2-mile radius is required because the terrain in the area is not safe for visual flight, either inbound or outbound, if the visibility is less than 2 miles. When the weather conditions at the airport are VFR (visibility 3 miles or more), an IFR departure procedure is not required. Presumably, the increased visibility enables the pilot to see and to avoid the mountains during the climbout.

In daylight VFR conditions, a visual climbout at distances beyond 2 nmi can be accomplished without difficulty. The mountains to the east and west would be visible during the climb and the pilot would accept the responsibility for terrain avoidance.

However, (a VFR climbout during the hours of ~~darkness~~ cannot be conducted with the same degree of safety unless a pilot is thoroughly familiar with the location of all obstructing terrain in the area) Without such knowledge, even with good visibility, a prudent pilot would conduct the climbout at night in proximity to the airport, and in a manner similar to that prescribed in the published IFR departure.

(Since there are no specifications for a VFR departure from the Bishop Airport, the excellent visibility in the case of Flight 802 proved to be a disadvantage. If the actual visibility had been 2 nmi, an IFR departure would have been required, and the flight would have been expected to circle the airport within the limits of visibility to comply with the procedure. The crew would have known that a loss of visual contact with the airport lights before reaching 8,000 feet was unsafe. With the 30-mile visibility conditions that existed, the climbout could be conducted at the pilot's discretion, based on his familiarity with the Bishop area. He would use the airport lights and other ground lights west of the airport as the primary means of orientation?

(The captain had flown into Bishop Airport eight times within the previous 6 months; three of these flights were at night. The first officer had flown into Bishop five times in the previous 3 months. From this experience, and the fact that they had just flown into Bishop about 1 hour before the accident in daylight hours, it must be concluded that both the captain and the first officer were at least aware of the hazardous terrain to the east of the airport.

It is possible, however, that the excellent visibility created a degree of crew complacency with respect to the need for strict adherence to a distance restriction on the visual climb around the airport. The crew would have had no fear of losing visual contact with the airport and this could well have created a sense of well being which could have lessened their concern over the VFR climb phase of flight.

Possibly a distraction of some sort occurred during the climbout which drew the attention of the crew from the normal vigilance in monitoring the progress of the aircraft. However, since there was no problem with the aircraft itself, no logical reason can be perceived for the distraction of all three crewmembers to the point of neglecting the flight track of the aircraft with respect to the hazardous terrain nearby.

The first officer had been ill for 4 days before the accident with a flu-type virus. Because of his illness, he had cancelled a scheduled flight the day before the accident. On the morning of March 13, the first officer reported for duty at 0515 and, except for a rest period between his two scheduled flights to Mammoth Lakes and return, he had been in duty status for more than 15 hours before the accident.

The autopsy revealed that the first officer's stomach was empty. This factor, in combination with long duty hours and the fatiguing after effects of the flu, could have caused the first officer to be degraded physically and mentally unalert.

Since the airport and the town of Bishop were on the right side of the aircraft during the climbout, the first officer, who was seated on that side of the cockpit, would have been expected to monitor the progress of the flight, particularly with respect to the distance the aircraft was progressing from the airport. An accurate judgment of this distance, based on his perception of the ground lights alone, would have been difficult. The proximity of the mountains to the east of the airport does not leave room for substantial misjudgments of distance.

The observer-pilot trainee was on his first flight out of the Bishop Airport. Therefore, an "instructional"-type relationship possibly existed between he and the captain. Consequently, the captain could have been detracted from monitoring adequately the flightpath of the aircraft.

2. 2 Conclusions

(a) Findings

1. The aircraft was certificated and maintained properly.
2. The crewmembers were certificated and qualified properly.
3. The aircraft weight and balance were within prescribed limits.
4. The flight departed runway 12 and advised the Tonapah FSS that they were climbing under visual flight rules while awaiting an IFR clearance.
5. There was no company prescribed VFR departure procedure for the Bishop Airport.
6. The flight maintained a right-turn pattern around the airport.
7. The aircraft struck a mountain side at an elevation of 6, 100 feet and 5. 2 statute miles southeast of the Bishop Airport.
8. Both engines were developing near maximum continuous power at impact.
9. There was no malfunction of the aircraft or its components.
10. The accident occurred during the hours of darkness before moon rise.
11. The mountains to the east of Bishop were not discernible against the sky.
12. The captain and the first officer had flown into the Bishop Airport on several occasions within the 6-month period preceding the accident.

- ✓ 13. The first officer was most probably in a fatigued condition as a result of the after effects of the flu virus, a long duty day, and a lack of food.

(b) Probable Cause

The National Transportation Safety Board is unable to determine the probable cause of this accident. The reason why the flightcrew did not maintain a safe distance from hazardous terrain during night visual flight conditions could not be established.

