

File No. 1008-12

Docket No. SA-65

Adopted: July 31, 1942

Released: August 1, 1942

REPORT OF THE CIVIL AERONAUTICS BOARD

Of the investigation of an accident involving aircraft of United States registry NC 18146 which occurred near Salt Lake City, Utah, on May 1, 1942.

CONDUCT OF INVESTIGATION

An airplane accident occurred in the vicinity of Salt Lake City, Utah, on May 1, 1942, about 11:00 p.m. (MWT)^{1/}. The airplane involved, NC 18146, was being operated at the time in scheduled air carrier service between San Francisco, California, and New York, New York, as Trip 4 of United Air Lines Transport Corporation (hereinafter referred to as "United"). All of the thirteen adult passengers and the one infant on board, and the crew of three, were fatally injured. The airplane was completely demolished.

The Washington office of the Civil Aeronautics Board (hereinafter referred to as the "Board") was notified of the accident about 2:00 a.m. (EWT). The Board immediately initiated an investigation in accordance with the provisions of Section 702(a)(2) of the Civil Aeronautics Act of 1938, as amended (hereinafter referred to as the "Act"). Air Safety Investigators of the Board were sent to the scene of the accident, the first of whom arrived about 9:00 o'clock on the morning following the accident. In accordance with the instructions of the Board, the wreckage had been placed under guard. This guard was maintained until the wreckage was officially released to the company on May 15, 1942.

A public hearing was held at Salt Lake City, Utah, on May 14 and 15, 1942. Robert B. Bias, an attorney for the Board, acted as presiding examiner, and the following personnel of the Safety Bureau of the Board participated in the hearing: R. D. Hoyt, Assistant Director; Ralph A. Reed, Senior Air Safety Investigator; and Perry Hodgden, Air Safety

^{1/} All times mentioned herein are Mountain War Time unless otherwise indicated.

Investigator. The Engineering Commission of the State of Utah was invited to participate in the hearing. John S. Evans and Lester Blackner, Chairman and Member respectively, attended as representatives of that body.

Upon the basis of all of the evidence disclosed by the investigation, the Board now makes its report in accordance with the Act.

II.

SUMMARY AND ANALYSIS OF EVIDENCE

Air Carrier

At the time of the accident, United was an air carrier operating under currently effective certificates of public convenience and necessity and air carrier operating certificates. These certificates authorized it to engage in air transportation over various routes, including Route No. 1 between the co-terminal points New York, New York, and Newark, New Jersey, and the terminal point Oakland, California, via certain intermediate points, including Salt Lake City, Utah, and San Francisco, California.

Flight Personnel

The crew of the flight in question consisted of Reserve Captain Donald Whittlesey Brown, First Officer Willard Harold Miner, and Stewardess Neva Cantwell.

Captain Brown, aged 34, had been employed by United since June 22, 1933, with the exception of the period from August 15, 1934, to April 1, 1935, when he was in the employ of Pratt & Whitney Aircraft Division, United Aircraft Corporation. He became a reserve captain on July 1, 1937.

and was assigned to captain's duty on April 1, 1939. He held an airline transport pilot certificate and had a total of about 7,015 hours flying time, of which approximately 3,236 hours had been on Douglas equipment as captain. He was assigned to the Oakland-Salt Lake division on September 9, 1940. Since October 1, 1940, he had made 167 trips into Salt Lake City, 77 of which were at night. His total commercial flying time during night hours was approximately 2,828 hours. He had a total instrument time of approximately 308 hours. His rest period prior to departure from San Francisco on May 1 was approximately 38 hours. His last physical examination required by the Civil Air Regulations was taken on January 22, 1942, and showed him to be in satisfactory physical condition.

First Officer Miner, aged 36, held a commercial certificate with an instrument rating. From January 17, 1929, to July 2, 1941, he had been employed by United as a mechanic. On July 2, 1941, he became a first officer for United. Prior to that time he had a total of approximately 276 hours flying time. He had a total of about 838 hours as first officer, all of which had been on Douglas equipment. After completing his training period he was assigned to the Oakland-Salt Lake division on October 16, 1941. This was his first trip since returning to active duty after an annual leave of about 18 days. His last physical examination required by the Civil Air Regulations was taken on December 20, 1941, and showed that he was in satisfactory physical condition.

