

CIVIL AERONAUTICS BOARD  
ACCIDENT INVESTIGATION REPORT

Adopted: June 15, 1951

Released: June 22, 1951

NORTHWEST AIRLINES, INC. - MARTIN 202, NEAR BUTTE, MONTANA,  
NOVEMBER 7, 1950The Accident

Northwest Airlines' Flight 115 of November 6, 1950, a Martin 202, N 93040, crashed about 2-1/2 miles east of the Butte, Montana airport at about 0815 MST, <sup>1/</sup>November 7, 1950. The aircraft was demolished, and all 17 passengers and four crew members were killed.

History of the Flight

Flight 115 originated at Chicago, Illinois, for Seattle, Washington, via intermediate stops. At Minneapolis, Minnesota, the first scheduled stop, both the equipment and the flight crew were changed. Flight 115 (N 93040) departed Minneapolis at 0030, November 7, and proceeded uneventfully to Billings, Montana, where another crew change was made. The outgoing crew from Billings consisted of Captain Lloyd Lampman, First Officer James Huff and Stewardesses Mohr and White. Flight to Great Falls, Montana, was without incident as was the next leg to Helena, Montana, the last scheduled stop before the accident.

At Helena, the aircraft was fueled; its total weight was 35,290 pounds as compared with a maximum allowable of 37,370 pounds and its center of gravity was within prescribed limits. The flight was off the ground at

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<sup>1/</sup>All times referred to herein are Mountain Standard Time and based on the 24-hour clock.

Helena at 0753, using Runway 29. The flight plan, amended before takeoff, specified an altitude of 10,500 feet MSL <sup>2/</sup>under instrument flight rules via Amber Airway No. 2 to the Whitehall (Montana) Range Station and from there to the Butte Airport via Red Airway No. 2. Also, before taking off, the pilot asked the Helena Tower if the Homestake Fan Marker was operating normally and was informed that Butte Radio advised that it was.

Following takeoff from Runway 29, the aircraft was flown in a climbing right turn so that it passed approximately over the Helena Radio Range Station as it headed south toward the Whitehall Range Station. At 0801 the flight reported to Helena that it had reached its cruising altitude. This message was acknowledged. The next message from the flight was to Butte at 0814 stating that it was over Whitehall (Range Station) at 0811 and starting descent. Butte acknowledged this message, gave the flight the station altimeter setting of 29.97, advised that the wind was south, calm, and that the Weather Bureau advised that the ceiling was lower to the east and north and better to the south and southwest. Flight 115 replied that it had vertical visibility at 10,500 feet. This was the last radio contact with the flight.

A search was instituted after several futile attempts to contact the aircraft. On the following morning, the wreckage was sighted from a local search aircraft at about 0900. Ground parties immediately started for the crash site.

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2/ Above mean sea level.

Investigation

It was determined that at approximately 0815 the aircraft had struck the eastern slope of a ridge about 30 feet below its crest, at an altitude of about 8,250 feet MSL while on a heading of about 309 degrees true or 290 degrees magnetic. The site of impact was approximately 2-1/2 miles east of the control tower at the Butte Airport, and about 1-1/2 miles to the right of the center of the on-course signal from Whitehall to Butte.<sup>3/</sup> The ridge which was struck is paralleled by another somewhat similar ridge approximately three or four miles to the east.

The time of the crash was estimated from the testimony of two witnesses on the ground, and from a time-distance reconstruction of the flight. Because of extremely rough terrain and deep snow at the crash site only one stopped timepiece was found in the wreckage; it indicated a time that obviously could not have been the time of the crash.

One witness, a rancher who lives approximately 13 miles east southeast of the accident site, was in his house located about 2-1/2 miles north of the Whitehall Range Station. His position is shown on Attachment A as Witness No. 1 (Roffler). Mr. Roffler returned from milking his cows and upon entering the house noted the time was about 0805 or 0810. From the bathroom window he saw the aircraft about one-half mile to the north of his house and saw it continue on a straight course in a northwesterly direction toward a mountain until it disappeared from his view as it entered a storm. He habitually checked the time each morning at the conclusion of these chores to insure getting his two daughters ready for the school bus which generally arrived about 0820.

He stated that the sky was overcast but the weather was good except to the west where a snowstorm obscured the mountains. He further stated

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<sup>3/</sup> See Attachment A.

that he watched this airplane for approximately 10 seconds but was unable to describe it other than as a "grey" color. (The 0730 weather from the Whitehall Communication Station, approximately five miles to the south, was reported as ceiling 5,500 feet, with an estimated 30 mile visibility.) Mr. Roffler also stated that on other occasions he had seen aircraft pass over his property travelling in a northwesterly direction but this aircraft was lower than others.