3. RECOMMENDATIONS

As a result of this accident, the Safety Board on November 5, 1974, submitted recommendations A-74-92 through 94 to the Administrator of the Federal Aviation Administration.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JOHN H. REED
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

/s/ WILLIAM R. HALEY
Member

January 10, 1975

APPENDIX A

INVESTIGATION AND HEARING

1. Investigation

The Safety Board was notified of the accident at 2145 on March 13, 1974, by the Federal Aviation Administration. An investigation team was sent to the scene of the accident on the following day. Working groups were established for operations, air traffic control, human factors, systems, structures, powerplants, and maintenance records. Parties to the investigation included the Federal Aviation Administration, Sierra Pacific Airlines, Inc., and Convair Aircraft Company. The on-scene investigation was completed on March 22, 1974.

2. Hearing

There was no public hearing.

APPENDIX B

CREW INFORMATION

Captain Albert J. Evans

Captain Albert J. Evans, 50, held Airline Transport Pilot Certificate No. 424834, with ratings for airplane multiengine land, Douglas DC-3, Convair 240, 340, 440, and Martin 202, 404.

His first-class medical certificate was issued September 7, 1973, with the limitation that corrective glasses be worn while exercising the privileges of the airman certificate.

He had accumulated 9,902 flight-hours, including 1,742 hours in the Convair-type aircraft. In the 90 days before the accident, he had flown 333' hours in the Convair 340/440.

Captain Evans was employed by Sierra Pacific Airlines on September 9, 1973, and had successfully completed a pilot-in-command initial proficiency check and en route flight check in the Convair 340/440 with an FAA inspector on October 2, 1973. During this check, Captain Evans qualified into the Bishop Airport and subsequently flew into Bishop eight times before the accident. Three of these trips were conducted at night and three were in the 90 days before the accident.

The captain had a 43-hour rest period before reporting for duty at 0515 on March 13, 1974. He had flown one round trip flight into Mammoth Lakes earlier that day and was not scheduled for any duties before the later departure for Bishop.

First Officer Paul T. Dennis

First Officer Paul T. Dennis, 26, held Airline Transport Pilot Certificate No. 2007875 with ratings for airplane multiengine land and the Convair 340/440.

His first-class medical certificate was issued April 10, 1973, with no limitations.

He had accumulated 2,845 flight-hours, of which 2,500 were in Convair-type aircraft. First Officer Dennis was employed by Sierra Pacific Airlines on October 15, 1973, and successfully completed a proficiency check in the Convair 340/440 on November 23, 1973. He had flown into Bishop five times during the previous 3 months. One of these flights was conducted at night.

First Officer Dennis had been ill and bedridden with flu virus for 4 days before reporting for duty at 0515 on March 13, 1974. He had flown one round trip to Mammoth Lakes on the day of the accident which departed Burbank at 0615 and returned at approximately 1030. He had not been scheduled for any duties in the intervening period before departing on the last flight to Bishop.

Observer-Pilot Harold R. West

Harold R. West, 45, occupied the cockpit jumpseat as an observer pilot on Flight 802. He was a pilot-in-command trainee for Sierra Pacific Airlines and had completed ground school and 2 hours of Link training. He held Airline Transport Pilot Certificate No. 1346876, with ratings for airplane multiengine land, and Convair 240, 340, and 440 aircraft. He had 8,831 flight-hours, of which 5,992 hours were in Convair-type aircraft.

His most recent first-class medical certificate was issued on February 15, 1974.

[Observer West had occupied the jumpseat five times before the day of the accident, but had not flown into Bishop until the evening of March 13, 1974.]

Flight Attendant Mary Joanne Parker

Flight Attendant Mary Joanne Parker, 19, was employed by Sierra Pacific Airlines on November 14, 1973. She completed her training on November 14, 1973. She was designated a Check Flight Attendant on January 25, 1974.

APPENDIX C

AIRCRAFT INFORMATION

N4819C, a Convair 340/440-38, Serial No. 138, was purchased by Sierra Pacific Airlines from Aspen Airways on November 11, 1973. The aircraft had 41, 112.7 airframe hours at the time of the accident. The last major inspection, a "G" check, was accomplished on January 31, 1974, and the last mid-period check was accomplished on March 2, 1974. The last service check was accomplished in Burbank on March 13, 1974, and the last recorded maintenance on the aircraft accomplished at that time was as follows:

1. The No. 1 fuel tank compensator **was** replaced.
2. During the electrical system check, the No. 1 generator would not properly parallel. The following actions were taken to correct the problem:
 - (a) The No. 1 voltage regulator was replaced - problem persisted.
 - (b) The No. 1 generator was replaced - no voltage could be obtained. Further inspection showed the No. 1 generator circuit fuse defective.
 - (c) The No. 1 generator circuit fuse was replaced - No. 1 generator system operated normally.
 - (d) Original generator was bench checked - generator operated normally.

