

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: July 23, 1948

Released: July 28, 1948

NORTHWEST AIRLINES, INC.—MT. SANFORD, ALASKA—MARCH 12, 1948

The Accident

A Northwest Airlines' Douglas DC-4, NC-95422, Flight 4422, a non-scheduled charter flight en route from Lunghwa Airport, Shanghai, China, to La Guardia Field, New York, crashed on the west slope of Mt. Sanford, Alaska, at an altitude of 11,000 feet at approximately 2114,¹ March 12, 1948. The 24 passengers and 6 crew members were fatally injured, and the aircraft was demolished by impact and fire.

History of the Flight

The flight from Shanghai to Anchorage, Alaska, was routine. At Anchorage a new crew consisting of Captain J. G. Van Cleef, Captain R. G. Petry, First Officer J. J. Stickel, Navigator W. W. Worsley, Flight Mechanic D. L. Rector, and Purser R. J. Haslett took over with Captain Petry occupying the pilot's seat at the time of departure from Anchorage. Twenty-four passengers for whom the flight had been chartered from Shanghai to New York, New York, were aboard.

Take-off from Anchorage was accomplished at 2012, March 12, 1948, and the flight proceeded en route.² At 2028 the flight reported over the Wasilla Intersection, which is the intersection of the north course of the Anchorage radio range and the east course of the Skwentna radio range. This intersection is located 35 miles north³ of Anchorage. Three minutes later, at 2031, the flight reported that it was at its cruising altitude of 11,000 feet. At 2042 the flight reported over Sheep Mountain, a non-directional radio beacon located 85 miles airways distance, 31 degrees, from Anchorage. At 2103 the flight reported being over the Gulkana

radio range station, 159 miles, 34 degrees, from Anchorage, and at this time it estimated that it would be over Northway, Alaska, 283 miles from Anchorage, at 2136. Gulkana did not establish communication with the flight. However, the flight repeated its clearance into the Fairbanks area back to Northway, indicating that the flight could receive on 400 kcs, the frequencies for both the Northway radio range and communication. Shortly before the position report of 2103, the flight was observed flying an easterly heading approximately 4 miles south of the Gulkana radio range station.

Approximately 42 miles, 51 degrees, from the Gulkana radio range station is Mt. Sanford, the elevation of which is 16,208 feet. In order to provide a safe lateral distance from Mt. Sanford for aircraft flying the route, the airway from Gulkana east is deflected to the north, its course being 23 degrees. Fifteen minutes after the flight was observed flying easterly from Gulkana a fire was observed on the western slope of Mt. Sanford. Except for a repeat transmission of the flight's Gulkana position report, overheard by Northway Radio 124 miles northeast of Gulkana and approximately one minute before the fire was observed on Mt. Sanford, no communication was received from the flight after 2103.

Northwest Airlines, at 2150, requested from Anchorage Radio the reported time of the flight over Northway, at which time Anchorage Radio advised that neither the Northway nor the Gulkana stations had been able to contact the flight, and that a fire had been reported on Mt. Sanford. Radio facilities over the route were immediately alerted. Since all attempts to contact the flight were unsuccessful, it was concluded that the flight had struck Mt. Sanford and burned.

Investigation

Immediately after the fire was reported, the Gulkana and Northway radio

¹ All times referred to in this report are Alaskan Standard and based on the 24-hour clock.

² See Appendix I—Chart of Airway.

³ All bearings and courses as stated in this report are magnetic. Average magnetic variation for the route which was flown is 29 degrees east. All mileage is given in statute miles.

ranges and the Sheep Mountain radio beacon were ground checked and found normal.