The other witness was outside her home in the mountains, located about two miles east of the crash site and about two miles north of the Homestake Fan Marker. Her position is shown on Attachment A as witness No. 2 (Setzer). Mrs. Setzer testified that she came into the house to hear the 0800 news broadcast but the clock indicated 0810, so she went back out to finish her work. She further stated that some minutes later she heard the aircraft come from the east, pass north of her home, continue to the west and then heard the crash. Falling snow and low clouds prevented her from seeing the aircraft.

The only other aircraft in the general area at the approximate time was Western Air Lines' Flight 5, a DC-3, en route from Helena to Butte. This aircraft was off the ground at Helena at 0807, reported reaching its cruising altitude of 10,500 feet at 0815, and arrived at the Whitehall Range Station at 0834, approximately 19 minutes after the accident. This flight reported that it had some vertical visibility and that both the railroad tracks north of the Whitehall Airport and the Whitehall Airport itself were seen. It was instructed to hold on the north leg of the Whitehall Range because of Flight 115 being overdue at Butte. It complied by making a 360-degree turn. Since Northwest Airlines' Flight 115 continued unreported, Western's Flight 5 asked for and received permission to

climb to 11,500 feet and proceed to Idaho Falls, Idaho , passing up its intended landing at Butte. Furthermore, this aircraft was seen by a person on the ground near the town of Whitehall at approximately 0830, headed in a southwesterly direction toward the Whitehall Airport. Thus it is apparent that the aircraft seen by Witness No. 1 and heard by Witness No. 2 could not have been Western's Flight No. 5.

Distribution and spread of the wreckage indicate that the aircraft struck while about level longitudinally. First impact was with trees with the left wing followed by the nose section and left wing striking rimrock solidly. The right wing outboard of the nacelle carried forward over the ridge 140 feet from the crest, and slightly to the left of the rest of the line of debris. The angle of the propeller blades on both engines was found in the forward pitch position. The precise number of degrees of the blade angles in the forward pitch position could not be determined, due to the extreme damage and fire. It was determined by the evidence found that power was being developed by both engines at the time of impact with the ground.

The extremely rough terrain was snow-covered and some scattered parts of the wreckage were burned in varying degree; there was no indication of fire prior to impact. There does not appear to have been any failure of the control system or of the aircraft's structure prior to impact. The control cables were found attached to their respective horns. All three control tabs, aileron, elevator and rudder, were determined to have been at, or close to, their respective neutral positions. Landing flaps were down about 12-1/2 degrees and the landing gear was extended. The radio

control panel was severely damaged and burned making it impossible to learn to what frequencies the various selector switches and tuning controls had been set. However, examination of condensers in the 2 ADF (automatic direction finding) receivers showed that one was tuned to the Butte Range, 233 KC, and the other to the Whitehall Range, 284 KC. It could not be determined whether either or both of these ADF receivers were being used as such or as range receivers in the antenna position (for range reception). The altimeters were not recovered.

Both pilots were in their respective seats at the time of impact, the captain in the left seat, the first officer in the right seat.

Maintenance records of the aircraft were examined carefully. In summary, this examination revealed nothing to indicate any irregularity in company maintenance procedures or anything that would suggest that the aircraft was not airworthy at the time of the accident.

In regard to weather, a weak cold front extending across northwest Montana was moving southeastward. At the time of the accident this front had not passed Butte, although it had progressed further south both to the east and west of Butte. This front was not very active and precipitation was occurring mainly in the Helena-Butte area where air was being lifted over the mountains.

Previous to the departure of Flight 115 from Helena, Captain Lampman obtained a copy of the 0730 PST weather sequence and discussed with a company agent the weather to be encountered to Butte. His clearance had attached the necessary current weather and forecasts.

The Weather Bureau forecast in effect at that time indicated the following conditions could be expected during the flight from Helena to

Butte; Overcast was forecast for the route with bases ranging from 6,000 to 10,000 feet above sea level and tops at 14,000 feet. Visibility was forecast two to six miles in snow showers in the vicinity of the cold front. The freezing level was expected to be at or near the surface. Ice was forecast in the clouds and turbulence in the frontal zone. The Butte terminal forecast indicated a 4,000-foot ceiling was expected with snow showers. Winds were expected to be southwest 20 miles per hour, shifting with the frontal passage to gusty northwest winds at 25 miles per hour.

An aftercast of the weather conditions existing during the flight from Helena to point of the crash follows: During the climb out of Helena contact conditions existed to about 8,000 feet MSL where the clouds should have been entered. The flight from that time on to the point of the crash appears to have been in the clouds and in snow showers but with periods of vertical visibility. The temperature at 10,500 was from 15 to 18 degrees F and short periods of light rime ice over the mountains appeared likely. Winds at the cruising level from Helena to Whitehall are estimated to have been from 260 to 280 degrees true and the velocity 25 to 30 knots.