It appears from the evidence that both Captain Brown and First Officer Miner were physically qualified, and held proper certificates of competency for the flight involved.

Airplane and Equipment

Aircraft NC 18146 was a Douglas Model DST-A, manufactured by Douglas Aircraft Company, Inc., of Santa Monica, California. It was completed March 25, 1938, and was purchased by United on April 4, 1938. The airplane was powered with two Pratt & Whitney S1C3G engines, and was equipped with Hamilton Standard constant speed, hydromatic, full-feathering propellers. This model airplane had been approved by the Civil Aeronautics Administration for air carrier operation over the routes flown by United with thirteen passengers (at night) and a crew of four. The evidence indicates that the airplane and its equipment had received the overhauls, periodic inspections, and checks which are required by company practice and approved by the Civil Aeronautics Administration, and that the airplane was in an airworthy condition at the time of its departure from San Francisco on the day of the accident.

History of the Flight

United's Trip 4 of May 1, 1942, originated at San Francisco, California, with New York, New York, as its destination. Several intermediate stops were scheduled, the first two of which were Oakland, California, and Salt Lake City, Utah. It was planned to fly contact to Blue Canyon, California, and on instruments the remainder of the trip to Salt Lake City. The trip departed from San Francisco at 5:21 p.m. and from Oakland, with 620 gallons of gasoline, at 5:57 p.m. (PWT). The gross weight of the airplane upon departure from Oakland was 25,169 pounds, which was within the permissible gross weight. The weight manifest prepared at that point shows that the load was distributed in accordance with United's approved loading schedule and therefore indicates that the c.g.

location was within the allowable limits. Trip 4 proceeded without incident to the vicinity of Wendover, Utah, arriving over that point at 9:49 p.m. At this time the trip estimated its arrival over Salt Lake at 10:18. The trip radioed that it was changing to contact flight rules at 10:02 p.m. At 10:15 p.m., after finding it impossible to make an approach under contact flight rules, Trip 4 advised that it was climbing to 12,000 feet,^{2/} westbound on the west leg of the Salt Lake Radio Range, pursuant to instructions previously given by Airway Traffic Control. At 10:22 the trip reported that it was at 12,000 feet and estimated arrival over Salt Lake at 10:34. At 10:26, Trip 4 was cleared to the Salt Lake Range Station, number two to approach, with the option of holding at 12,000 feet on the west leg of the Salt Lake range or proceeding to Ogden, about 30 miles north of Salt Lake City, and following United's westbound Trip 17 in. Captain Brown elected to proceed to Ogden. This resulted in a variance from standard instrument procedure for trips approaching from the west in that ordinarily such trips proceed north only to the Layton Fan Marker, about 18 miles north of the Salt Lake Range Station, before turning south for the final approach.

At 10:32 p.m., Trip 4 reported over the Salt Lake Range Station at 12,000 feet, and at 10:47 p.m. the trip reported over the Ogden Range Station at 10,000 feet. Trip 4 received its clearance to the Salt Lake Tower, number one to approach, at 10:50, and 10:51 reported over the Layton marker at 8,000 feet. At 10:56, the trip reported that it was contact at 6,000 feet about 10 miles north of the field, and changed over

^{2/} All altitudes mentioned herein are above sea level unless otherwise indicated.

to the Salt Lake tower frequency. At 10:57, Trip 4 contacted the tower,^{3/} reported that it was five miles north,^{4/} approaching the range station, and received landing instructions. The message from the tower was acknowledged by Trip 4.^{5/} About one or two minutes later, the airplane crashed into the side of a hill about three miles east-northeast of the range station and 3.8 miles northeast of the airport. The point of impact was at an elevation of 5,053 feet above sea level, or about 830 feet above the level of the airport. (See map opposite this page.)

3/ The control tower operator was unable to state which member of the crew made the transmission. The contact with United's station at 10:56 had been made by Captain Brown.