A pilot and observer, at 2330, two hours and 15 minutes after the fire was observed on Mt. Sanford, took off from the Gulkana Airport in a Luscombe airplane to investigate. This aircraft flew at an altitude of 10,000 feet in the Mt. Sanford vicinity but observed no sign of fire or wreckage. The pilot reported that the ceiling was unlimited and the visibility 50 miles except when occasionally reduced in the vicinity of Mt. Sanford by a display of the aurora borealis. According to this pilot, the northern lights appeared as hanging curtains and were unusually bright, obscuring Mt. Sanford from view for periods of one to five minutes. However, he stated that neither radio reception nor compass was affected, and that the Gulkana radio range operated normally.

The United States Air Force, 10th Rescue Group based at Anchorage, routed an aircraft to Mt. Sanford three hours after the fire had been reported. The pilot saw no sign of fire, and reported radio reception and magnetic compass operation normal.

At 0600 the day following the accident, a DC-3 with officials from the Civil Aeronautics Board, Civil Aeronautics Administration, and Northwest Airlines departed from Anchorage for the Mt. Sanford area. The west course of the Gulkana radio range and the Sheep Mountain radio beacon were flight checked en route and found to be operating normally. The wreckage was located at an elevation of 6,500 feet on the west slope of Mt. Sanford 23 miles southeast of the center line of the airway. The point of impact, approximately 2,500 feet above the wreckage, was observed to be a section of smoke-blackened snow and ice. From this point there was a clearly defined fire-path where the burning wreckage had fallen down the almost perpendicular wall of the mountain.

The wreckage was in a small glacial cirque the walls of which were avalanche slopes. Snow and ice were constantly falling into this cirque from an overhanging glacier 4,000 feet above. It was estimated that the falling snow and ice would cover the wreckage in a matter of days. The scene of the accident was inaccessible from either the ground or the air. However, positive identification was made by an Air Force pilot who was

able to see the Northwest Airlines' insignia on the vertical fin.

Mt. Sanford, elevation 16,208 feet, is the most northerly peak of the Wrangell Mountains which are located in the southeastern portion of interior Alaska. Twenty miles to the southwest of Mt. Sanford is Mt. Drum which has an elevation of 12,002 feet. This entire area is extremely precipitous, and to a large extent is covered by snow and ice to a depth of 60 to 200 feet. As stated above, the airway from Gulkana east is deflected to the north so that aircraft flying the route will be provided safe lateral clearance from these mountains.

Snag, in the Territory of the Yukon, Canada, is located 170 miles east of Gulkana. It is about one-third the distance from Anchorage to Edmonton, Alberta, Canada, which is a fuel stop for Northwest Airlines used on their route from Anchorage to Minneapolis, Minnesota. An aircraft en route to Edmonton could fly directly from Gulkana to Snag except that Mt. Sanford is located on this straight line course. Approximately 18 miles would be saved by flying this direct route from Gulkana to Snag, and given unrestricted visibility, Mt. Sanford could be safely circumnavigated.

Captain J. G. Van Cleef was employed by Northwest Airlines June 27, 1942, and his employment was continuous until the accident. He held a valid airline transport pilot rating, and had logged a total of 4,453 flying hours, of which 733 were obtained in DC-4 aircraft and 665 hours of which were flown in foreign operations. During the war he had been assigned to the Army contract operation conducted by Northwest Airlines in Alaska, and had made numerous flights over the Anchorage-Edmonton segment. Since the war he had made 21 flights over this route as a captain for Northwest Airlines.

Captain R. G. Petry was employed by Northwest Airlines September 9, 1942, and his employment was continuous until the accident. He held a valid airline transport pilot rating, and had logged a total of 8,324 flying hours, of which 728 were obtained in DC-4 equipment and 607 hours of which were flown in foreign operations. During the war he made many flights over this route for the Army and was making his 24th trip for Northwest Airlines at the time of the accident. First Officer J. J. Stickel was employed

by Northwest Airlines May 3, 1944, and his employment had been continuous until the accident. He held a valid airline transport pilot rating, and had logged a total of 4,772 flying hours, of which 779 had been obtained in DC-4 aircraft, and 661 hours of which were in foreign operations. He had also been assigned to the Army contract operation conducted by Northwest Airlines in Alaska during the war, and had made numerous flights over this route.