At the time the flight reported that it was over Whitehall, the weather there was ceiling estimated 4,000, overcast, visibility 30 miles, wind west southwest 10, altimeter 29.96, storming in mountains in all quadrants. At 0750 the observer on duty at Butte made a special check of the weather and requested the company radio operator on duty to transmit to Flight 115 that the ceiling was lower to the east and north and better to the south and southwest (contained in the last message to the flight).

The sequence weather reports which the pilot had at time of departure from Helena showed the following weather at stations along the airway to Butte:

- Helena - Estimated 5,000, overcast lower broken, 30 miles, light rain showers, temperature 39, dew point 34, NW 13, altimeter 29.95, overcast estimated at 13,000 and scattered clouds at 2,200, snowing mountains west.
- Whitehall - Estimated 5,500, overcast, 30 miles, temperature 41, dew point 32, wind SW 20, strong gusts, altimeter 29.97, storming on mountains in all quadrants.
- Butte - Indefinite 3,100, overcast, lower scattered at 1,700, 5 miles, light snow showers, temperature 35, dew point 29, wind WSW 14, altimeter 29.98.

Northwest Airlines' flight manual which is approved by the Civil Aeronautics Administration prescribes the instrument approach procedure for landing at Butte. This procedure requires that an aircraft approaching Butte from the east pass over the Whitehall Range Station and then proceed out the west leg of the Whitehall Range on a course of 275 degrees magnetic and, while on this leg of the range, shall pass over and receive a signal<sup>4/</sup> from the Homestake Fan Marker which is 12 miles from the Whitehall Range. The fan marker shall be crossed at an altitude of 9,500 feet MSL and 140 MPH JAS<sup>5/</sup> whereupon descent to the authorized minimum of 8,050 feet MSL may be started on the same course of 275 degrees magnetic for the Butte Airport. This procedure is shown graphically on Attachment B entitled "Standard Instrument Approach Procedure No. 2," to Butte Airport, as published by the Department of Commerce, Coast and Geodetic Survey.

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<sup>4/</sup> Discussed later on page 12.  
<sup>5/</sup> Miles per hour indicated air speed.



The Whitehall Range Station was installed during September 1938. Since its commissioning this range had been checked for performance no less than 38 times; on only one occasion was it necessary to readjust the equipment because of a minor misalignment of the north leg of the range. The CAA checks orientation of range legs both in flight and on the ground at periodic intervals. Range facilities, following installation, are flight checked frequently. Thereafter, this is done at least yearly and in addition, following any complaint of alleged course misalignment. At 0805, approximately ten minutes before the accident, the south course of the Whitehall Range was routinely monitored by the Dillon, Montana, radio range station and was reported normal.

Aural monitoring of the south course is accomplished locally at the CAA Communications Station, and as previously stated, distant monitoring of this course is accomplished at Dillon. While only one course is monitored, it is highly improbable that one course would become displaced without the remaining courses becoming displaced. If a pair of courses did move, without moving the other pair, which is possible, equipment adjustments would have to be changed or failures of equipment components would have to occur which would be quickly detected on investigation of the malfunction by the ground communicators. Neither was found to be the case on November 7, 1950. This is further substantiated by Western's Flight 5 report that the north and south legs of the Whitehall Range were functioning normally. On the morning of November 8, the day after the accident, the CAA flight checked three legs of the Whitehall Range, including the west leg and found all three to be in correct alignment, as published. The fourth leg was not checked at this time because of mechanical trouble with the testing aircraft; however, it was later checked and found to be normal.

The Homestake Fan Marker is a standard unmanned low power (5 watt) very high frequency facility. It is at an elevation of 6317 feet MSL and located at the center of the on-course signal of the west leg of the Whitehall Range in Homestake Pass leading into Butte Valley through which the west leg of the Whitenall Range is beamed. The low power ( 5 watt) type of marker was chosen for this location because its signal is far more localized than is that of the high powered fan marker. This localization of the signal is necessary because of the mountainous terrain that requires close adherence to course. It was placed in commission during March 1945, and since that date has been ground checked five times. All five of these ground inspections showed that it was operating normally. Also, since its commissioning the fan marker had been flight checked 15 times, the last time on November 8, 1950, the day following the accident. All 15 flight checks showed it to be operating normally; furthermore, the CAA ground checked this fan marker approximately four hours after the accident and found it to be functioning normally. This fan marker has two transmitters, main and standby, and a monitor automatically transfers the output of the main transmitter to the standby transmitter if the main transmitter's output falls to 75 per cent of normal strength. During the ground check some four hours after the accident, it was found that there had been no transfer to the standby transmitter and that both main and standby transmitters were in satisfactory condition. It was also found that there had been no damage to or deflection of the antenna, the only condition that could have caused a lateral displacement of the signal.