4/ The first part of this message, giving the distance as five miles, was not logged by the control tower. It was heard, however, by the person who was monitoring the range in the Communications Office. He testified that the first words were "Five north". The control tower operator testified that at the beginning of the message the crew member making the transmission said "Errr". Apparently the reception at the control tower at that moment was such that the words "Five north" were garbled into the sound described by the control tower operator. Although the previous radio message at 10:56 had given the position of the airplane as about 10 miles north of the field, the actual distance was probably substantially less. This conclusion is substantiated not only by the fact that the trip reported about one minute later that it was five miles north, but also by the fact that it had reported over the Layton marker at 10:51. Such an inaccuracy in distance is not unusual since the course south of the Layton marker lies over a portion of the lake and salt flats with no distinctive marker, for the most part, to use as a fix. It is customary for pilots to report as quickly as possible after becoming contact and to give their approximate position at the time.

5/ The message from the control tower indicated that the wind direction was between northwest and north, with the velocity gusty to 25 m.p.h., and that traffic was landing to the northwest. Trip 4 replied that it would land north.

Witnesses who saw the airplane just before the crash testified that it was flying in a southeasterly direction and that it appeared to continue approximately on a straight course until it crashed into the hillside. One witness testified that it appeared to be turning to the right as it passed out of sight behind a ridge just before the crash.

Weather Conditions

The weather conditions were satisfactory for the flight. In the vicinity of Salt Lake City the sky was overcast with light to moderate rain. The United States Weather Bureau reports^{6/} issued at the Salt Lake City Airport indicate that at both 10:30 and 11:00 p.m. the weather was observed as follows: ceiling 1600 feet, overcast, with scattered clouds at 700 feet; visibility unlimited, except that it was restricted to 3 miles to the southeast by light smoke; light rain; wind north-northwest 20 m.p.h.; temperature 40 degrees and dew point 38 degrees. The Weather Bureau observer who was on duty at the time testified that between 10:00 and 11:00 p.m. there was thin scud passing through the beam of the ceiling light at an altitude of about 700 feet. At 10:12 the patches of scud were large enough so that a special report was issued in which the ceiling was reported as 700 feet. The observer stated that this condition improved so that at 10:30 and 11:00 p.m. the observations were as previously mentioned.

The witnesses who observed the airplane in flight testified that it was definitely beneath the overcast and that their view of it was never

^{6/}See appendix for the United States Weather Bureau observations made at the Salt Lake City Airport from 10:00 p.m. to 11:30 p.m.

obscured by clouds. These witnesses, as well as the observer on duty at the Weather Bureau Station, testified also that the ensuing fire of the wreckage was clearly beneath the overcast. Estimates of the witnesses as to the visibility varied between 4 and 8 miles.

United's Trip 17, which landed at 10:53 p.m., became contact just north of the range station at an altitude of about 5,000 feet above sea level. The crew members estimated that the visibility as observed from the cockpit was between 5 and 8 miles. In the vicinity of the Layton marker, at an altitude of about 7000 feet above sea level, they observed light snow, but by the time the trip had descended to about 6500 feet the precipitation was a moderate rain. They stated that there was no wind drift noticeable and that they observed no ice during the approach from Ogden to Salt Lake.

One witness who climbed the hill to the scene of the accident testified that the rain changed to light snow about 35 or 40 minutes after the crash occurred.

Examination of the Wreckage

The airplane first struck a knoll or shoulder on the hillside which sloped downward toward the west at an angle of approximately 30 degrees from the horizontal. The marks on the hillside indicated that the left propeller contacted the ground first, followed by the left landing gear wheel which plowed into the ground. A few feet farther on, the right propeller blades struck the ground, followed by the right wheel which also plowed into the ground but not as deeply as the left wheel. The airplane apparently ricocheted across a gully and crashed into a steep bank on the far side. At this point the airplane apparently began to disintegrate,

scattering small parts over the hillside. The main portion of the wreckage came to rest approximately 300 feet beyond the first point of impact. The fuselage, except for the extreme rear portion, was almost completely consumed by the ensuing fire.

The radio system, controls and instruments were so badly damaged by impact and fire as to make any findings of doubtful value. The Flight Analyzer was completely destroyed.