A review of the aircraft flight log sheets for December 3, 1973, through March 12, 1974, showed no chronic malfunctions or discrepancies that would indicate an impending failure of malfunction.

Two Pratt and Whitney double WASP CB 16/17 (R2800) engines were installed as follows:

<u>Position</u>	<u>Serial No.</u>	<u>Time Since Overhaul (TSO)</u>
1	P 34505	447.3 hrs.
2	P 30606	806.0 hrs.

APPENDIX C

Two Hamilton Standard Type 43E60-381 propellers were installed on the aircraft. The No. 1 propeller, serial No. 167772, had a TSO of 162.2 hours, and the No. 2 propeller, serial No. 191742 had a TSO of 367.2 hours.

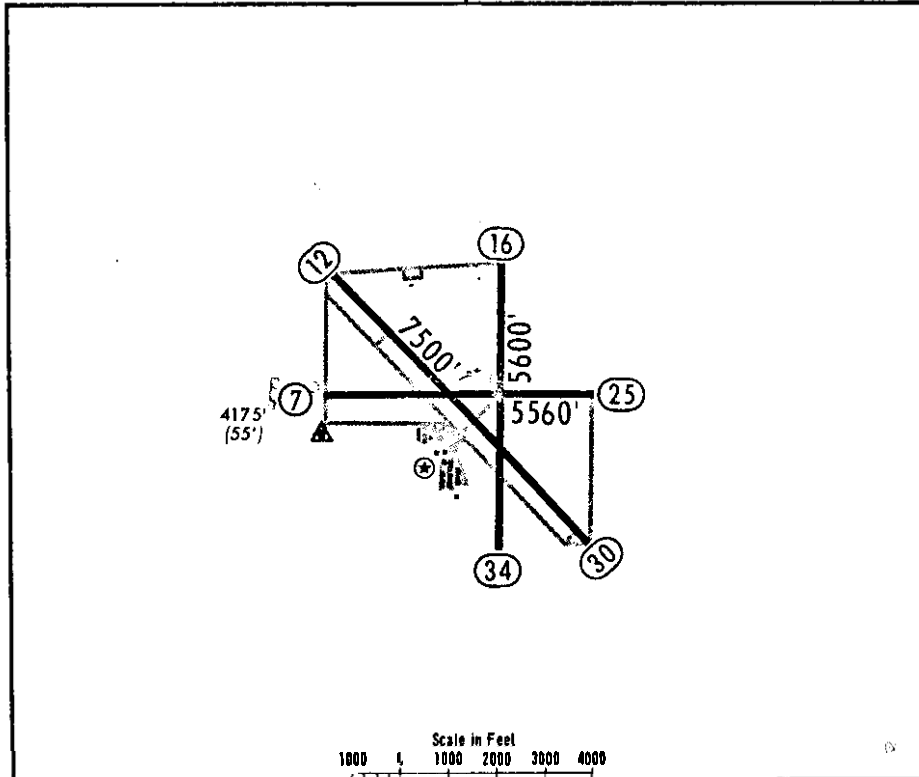
APPENDIX D

BISHOP, CALIF.
BISHOP APT.
 Elev 4120' 37°22'N 118°22'W

(13-1)