The weather forecast for the flight, prepared at 1820 March 12, 1948, anticipated excellent visibility and unlimited ceilings from Anchorage to Snag. Wind at 11,000 feet was indicated at Anchorage to be from 245 degrees at 10 miles per hour, at Gulkana from 275 degrees at 22 miles per hour, and at Northway from 285 degrees at 28 miles per hour. A thin veil of clouds over Mt. Sanford above 10,000 feet could have been present at the time of this flight, but none was reported by the ground stations between Anchorage and Northway. There was not sufficient moisture in the air to cause appreciable aircraft icing. The air was stable, but light mechanical turbulence existed over the mountains. The moon set March 12 at 2012.

Discussion

Communications from the flight were received to within approximately one minute before the crash. In view of the fact that no mechanical difficulty was reported at any time it is unlikely that this accident was caused by any mechanical failure. Furthermore, the aircraft crashed at its cruising altitude of 11,000 feet. All ground radio navigation facilities were flight checked and found to be operating normally, so they also are eliminated from any causal relationship to the accident.

The possibility that an error in navigation was made as a result of an erroneous compass reading caused by the aurora borealis cannot be supported. Had the pilot followed airways he would have remained on or reasonably close to the northeast course of the Gulkana radio range, which was operating normally, regardless of magnetic compass reading. Furthermore, other pilots flying shortly after the accident in the same vicinity and under the same conditions reported no noticeable effect of the aurora borealis on the magnetic compass.

Since the aircraft was observed to fly easterly from Gulkana, at which time it was 4 miles south of the Gulkana radio range station, it appears that the flight was not following the airway, but was flying directly from Gulkana to Snag. It is probable that the pilot, relying on good visibility, felt confident that he would see Mt. Sanford and be able to safely circumnavigate it. Though no clouds were reported, the top of Mt. Sanford could very well have been capped by a thin layer of clouds. Such a layer of clouds would not only have tended to obscure the mountain but may have acted as a reflector for the aurora borealis which was observed to be particularly brilliant the night of this flight.

It is concluded, therefore, that the flight flew south of the airways for the purpose of flying the straight line course from Gulkana to Snag, intending to circumnavigate Mt. Sanford; and since Mt. Sanford was not discernible either because of clouds, the aurora borealis, or both, the aircraft crashed into the mountain.

Findings

On the basis of all available evidence, the Board finds that:

1. The carrier, aircraft, and crew were properly certificated.
2. The flight departed from Anchorage at approximately 2012, March 12, 1948, and proceeded toward Edmonton, Alberta, Canada, at a cruising altitude of 11,000 feet.
3. Routine position reports were received from the flight until after it had passed the Gulkana radio range station, which was 159 miles 34 degrees magnetic from Anchorage.
4. The aircraft was observed approximately 4 miles south of the Gulkana radio range station at approximately 2100 flying an easterly course.
5. Ceiling and visibility over the route were reported as unlimited, though conditions were suitable for the formation of a thin veil of clouds over the tops of mountains in the area.
6. At the time that the flight was in the Gulkana area a brilliant display of the aurora borealis was observed.
7. The airway east from Gulkana is deflected to the north so as to provide a safe lateral distance from Mt. Sanford, 16,208 feet in elevation, for aircraft flying the route.

8. The aircraft crashed approximately 42 miles 51 degrees from the Gulkana radio range station on Mt. Sanford at its cruising altitude of 11,000 feet, and 23 miles southeast of the center line of the airway as described above.

Probable Cause

The Board determines that the probable cause of this accident was the pilot's failure to see Mt. Sanford, which was

probably obscured by clouds or the aurora borealis or both while flying a course off the airway.

BY THE CIVIL AERONAUTICS BOARD

/s/ JOSEPH J. O'CONNELL, JR.

/s/ OSWALD RYAN

/s/ HAROLD A. JONES

/s/ RUSSELL B. ADAMS

Lee, Member, did not participate.