Inspection of the propeller hubs revealed that the blades of each propeller were in a pitch setting of about 27 degrees. The fact that neither the cam lugs nor the low pitch stopper were damaged, as well as the way in which the blades were bent, indicated that both engines were developing power at the time of impact.

According to all indications the landing gear was extended, which was normal for the final approach.

The examination of the wreckage did not reveal any evidence of failure of any part of the airplane or its equipment prior to impact.

Conduct of the Flight

The evidence indicates that the trip was properly dispatched and that its operation was normal until it arrived in the vicinity of Salt Lake City.

It is clear from the evidence that the radio range facilities involved, maintained by the Civil Aeronautics Administration, were functioning

properly during the approach of the trip.^{7/}

Under United's standard instrument procedure for trips approaching Salt Lake City, the north leg of the Salt Lake Radio Range and the south leg of the Ogden Radio Range, which overlie each other, are used. As a supplement to the monitoring of these legs which is accomplished by personnel and instruments on the ground, the approach procedure includes provision for a check, by the pilot, of the alignment of each of the two legs. On trips approaching from the west, the pilot tunes the aural long wave receiver to the Ogden Range while approaching the Salt Lake Range Station in order to check the alignment of the south leg of the Ogden Range. If that leg bears on the Salt Lake Range Station, the procedure into Salt Lake is started, using the south leg of the Ogden Range north-bound as far as the Layton Marker. Constant back bearings are taken with the ADF^{8/} tuned to the Salt Lake Range. At the Layton marker the alignment of the south leg of the Ogden Range is compared with that of the north leg of the Salt Lake Range. If the legs coincide, a procedure turn is made and the low approach into Salt Lake is completed with both the long wave receiver and the ADF tuned to the Salt Lake Range.

^{7/} In addition to the usual monitoring conducted by outlying stations, the north leg of the Salt Lake Radio Range is monitored by a receiver located a short distance north of the station. An Esterline Angus Recorder continuously records the operation of the leg. Moreover, equipment affording means of visual and aural monitoring is located in the Communications Station of the Civil Aeronautics Administration and the dispatch offices of United and Western Air Lines. Whenever an instrument approach is being made on the north leg, one person in each of these offices is assigned the duty of continuously monitoring the operation of the leg and reporting any deviation to the pilot immediately. All of these facilities indicated that the north leg was in its proper position during the approach of Trip 4.

^{8/} The ADF, or Automatic Direction Finder, is a radio device which, through the use of a needle indicator, points continuously in the direction of the radio station to which it is tuned.

Trips from the east approaching on instruments tune to the Salt Lake Range while approaching the Ogden Range Station in order to check the alignment of the north leg of the Salt Lake Range. After completing a shuttle on the north leg of the Ogden Range, the approach into Salt Lake is started using the north leg of the Salt Lake Range southbound. Constant back bearings are taken with the ADF tuned to the Ogden Range. At the Layton marker the north leg of the Salt Lake Range and the south leg of the Ogden Range are compared. If they coincide, both receivers are tuned to Salt Lake for the remainder of the approach.

It is apparent from the foregoing that whether the approach is started over Salt Lake or over Ogden, the procedure during the latter portion, i.e., from the Layton marker to completion, is the same.

Once the final approach is under way, it is not likely that a pilot would deviate in the slightest from the on course signal before becoming contact because of the high terrain which lies to the east. It is almost certain, therefore, that at least until about 10:56 when Trip 4 reported that it had become contact, the airplane was on the north leg of the Salt Lake Range. The apparent normality of the radio contacts up to that time tends to substantiate that conclusion. The north leg of the Salt Lake Range has a magnetic bearing of 150 degrees toward the station. The marks on the ground at the scene of the crash indicated that the airplane's course, at the time of first impact, was about 124 degrees magnetic. In view of the foregoing and of the witnesses' testimony that the airplane appeared to be traveling in a straight line to the southeast, it appears highly probable that the course of the airplane was altered by at least 25 degrees to the left very shortly after the trip became contact. The marks on the ground at the scene of the crash indicated that the airplane might have been

banked to the right about five degrees at the time. The course taken by the airplane following the first impact also indicates a possibility that the airplane was in a slightly nosed-up attitude when it struck the hillside. It may be that the pilot saw the ground at the last moment and endeavored to avoid it by starting a climbing turn to the right. The testimony of one witness that he heard the engines being "gunned" a moment before the crash occurred tends to support that hypothesis.