DEC1.72

Jeppesen Approach Chart



ADDITIONAL RUNWAY INFORMATION

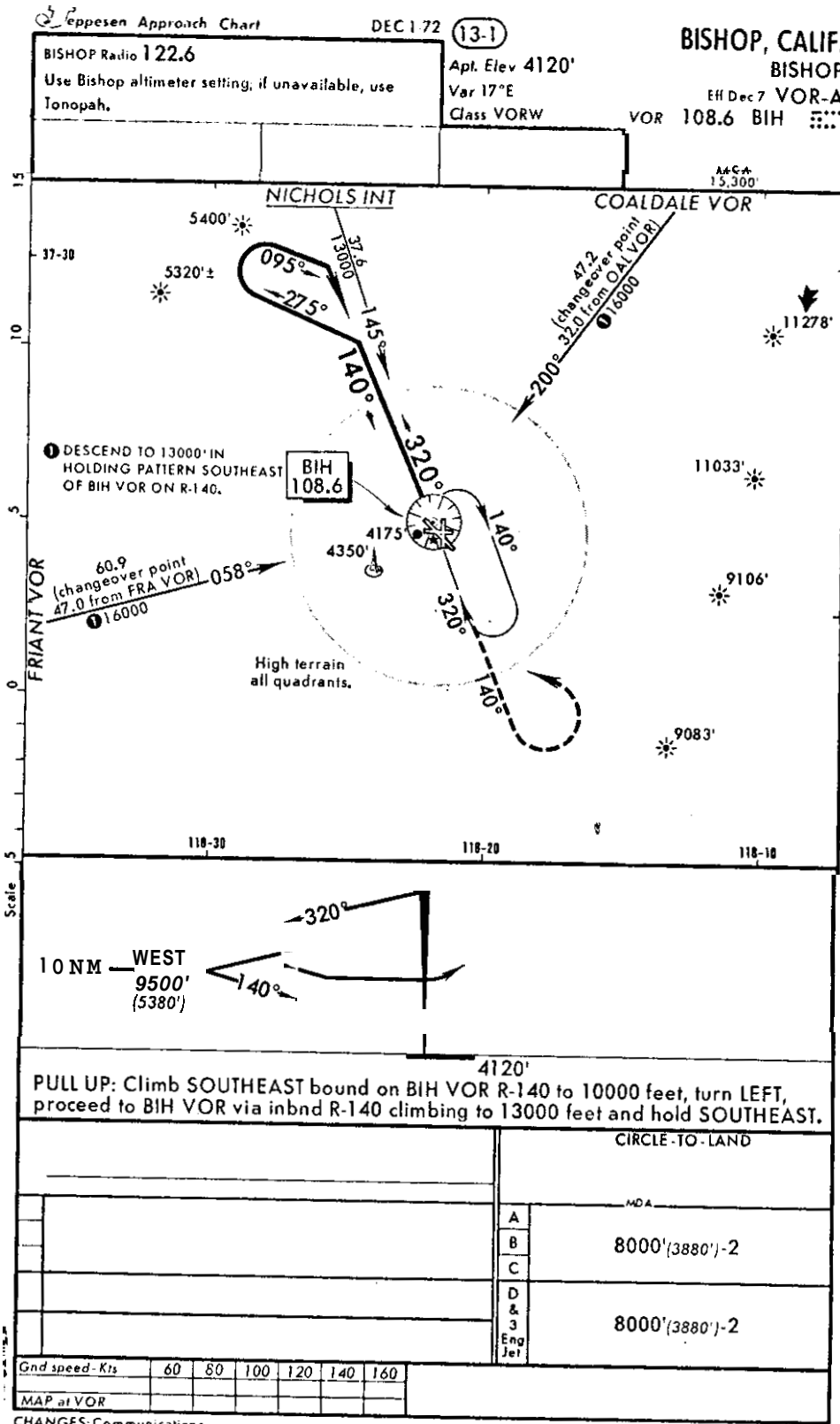
RWY	LIGHTING	USEABLE LENGTHS			WIDTH
		LANDING BEYOND Threshold	Glide Slope	TAKE OFF	
7 25					150'
12 30					150'
16 34	MIRL				150'

	AIR CARRIER TAKE - OFF			ALTERNATE
	SCHEDULED	TAKE - OFF ALTN FILED WITHIN: 1 Hr 2 Eng - 2 Hr 3 & 4 Eng	TAKE - OFF ALTN NOT FILED	
		Altn Apt & Non-Skd All Carriers		
2 Eng Tailwheel				NA
2 Eng Tricycle	2	2	Landing Weather Minima	
3 & 4 Eng				

IFR departure procedures: Climb visually within 2 NM of Bishop Apt. to cross BIH VOR at or above 8000', climb southeast-bnd on R-140 to 10000', turn LEFT, proceed to BIH VOR continuing climb in a one minute holding pattern on R-140 (320° inbnd), right turns to the following MCA's: Northwest bnd direct to Nichols Int, 13000'; north bnd direct to OAL VOR, 15500'; southwest-bnd direct to FRA VOR, 15000'.

CHANGES: Minor.

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LEGEND

- | | |
|---------------------------------|-------------------------|
| 1. NOSE GEAR ASSEMBLY | 26. CREW SEAT |
| 2. ENGINE CYLINDER | 27. PART OF AIR STAIR |
| 3. SECTION OF LEFTAILERON | 28. SECTION OF WING |
| 4. POINT OF IMPACT | 29. SECTION OF FUSELAGE |
| 5. TIP OF PROPELLER BLADE | 30. SECTION OF FUSELAGE |
| 6. EMPENNAGE | 31. EMERGENCY EXIT |
| 7. SECTION OF RIGHT WING | 32. OBSERVERS SEAT |
| 8. RIGHT WING TIP | 33. COCKPIT DOOR |
| 9. WING PANEL WITH SIGHT GAGE | 34. RIGHT ENGINE |
| 10. UPPER NACELLE FAIRING | 35. CABIN DOOR |
| 11. RIGHT PROPELLER | 36. LUGGAGE DOOR |
| 12. GEAR DOOR | 37. LAVATORY DOOR |
| 13. GEAR DOOR | 38. EMERGENCY EXIT |
| 14. INBOARD FLAP SEGMENT | 39. ENGINE COWLING |
| 15. OUTBOARD FLAP SEGMENT | |
| 16. DORSAL FIN | |
| 17. ENGINE ACCESSORY SECTION | |
| 18. EMERGENCY EXIT | |
| 19. WING SECTION AND RIGHT GEAR | |
| 20. LEFT GEAR | |
| 21. NOSE GEAR | |
| 22. LEFT WING TIP | |
| 23. ENGINE EXHAUST TUBES | |
| 24. LEFT ENGINE | |
| 25. LEFT PROPELLER | |