This fan marker projects a cone shaped signal with a vertical axis. The diameter of a horizontal cross section of this cone at an altitude of

9,500 feet MSL is approximately two miles. The identifying signal for the Homestake Fan Marker is M (two dashes). As an aircraft traverses this cone a light on the pilot's instrument panel comes on and goes off in accordance with this signal. At an air speed of approximately 140 miles per hour and at 9,500 feet MSL, it would take slightly less than one minute to cross the cone if the aircraft passed through the center of the signal, less if it were to one side of the center. However, the fan marker receiver in the aircraft also gives an aural indication of the same signal simultaneously with the light. Because there is a control on the aircraft's fan marker receiver to have the audio signal strength either "high" or "low", it is possible to receive the aural signal at some distance, and time, before the visual signal comes on. The aural signal is not intended to be used, nor is it commonly used, as a means of fixing the aircraft's position; rather it is merely a means of alerting the pilot of the close proximity of the fan marker and the short interval of time before he may expect to receive his light signal.

Immediately subsequent to this accident a number of complaints were filed by Northwest Airlines' pilots questioning the proper functioning of the Whitehall Range. Only one complaint concerning this facility had been filed with the CAA prior to this accident. It concerned a slight irregularity, which was quickly corrected, of the north leg of the Whitehall Range. However, pilots of another carrier flight checked the Whitehall Range the morning following the accident and reported the west course to be normal.

Because of the complaints from Northwest Airlines' pilots, the west leg of the Whitehall Range and the Homestake Fan Marker were flight checked again, on November 19. Both facilities were operating normally and the center line of the northwest leg of the Whitehall Range was found to lie

one degree to the north of its published heading. (The accepted tolerance is one and one-half degree on either side of the center line.)

Another flight check was made by CAA on November 24 at which time all courses of the Whitehall Range were found to lie within the one and one-half degrees of accepted tolerance.

The matter of "multiples" on the west leg of the Whitehall Range was thoroughly explored. "Multiples" is the term used to describe the existence of an additional course or courses lying to one or both sides of the center line of the published course, generally over mountainous country. Investigation disclosed that such multiples exist on the west leg of the Whitehall Range, and their existence has been long known, but they occur only to the west of the Homestake Fan Marker. Provided prescribed approach procedures are followed, the multiples on the west leg of the Whitehall Range do not constitute a hazard to flight, by virtue of their weakness, geographical location and relatively small displacement from the true on-course signal. In this connection the current CAA Flight Information Manual states:

"WARNING: Low frequency range courses are subject to disturbances that result in multiple courses and signal fades or surges over rough country. Pilots flying over unfamiliar routes are cautioned to be alert to detect these vagaries, particularly over mountainous terrain."

#### Analysis

As the flight crashed on the lee side of a ridge only about 30 feet below its crest, there arises the question of possible turbulence and downdrafts at the scene of the accident. Upper air wind observations on the west side of the ridge indicate that the wind was 15 knots or less at the lower altitudes from a direction ranging from nearly paralleling to

quartering the ridge. Above 7,000 feet MSL the wind had an increasing westerly component and in the free air at 8,000 feet it was indicated to have been about 250 degrees at 18 knots. This condition would not indicate a build-up to a very high velocity over the crest of the ridge. Where there is a build-up of wind speed over a mountain ridge it usually persists for a number of miles to the leeward. A witness (Setzer) located about 1-1/2 miles east of the ridge testified that the wind was not strong enough to attract her attention indicating the absence of a high wind over the ridge. From studies that have been made on the resulting effect in altimeter readings due to wind velocity over a mountain crest, they indicate that in this case where the velocity does not appear to have been very high the effect on altimeter reading would have been insignificant.

The east slope of the ridge where the accident occurred drops off rather steeply about 1,000 feet toward a high plateau extending for three or four miles to the east where the previously mentioned ridge rises. This is not conducive to large scale downdrafts, particularly under relatively light wind conditions. However, down currents and turbulence no doubt existed within the first few hundred feet above the eastern slope of the ridge where the crash occurred.

After considering all the factors involved, it is concluded that at a clearance of 1,000 feet or more over the ridge, downdrafts and turbulence would have been light and, at the most, briefly moderate.

The histories of performance of the Whitehall Range and the Homestake Fan Marker as set forth in the investigation of this accident preclude any question as to proper functioning during the period Flight 115 was approaching Butte. The Board has given exhaustive attention to the complaints of

Northwest Airlines' pilots, submitted subsequent to the accident, and the Board's evaluation of all the evidence obtained shows that both the Whitehall Range and the Homestake Fan Marker were functioning normally. It is, therefore, concluded that had Flight 115 utilized these facilities, as prescribed by the carrier and approved by the Civil Aeronautics Administration, the accident would not have occurred.