We have been unable to determine definitely the reason for the change in direction which carried the airplane into the hillside. No indication of any malfunctioning or failure of any part of the airplane could be found, nor was there any evidence of external interference of any kind. Despite the difficulty of understanding how, under the circumstances, a pilot could make such a substantial deviation from the proper course merely through inadvertence, every available indication leads to the conclusion that that is the most probable explanation that can be made. Such inadvertence may have been either of two kinds, namely, the pilot may have been unaware of the deviation and consequently under the impression that he was continuing on the course on which he had been flying, or he may have changed his course purposely but on an erroneous assumption.

It is extremely hard to conceive that a change in course of at least 25 degrees could have been imperceptible to the pilot, and, if it were imperceptible initially, that it would not have been discovered promptly. It is equally difficult to believe that the pilot could have changed his course intentionally, since he had been following the radio range leg

which obviously led to the range station just north of the field. It may be that the pilot, after becoming contact, saw some object ahead which he mistook for some other object and that he altered his course on the supposition that he was too far to the right. What object could have so misled the pilot, however, and how he could have failed to recognize that the course led in the wrong direction, are matters of conjecture.

It is possible that Captain Brown confused the lights of the towers of radio station KUTA with those of the Salt Lake Range Station. These towers are about 1.4 miles northwest of the scene of the accident and 1.9 miles northeast of the Salt Lake Range Station. (See map opposite page 6.)

The fact that at 10:57 p.m. the trip reported: "Five miles north, approaching the range station", when, according to witnesses, it was apparently a short distance north of the KUTA towers, indicates the possibility of such an error. However, the KUTA towers are lighted with standard high obstruction lights which are quite different from those of the Salt Lake Range Station. The former consist of flashing red lights on top with steady red lights below, while the latter are steady red lights of much less intensity.

The KUTA towers have only recently been installed and the lights were put into operation on March 28, 1942. The record shows that Captain Brown had made ten trips into Salt Lake between that date and May 1. Seven of these trips were during the hours of darkness so it is reasonable to assume that Captain Brown had become familiar with the lights on these towers.

It is, of course, also possible that Captain Brown was confused by some other lights or objects which caused him to set a course too far to the east.

The time element was shortened by stiff northerly winds which were reported as 20 m.p.h. at the airport and may have been much stronger at higher altitudes. The fact that Trip 17 averaged 180 m.p.h. ground speed in its approach from Ogden to the Salt Lake Station would indicate that this was the case. Such a wind would have reduced the time in which any mistake could be rectified. Whatever caused Captain Brown to assume a wrong heading after breaking out of the overcast, it is obvious that had he continued on the north leg of the radio range until he arrived at the range station, the accident could not have occurred.

In any event, it seems fairly clear that while the airplane was proceeding on the improper course, nevertheless the members of the crew believed that they were heading toward the field. There is hardly room for doubt that the course had already been altered when the trip contacted the tower at 10:57^{9/} and reported that it was approaching the range station.

In view of the fact that the crash occurred shortly after the trip had received coded weather information from the control tower, it is quite probable that the first officer was in the act of decoding the message at the time. If this were the case, it would probably tend to reduce the possibility of discovery of an error in course since the act

^{9/} Witnesses placed the time of the accident very close to 11:00 p.m. The control tower attempted unsuccessfully to contact the trip at 10:58. Although the failure of the crew to respond does not conclusively prove that the airplane had already crashed, it is highly probable that the accident occurred about that time. Assuming that the crash occurred at approximately 10:58, the airplane's position at 10:57 would have been between 2 and 3 miles northwest of the point of impact.

of decoding would require the first officer's full attention. The first witness to arrive at the scene of the accident found a lighted flashlight on the ground near the wreckage. The flashlight bore the initials of the first officer, who may have been using it at the time in order to see to decode the message. However, it was observed that a moderate jar would operate the flashlight switch, so that the fact that the flashlight was burning after the crash occurred cannot be considered conclusive evidence of its condition prior to that time.