Supplemental Data

Investigation

The Civil Aeronautics Board, VIII Region, was notified of the accident at 2145, March 12, 1948, by a telephone call from Civil Aeronautics Administration communications. An investigation was initiated immediately in accordance with the provisions of Section 702 (a) (2) of Civil Aeronautics Act of 1938, as amended. The investigator from the Civil Aeronautics Board's regional office arrived at approximately 0700 March 13, 1948, at Mt. Sanford by air, after which the wreckage was located from the air. A public hearing was conducted as a part of this investigation in Minneapolis, Minnesota, April 16, 1948.

Air Carrier

Northwest Airlines, Inc. is incorporated in the State of Minnesota, and maintains its Headquarters at St. Paul, Minnesota. At the time of the accident, it was operating under a certificate of public convenience and necessity and an air carrier operating certificate, both issued pursuant to the provisions of the Civil Aeronautics Act of 1938, as amended. The certificates authorized the company to transport persons, property, and mail, and schedule their commerce between various points in the United States, Alaska, and the Orient.

Flight Personnel

Captain J. G. Van Cleef was employed by Northwest Airlines June 27, 1942, and his employment was continuous until the accident. He held a valid airline transport pilot rating, certificate #47178-40, and had logged a total of 4,453 flying hours, of which 733 were obtained in DC-4 aircraft and 665 hours of which were flown in foreign operations. During the war he had been assigned to the Army contract operation conducted by Northwest Airlines in Alaska, and had made numerous flights over the Anchorage-Edmonton segment. Since the war he had made 21 flights over this route as a captain for Northwest Airlines.

Captain R. G. Petry was employed by Northwest Airlines September 9, 1942, and

his employment was continuous until the accident. He held a valid airline transport pilot rating, certificate #65884, and had logged a total of 8,324 flying hours, of which 728 were obtained in DC-4 equipment and 607 hours of which were flown in foreign operations. During the war he made many flights over this route for the Army and was making his 24th trip for Northwest Airlines at the time of the accident.

First Officer J. J. Stickel was employed by Northwest Airlines May 3, 1944, and his employment had been continuous until the accident. He held a valid airline transport pilot rating, certificate #49340, and had logged a total of 4,772 flying hours, of which 779 had been obtained in DC-4 aircraft, and 661 of which were in foreign operations. He had also been assigned to the Army contract operation conducted by Northwest Airlines in Alaska during the war, and had made numerous flights over this route.