There can be no doubt as to Captain Lampran's familiarity with the instrument approach procedure to Butte or as to his knowledge of the high ridges within Red Airway No. 2, where the aircraft crashed. He had been flying the Seattle-Billings route for several years and during the 30 days preceding the accident had made 18 trips over that route. Captain Lampran must have had knowledge of the existence of any multiples and their location relative to the west leg of the Whitehall Range and the highly localized signal of the Homestake Fan Marker.

There was testimony concerning the practice of NWA pilots turning on to the west leg of the Whitehall Range, from the north leg of the range, while short of the range station, and that some NWA pilots apparently believed that the visual and aural signals from fan markers occur over the same area. It was also testified that "on and off" instrument technique is sometimes practiced under certain weather conditions during the approach to Butte from the east.

There are only two ground witnesses whose testimony can be of any material assistance in reconstructing the probable flight path of Flight 115.

Attachment A places these witnesses at their proper positions relative to one another, to the west leg of the Whitehall Range, the Homestake Fan Marker, the site of the crash and the Butte Airport. It seems obvious that the flight came southbound down the north leg of the Whitehall Range as it should have done and then, according to witness No. 1 (Roffler) who saw the aircraft approximately one-half mile northwest of his home heading in a northwesterly direction, turned right on approximately the correct heading for Butte while still some three miles short of the range station. The weather forecasts indicated there would be occasional vertical visibility between snow showers and clouds, and this was verified by the flight's last message at 0814, stating that it had vertical visibility at 10,500 feet. Under these conditions, it seems probable that the pilot anticipated finding suitable weather for the last few miles to allow him to go through Homestake Pass visually.

Mention has been made of another ridge more or less paralleling the ridge that was struck and about three or four miles to its east. They are somewhat similar and it is possible that Captain Lampman, flying "on and off" instruments may have mistaken the easterly ridge for the ridge which was struck during the letdown to Butte.

If we accept the probable flight path as it appears on Attachment A, the flight nearly paralleled the west leg of the Whitehall Range and would definitely have passed appreciably to the north of where it would have received the visual signal of the Homestake Fan Marker. The flight may or may not, depending upon how the control was set, have received the aural indication of the fan marker. The direction of flight at the time of impact was estimated to be 309 degrees true or 290 degrees magnetic.

Accordingly, the Board concludes that the final few miles prior to the crash were flown visually under conditions of intermittent and alternating instrument and visual flight and appreciably to the right (north) side of both the west leg of the Whitehall Range leg and the Homestake Fan Marker, and that the aircraft struck the ridge during a local snowstorm.

The record in this case clearly shows that the captain demonstrated a complete lack of flight discipline by deviating from the prescribed instrument approach procedure to Butte. It is obvious that had he followed such prescribed procedures, the accident would not have occurred. However, the company is responsible for the establishment and execution of a comprehensive pilot training program as required by the Civil Air Regulations and designed to require the highest degree of efficiency in scheduled carrier operations. Certainly this program was not as effective as required.

As a result of this and subsequent accidents involving Northwest Airlines, the Civil Aeronautics Administration took the following actions:

1. Required higher ceiling and visibility minimums for Northwest Airlines' operations on both domestic and international routes. (Effective January 26, 1951),
2. Required the establishment of a concentrated pilot training program for all pilots. (Effective February 1, 1951);
3. Required a comprehensive inspection of all company aircraft. (Effective February 1, 1951);



4. Restricted operations to 225 miles for 4-engine aircraft, and 150 for 2-engine aircraft unless an airport having the higher weather minimums was available within such distances. (Effective January 26, 1951);

5. Restricted flight schedules to allow sufficient time to accomplish necessary maintenance. (Effective February 1, 1951).

It is the Administration's intention to alter the minimums downward as the operator demonstrates ability to complete the pilot training program and the aircraft inspection program.

#### Findings

On the basis of all available information the Board finds that:

1. The company, the aircraft, and the crew were properly certificated.
2. There was no structural failure or power interruption prior to the accident.
3. Both the Whitehall Radio Range Station and the Homestake Fan Marker were functioning properly at the time of the accident.
4. The pilot failed to follow the carrier's prescribed No. 2 instrument approach procedure to the Butte Airport, which procedure is approved by the Civil Aeronautics Administration.
5. The aircraft struck a mountain, at about the 8,250-foot level, while on a heading of approximately 290 degrees magnetic.
6. The accident occurred during a local snowstorm, and under conditions of variable ceiling and visibility.