We have considered the possibility that the pilot intentionally flew to the east of the correct course preparatory to making a right-hand turn for the landing approach. That possibility seems unlikely. The control tower operators testified that right-hand turns at the Salt Lake City Airport are made only when permission is requested from and granted by the control tower, and that there was no request for such permission in this instance.

III.

CONCLUSION

Findings

We find, upon all the evidence available to the Board at this time, that the facts relating to the accident involving aircraft NC 18146, which occurred near Salt Lake City, Utah, on May 1, 1942, are as follows:

1. The accident, which occurred at approximately 11:00 p.m. (MWT) to Trip 4 of United Air Lines Transport Corporation, resulted in fatal injuries to the thirteen adult passengers, one infant and crew of three on board and in destruction of the airplane.

2. At the time of the accident United Air Lines Transport Corporation held a currently effective certificate of public convenience and necessity and an air carrier operating certificate authorizing it to conduct the flight.

3. Captain Brown and First Officer Miner were physically qualified and held proper certificates of competency to perform their duties on the flight in question.

4. Aircraft NC 18146 was currently certificated as airworthy at the time of the accident.

5. Trip 4 originated at San Francisco, California, with New York, New York, as its destination. It departed from San Francisco at 5:21 and from Oakland, California, at 5:47 p.m. (PWT), having been cleared in accordance with company procedure to Salt Lake City, Utah.

6. The operation of the trip was normal until it arrived in the vicinity of Salt Lake City.

7. Trip 4 proceeded to Ogden, Utah, while awaiting its clearance to commence an instrument approach to the Salt Lake City Airport.

8. The trip reported at 10:56 p.m. that it had become contact 6,000 feet above sea level about 10 miles north of the field. The actual position of the airplane was probably about 7 or 8 miles north of the field at the time. At 10:57 p.m., Trip 4 contacted the control tower and reported that it was five miles north, approaching the range station, and received landing instructions in code. About one or two minutes later the airplane crashed into the side of a hill about three miles east-northeast of the range station and 3.8 miles northeast of the airport.

9. The point of impact was at an elevation of 5,053 feet above sea level and about 830 feet above the airport.

10. The north leg of the Salt Lake Radio Range, on which Trip 4 had been proceeding, has a magnetic bearing of 150 degrees toward the station. The marks on the ground at the scene of the accident showed that the airplane was following a course of about 124 degrees magnetic at the time.

11. The weather conditions in the area at the time were satisfactory for the flight, although visibility was restricted by light to moderate rain.

12. The available radio range facilities were operating normally at the time of the accident.

13. There was no evidence of failure of the airplane or any of its parts.

14. There were no icing conditions which would affect the flight during its approach from Ogden to Salt Lake.

15. The crew of Trip 4 carried on a normal radio conversation with the Salt Lake control tower at 10:57, about one or two minutes prior to the crash. At the time of that radio contact the trip was considerably off course.

PROBABLE CAUSE

Upon the basis of the foregoing findings and of the entire record available at this time, we find that the probable cause of the accident to aircraft NC 18146 on May 1, 1942, was a deviation from the proper course, for reasons undetermined, after the trip had become contact within ten miles of the airport.

COMMENT AND RECOMMENDATIONS

The investigation of this accident emphasizes the need for establishing more precise and specific operational procedures at airports where the surrounding terrain makes any deviation from established flight paths hazardous. In view of the varying conditions existing at different airports, it appears that this objective could best be accomplished by administrative procedure rather than through standards established by the Civil Air Regulations. Accordingly, the Board directed a memorandum to the Administrator of Civil Aeronautics which stated, in part, as follows:

"Specifically, we believe that under night contact conditions the approach procedures at an airport surrounded by hazardous terrain should be as precise as under instrument conditions. Particularly is this true when the approach has been started under instrument conditions and contact established before reaching the range station. In the latter case the pilot's vision is almost invariably restricted to some degree. We also believe that procedures for ascent from such airports under night contact conditions can be developed to increase safety without placing any material burden on either the pilot or the air carrier. This can be accomplished by requiring that at such airports a minimum altitude be reached before departure from the vicinity of the range station."