ROCKY TERRAIN

37

35

36

38

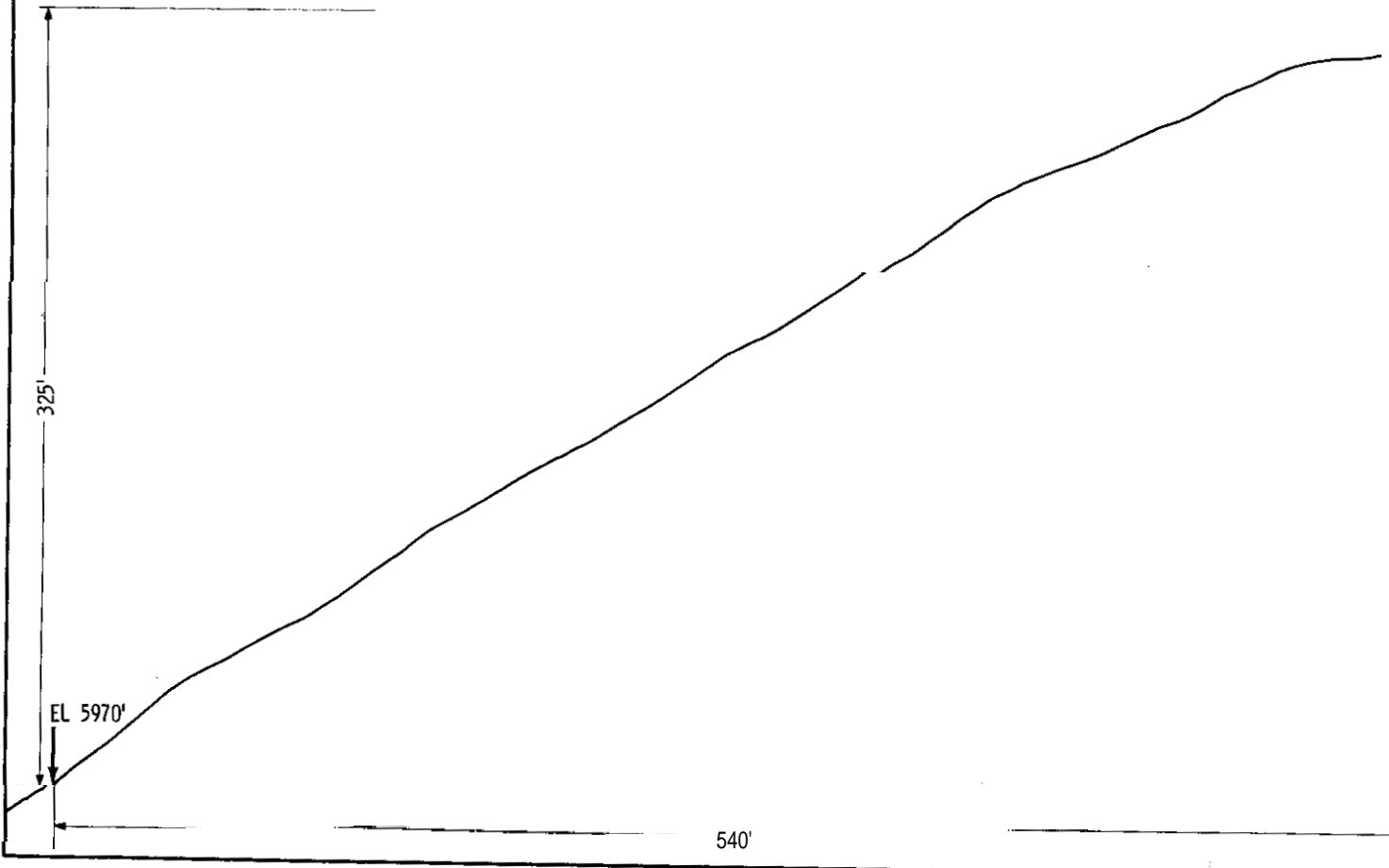
39

R11

325'