Probable Cause

The Board determines that the probable cause of this accident was the failure of the captain to conduct the flight in accordance with the prescribed approach procedure.

BY THE CIVIL AERONAUTICS BOARD:

/s/ OSWALD RYAN

/s/ JOSH LEE

/s/ JOSEPH P. ADAMS

/s/ CHAN GURNEY

Donald W. Nyrop, Chairman, did not participate in the adoption of this report.

## S U P P L E M E N T A L D A T A

### Investigation and Hearing

Notification of this accident was received by the Civil Aeronautics Board from Northwest Airlines' Flight Operations at Seattle, Washington, at 0930 MST, November 7, 1950. An investigation was immediately initiated in accordance with the provisions of Section 702(a)(2) of the Civil Aeronautics Act of 1938, as amended. As part of the investigation, a public hearing was held on November 30, December 1 and 2, 1950, at Seattle, Washington.

### Air Carrier

Northwest Airlines, Inc., is a Minnesota corporation having its principal place of business at 1885 University Avenue, St. Paul, Minnesota. The company is engaged in the transportation by air of persons, property and mail, and holds a certificate of public convenience and necessity issued by the Civil Aeronautics Board which authorizes it among other things, to operate between New York, New York, and Seattle, Washington, via various other intermediate stops. The carrier also holds an air carrier operating certificate issued by the Administrator of Civil Aeronautics.

### Flight Personnel

Lloyd G. Lampman, the captain, age 37, was employed by Northwest Airlines on December 2, 1942. He was checked out on Martin 202 type aircraft March 7, 1949, and qualified on the Seattle-Billings portion of the route on July 20, 1945. During the last 30 days prior to the accident, he had flown 71:42 hours and had made 18 trips over that route.

Captain Lampman was the holder of a current airline transport pilot certificate No. 36790 with single and multi-engine land ratings, 0-7200 horsepower. He had logged a total of 8,291 hours of flight time, 610:00 hours of which were in Martin 202 type aircraft. His total instrument time as of September 30, 1950, was 1007:30 hours. He had 12:24 hours of flight time accumulated for the month of November. Prior to departure of Flight 115 from Billings, he had a total rest period of 14:05 hours. He had completed a first-class CAA physical August 19, 1950, and had completed a six-months' instrument check flight on August 30, 1950. He had also completed an annual line check on March 10, 1950.

James A. Huff, the copilot, age 29, was employed by Northwest Airlines June 22, 1949. He was checked out on Martin 202 type equipment July 9, 1949, and had maintained his qualification continuously since that date. During the last 30 days prior to the accident, he had flown 80:11 hours in Martin 202 type equipment and had flown 15 round trips over the Seattle-Billings route.