In addition, the Board submitted the following recommendation to the Administrator of Civil Aeronautics:

"In connection with the recent accident in Salt Lake City on May 1, 1942, involving United Air Lines' plane, our staff believes that in the interest of safety the approach lights at the Salt Lake City airport should be extended from the end of the runway all the way to the range tower."

Approved:

/s/ L. Welch Pogue
L. Welch Pogue

/s/ Harllee Branch
Harllee Branch

/s/ Oswald Ryan
Oswald Ryan

Baker and Warner, Members, did not take part in the decision.

APPENDIX

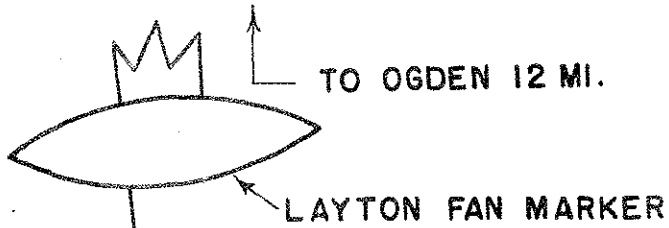
United States Weather Bureau observations made at the Salt Lake City Airport from 10:00 to 11:30 p.m. on May 1, 1942.

10:00 p.m. Classification contact; ceiling 2000 feet, overcast with scattered clouds at 1200 feet; visibility 8 miles limited to 3 miles to the southeast by light smoke; light rain; temperature 42, dew point 41; wind north-northwest, 18 m.p.h.

10:12 p.m. Classification instrument; ceiling 700 feet variable, overcast, with lower broken clouds; visibility 8 miles, limited to 3 miles to the southeast by light smoke; light rain; temperature 42, dew point 41; wind north-northwest, 20 m.p.h.

10:30 p.m. Classification contact; ceiling 1600 feet, overcast, with scattered clouds at 700 feet; visibility unlimited, limited to 3 miles to the southeast by light smoke; light rain; temperature 40, dew point 38; wind north-northwest, 20 m.p.h.

11:00 p.m. Classification contact; ceiling 1600 feet, overcast, with scattered clouds at 700 feet; visibility unlimited, limited to 3 miles to the southeast by light smoke; light rain; temperature 40, dew point 38; wind north-northwest, 20 m.p.h.



TO OGDEN 12 MI.

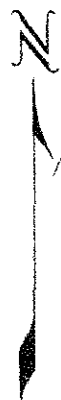
LAYTON FAN MARKER

MAP SHOWING PROBABLE APPROXIMATE FLIGHT PATH OF THE AIRPLANE

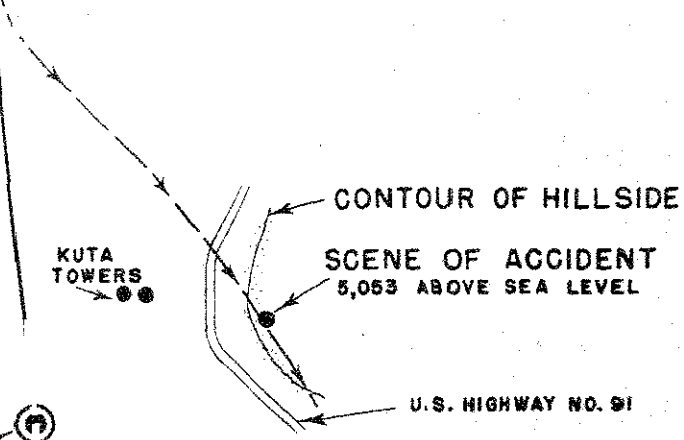
150° MAGNETIC



SCALE OF MILES



WOODS CROSS BEACON



CONTOUR OF HILLSIDE

SCENE OF ACCIDENT
5,053 ABOVE SEA LEVEL

KUTA TOWERS

U.S. HIGHWAY NO. 91



SALT LAKE RADIO RANGE STATION



SALT LAKE CITY

AIRPORT

4,220 FEET ABOVE SEA LEVEL

5-22763