EL 5970'

540'



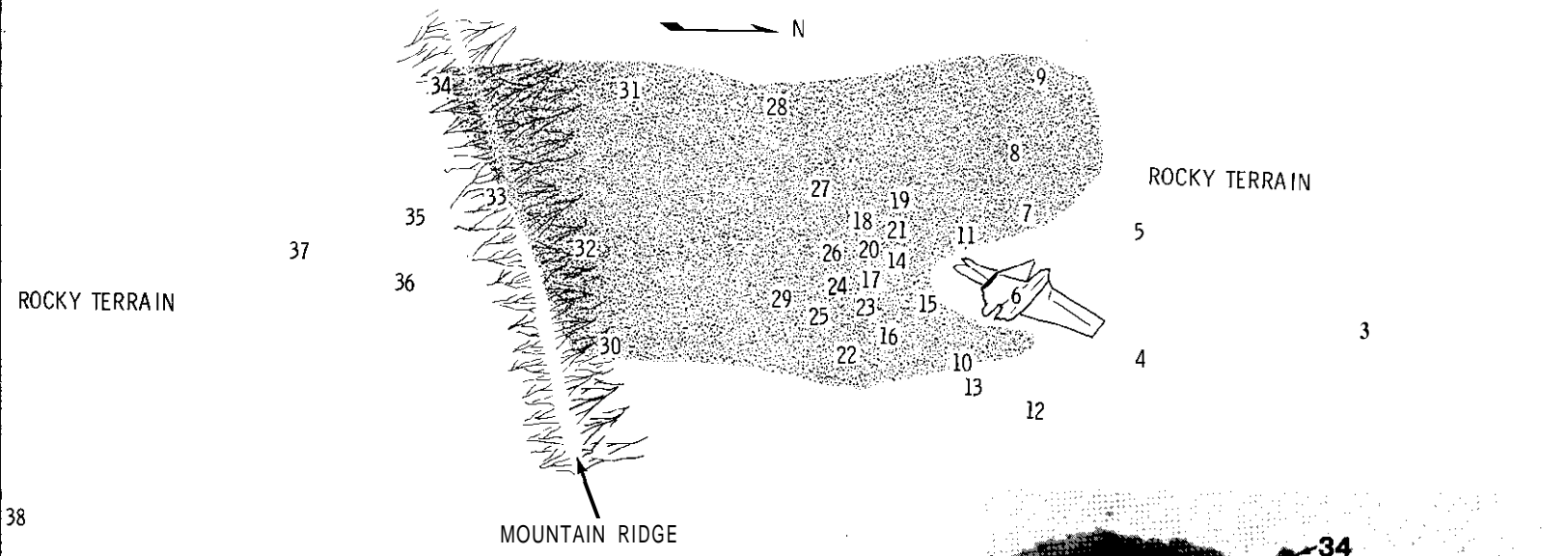
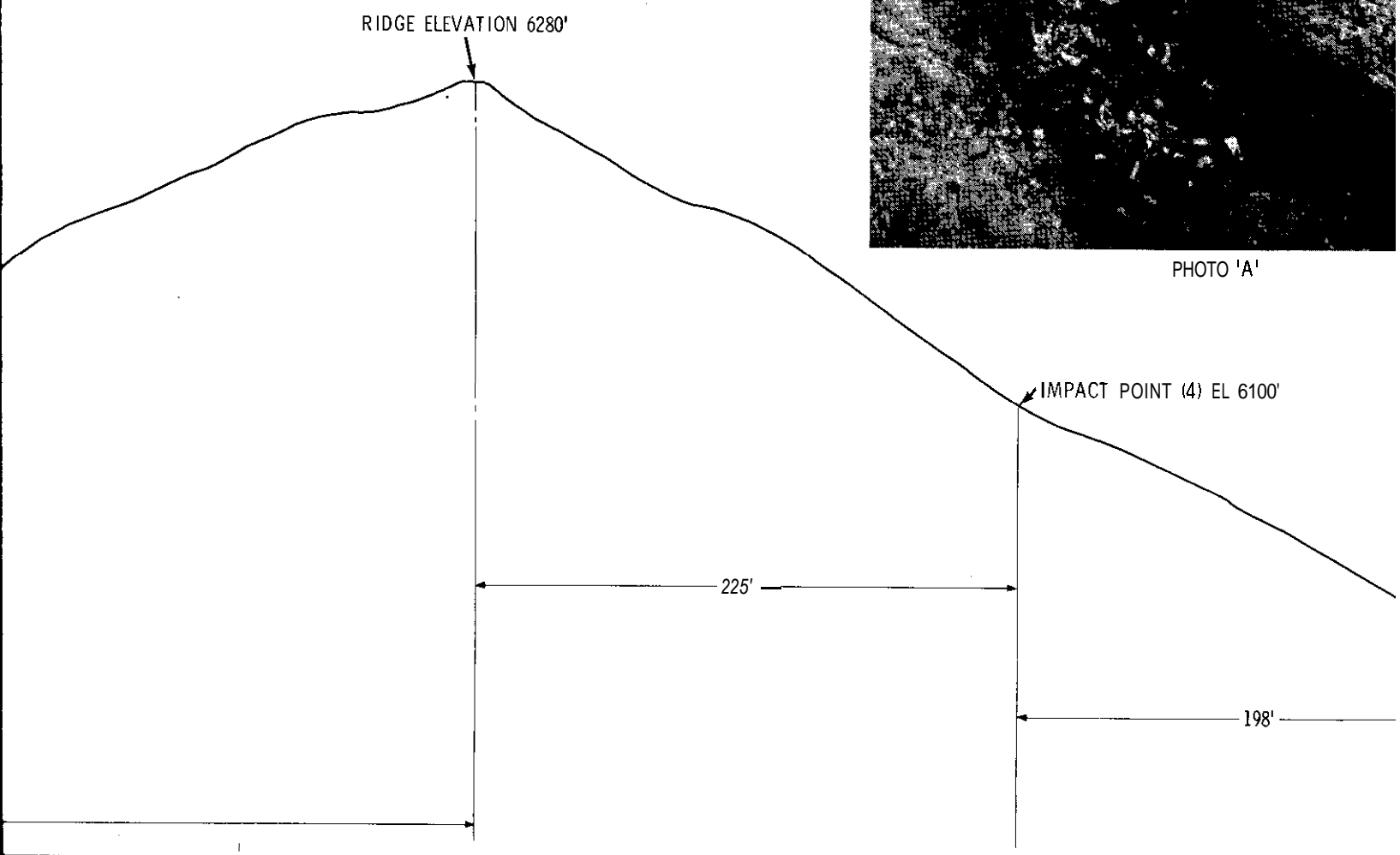