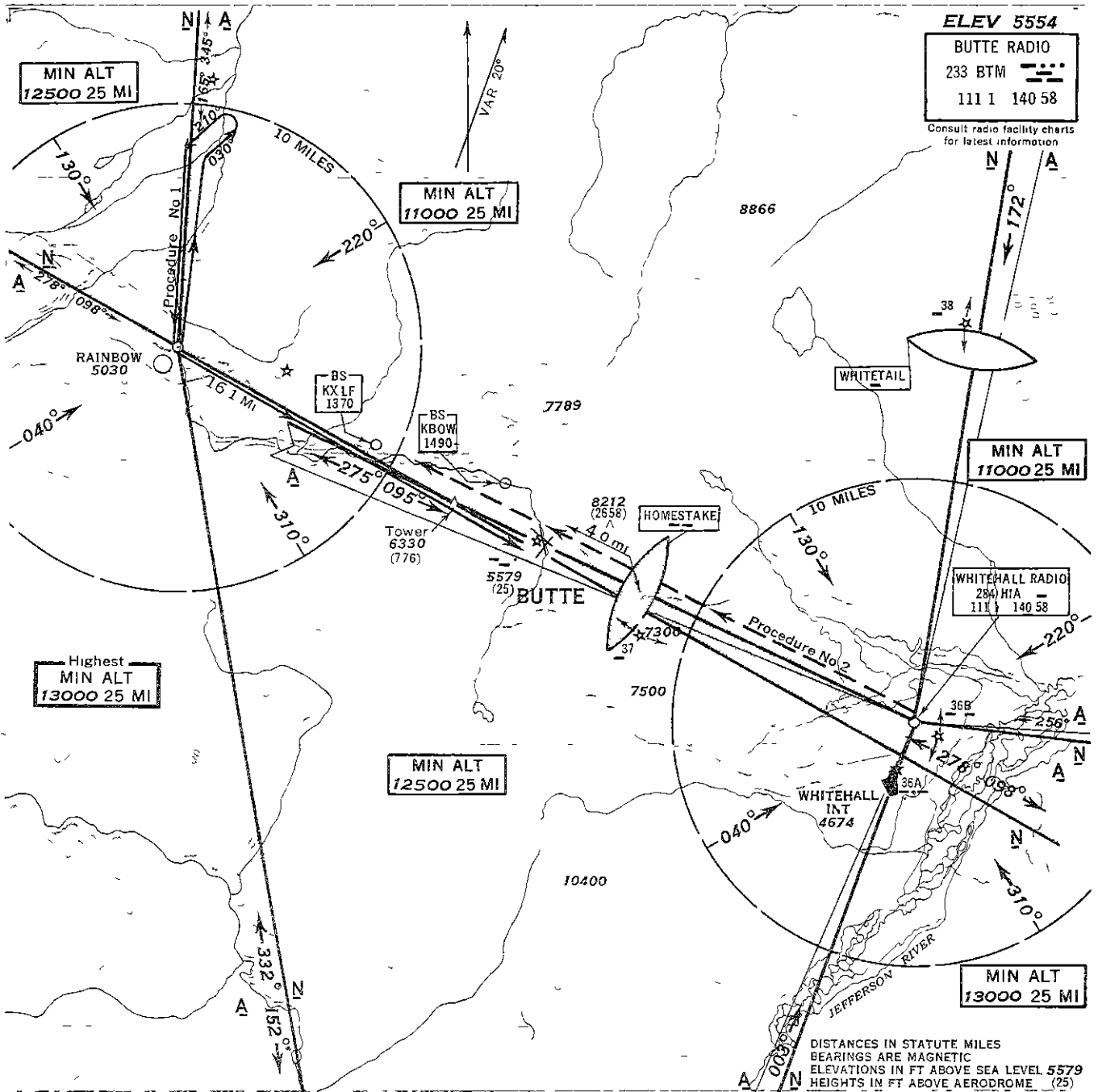
Copilot Huff held a currently valid commercial pilot certificate No. 437463 with an instrument rating. He had logged a total of 2,873 flight hours, of which 844 had been in Martin 202 type aircraft. His total instrument time was 202 hours. Prior to departure of Flight 115 from Billings, he had a rest period of 14:05 hours. Copilot Huff completed a first class CAA physical June 2, 1950.

#### Aircraft

N 93040, a Martin 202, currently certificated by the Administrator of Civil Aeronautics, was owned and operated by Northwest Airlines. It was

manufactured August 27, 1947. It was received by Northwest Airlines on September 28, 1947, and entered scheduled Northwest Airlines' service on October 12, 1947. At the time of the accident it had a total of 6166:33 flight hours and 2588 since the last 4000 hour overhaul. The engines, Pratt & Whitney Model R2800 CA18, had been flown 3314:56 and 4090:25 hours, left and right, respectively.

EMERGENCY ALTITUDE  
100 Nautical Miles 15,000



PROCEDURE TURN  
East side N course  
9000 within 15 miles  
NA beyond 15 miles

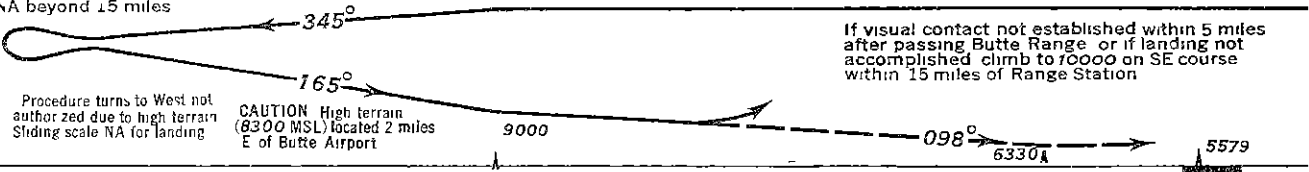
Z MARKER  
(BTM range)