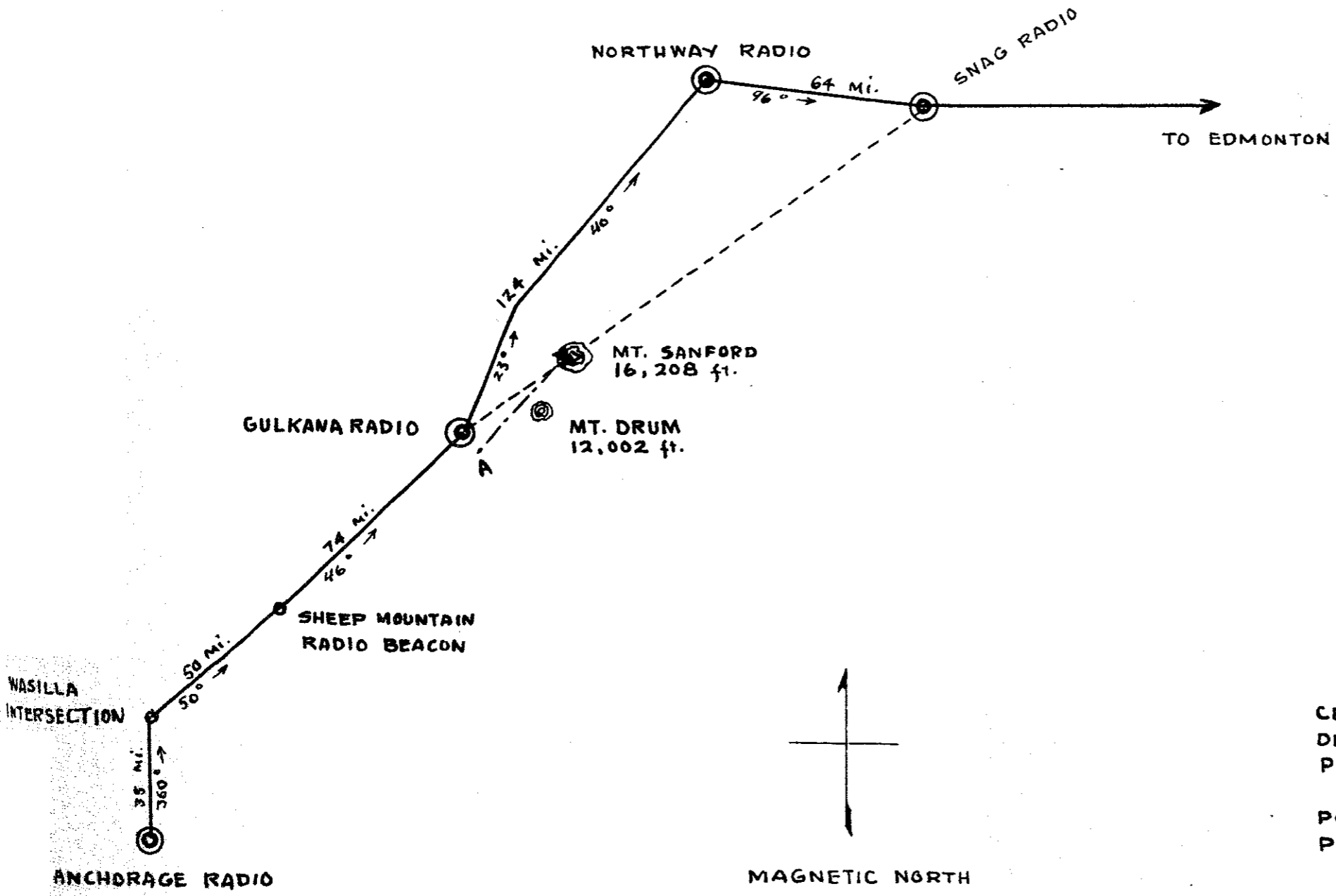
Wayne W. Worsley, navigator, had been employed by Northwest Airlines since November 25, 1946. He held a flight navigator certificate dated September 29, 1947, and had logged 2,556 flight hours. Donald L. Rector, flight mechanic, had been employed by Northwest Airlines since October 18, 1939. He held A and E license #384837 issued July 5, 1945. Robert J. Haslett, flight purser, had been employed by Northwest Airlines since October 11, 1945.

Aircraft

The Douglas DC-4, NC-95422, Serial No. 35966, Model C54-G, had been operated a total of 3,306 hours since its manufacture June 30, 1945. It had installed four Pratt & Whitney R-2000-13 engines, and was equipped with Hamilton standard hydromatic propellers, hub model 29E50-505, blade model 6507-A-0.

At time of take off from Anchorage the total weight of the aircraft was less than the maximum allowable gross and the load was distributed with respect to the center of gravity within the allowable limits.

CHART OF AIRWAY FROM ANCHORAGE TO SNAG



CENTER LINE OF AIRWAY
 DIRECT COURSE GULKANA TO SNAG
 POINT "A" - AIRCRAFT OBSERVED FLYING
 EASTERLY FROM THIS POINT.
 POINT "X" - APPROXIMATE POINT OF CONTACT.
 PROBABLE COURSE OF AIRCRAFT.

MAGNETIC NORTH

ALL COURSES MAGNETIC.
 AVERAGE VARIATION 29° E
 SCALE: 1" = 40 MILES