PHOTO 'A'



ROCKY TERRAIN

5

4

3

2

1

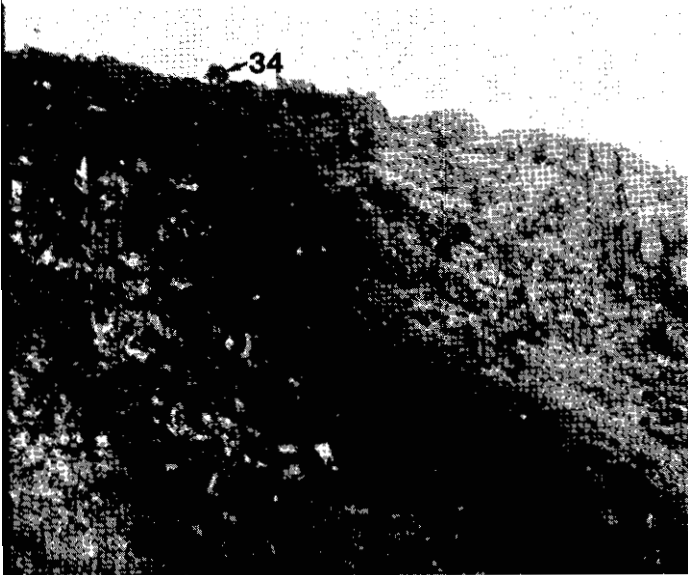
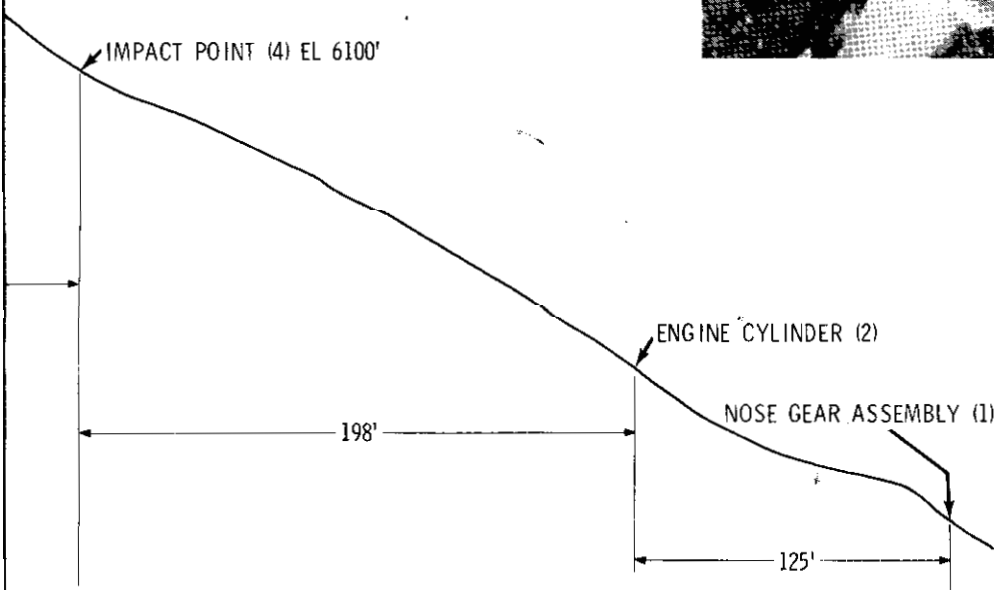


PHOTO 'A'



PHOTO 'B'



NATIONAL TRANSPORTATION SAFETY BOARD
 WASHINGTON, D.C.

WRECKAGE DISTRIBUTION CHART
 SIERRA PACIFIC AIRLINES
 CONVAIR 340/440, N4819C
 DCA 74-A-18
 NEAR BISHOP, CALIFORNIA
 MARCH 13, 1974

**NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.**

APPENDIX F

ISSUED: November 5, 1974

Forwarded to:

Honorable Alexander P. Butterfield
Administrator
Federal Aviation Administration
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-74-92 thru 94

On March 13, 1974, shortly after takeoff, Sierra Pacific Airlines Charter Flight 802 crashed into a foothill of the White Mountains, $5\frac{1}{4}$ miles southeast of Bishop Airport, Bishop, California. The flight was making a visual climb in compliance with the published procedure during nighttime hours when it struck the foothill at an elevation of about 6,100 feet. The ceiling was an estimated 25,000 feet, and the surface visibility was 30 miles.

Bishop lies in a deep, funnel-shaped valley bounded on the west by the Sierra Nevada Mountains and on the east by the White Mountains. The valley south of Bishop is about 7 miles wide. To the north, the valley opens to about 12 miles wide. The valley floor at Bishop, and to the south, is flat with an average elevation of about 4,100 feet m.s.l. The floor to the north is composed of volcanic tableland that rises slowly in elevation. The highest terrain near the airport is the range of foothills and mountains to the east.

The terrain begins to rise from the valley floor about 2 nmi from the airport's eastern boundary; it rises to 4,400 feet m.s.l. at $2\frac{1}{2}$ nmi, 5,200 feet m.s.l. at $2\frac{2}{3}$ nmi, and 6,000 feet at $3\frac{1}{2}$ nmi. To the west, the terrain rises to 4,400 feet m.s.l. at $3\frac{1}{2}$ nmi and to 6,000 feet m.s.l. 5 nmi from the airport.

The published IFR climb procedure requires a visual climb to 8,000 feet m.s.l. within 2 nmi of the airport. This instruction implies that a circular flightpath should be made around the airport, maintaining a distance no greater than 2 nmi from the airport boundary. With no distance measuring equipment (DME) installed on the airport, the maintenance of the required distance becomes a matter of judgment that leaves little margin for error, especially to the east. At night, when the mountains are not visible and lights to the east of the airport are few, estimation of an aircraft's distance east of the airport is difficult. The lighted town of Bishop gives good guidance to a pilot west of the airport.

APPENDIX F

Honorable Alexander P. Butterfield

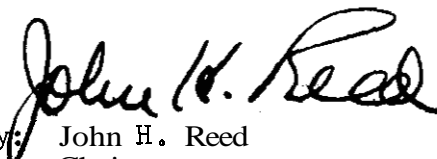
2

Bishop is located about 30 miles southeast of the Mammoth Ski area. The area is becoming increasingly popular, and therefore, the Bishop Airport traffic will probably increase proportionately. The increased traffic will no doubt be accompanied by larger aircraft carrying larger numbers of passengers.

In view of the difficulties in maintaining visually the prescribed distance from the airport, and in view of the proximity of high terrain and the traffic growth potential of the area, the National Transportation Safety Board recommends that the FAA:

1. Install a DME, cochanneled and collocated with the Bishop VOR.
2. Study the feasibility of an IFR climb procedure to the northwest of the Bishop VOR using a designated radial and the DME.
3. Require that all nighttime departures and arrivals at the Bishop Airport be conducted in accordance with the prescribed IFR procedures.

~~RED~~ Chairman, ~~FNR~~ BURGESS, and HALEY, Members, concurred in the above recommendations. McADAMS, Member, did not participate.


 By: John H. Reed
 Chairman

Sierra Pacific Airlines,
Inc. Convair 340

NTSB
AAR
75-1
C.1