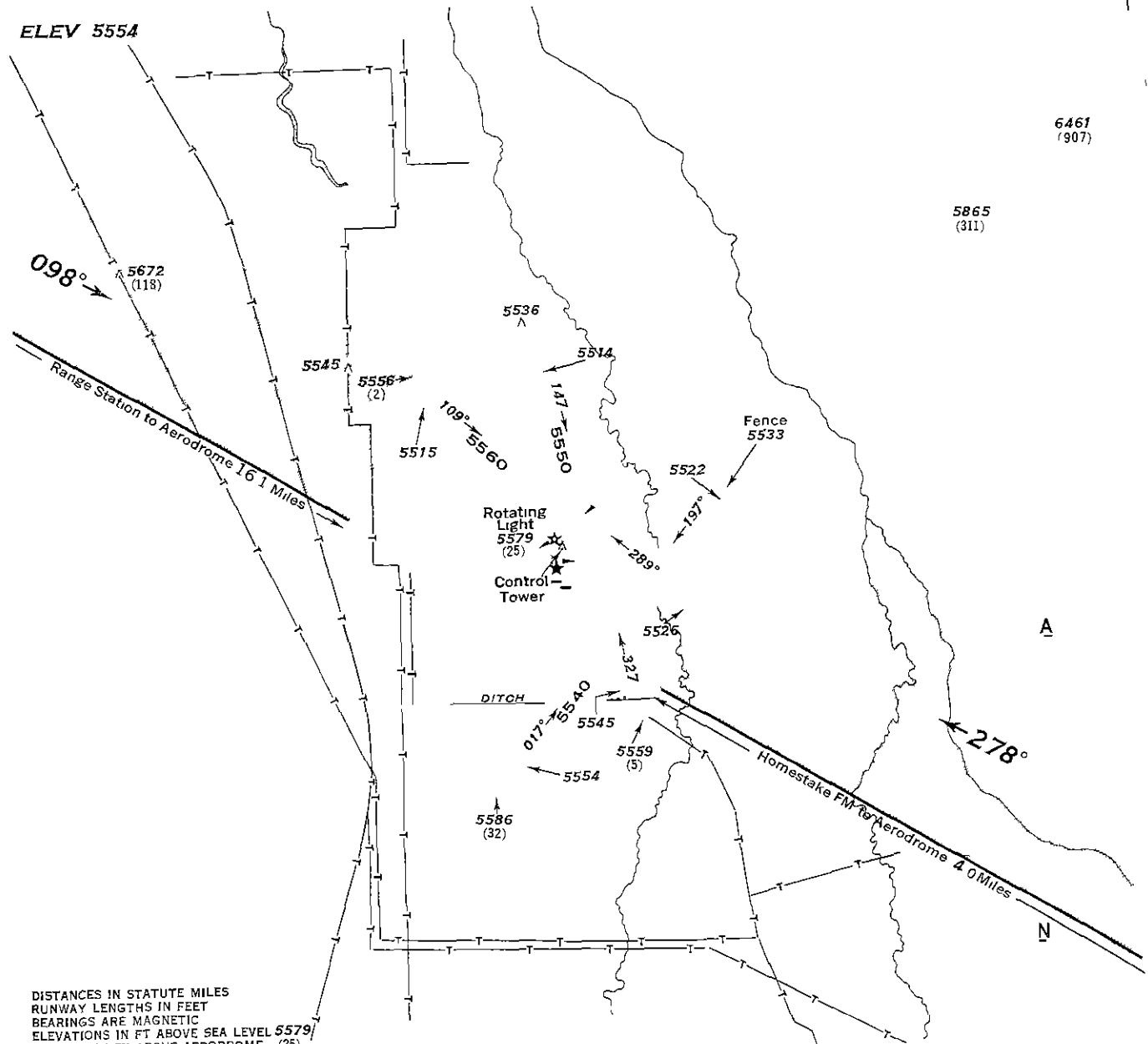
INITIAL APPROACH  
N course 9000 from int E course DRU Range  
SE course 10000 from HIA Range  
S course 11500 from DLN Range  
NW course 12700 from int SW course DRU Range

If visual contact not established within 5 miles  
after passing Butte Range or if landing not  
accomplished climb to 10000 on SE course  
within 15 miles of Range Station

Procedure turns to West not  
authorized due to high terrain  
Sliding scale NA for landing

CAUTION High terrain  
(8300 MSL) located 2 miles  
E of Butte Airport





DISTANCES IN STATUTE MILES  
 RUNWAY LENGTHS IN FEET  
 BEARINGS ARE MAGNETIC  
 ELEVATIONS IN FT ABOVE SEA LEVEL 5579/  
 HEIGHTS IN FT ABOVE AERODROME (25)

AERODROME POSITION Lat 45°57'N, Long 112°30'W

RADIO BMRLZ range and VHF voice

LIGHTING Rotating light and flashing code light  
 Obstruction threshold and runway lights on request  
 CHART LOCATION Yellowstone Park Sectional,  
 WAC 268, and RF 9

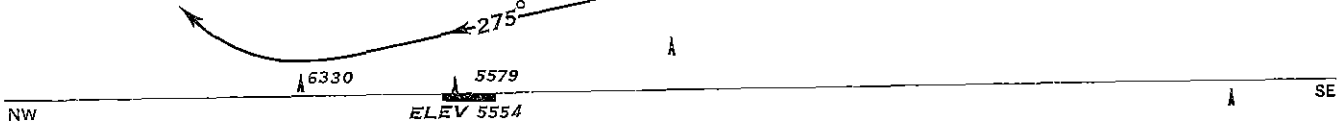
FINAL APPROACH  
 NW course HIA Range

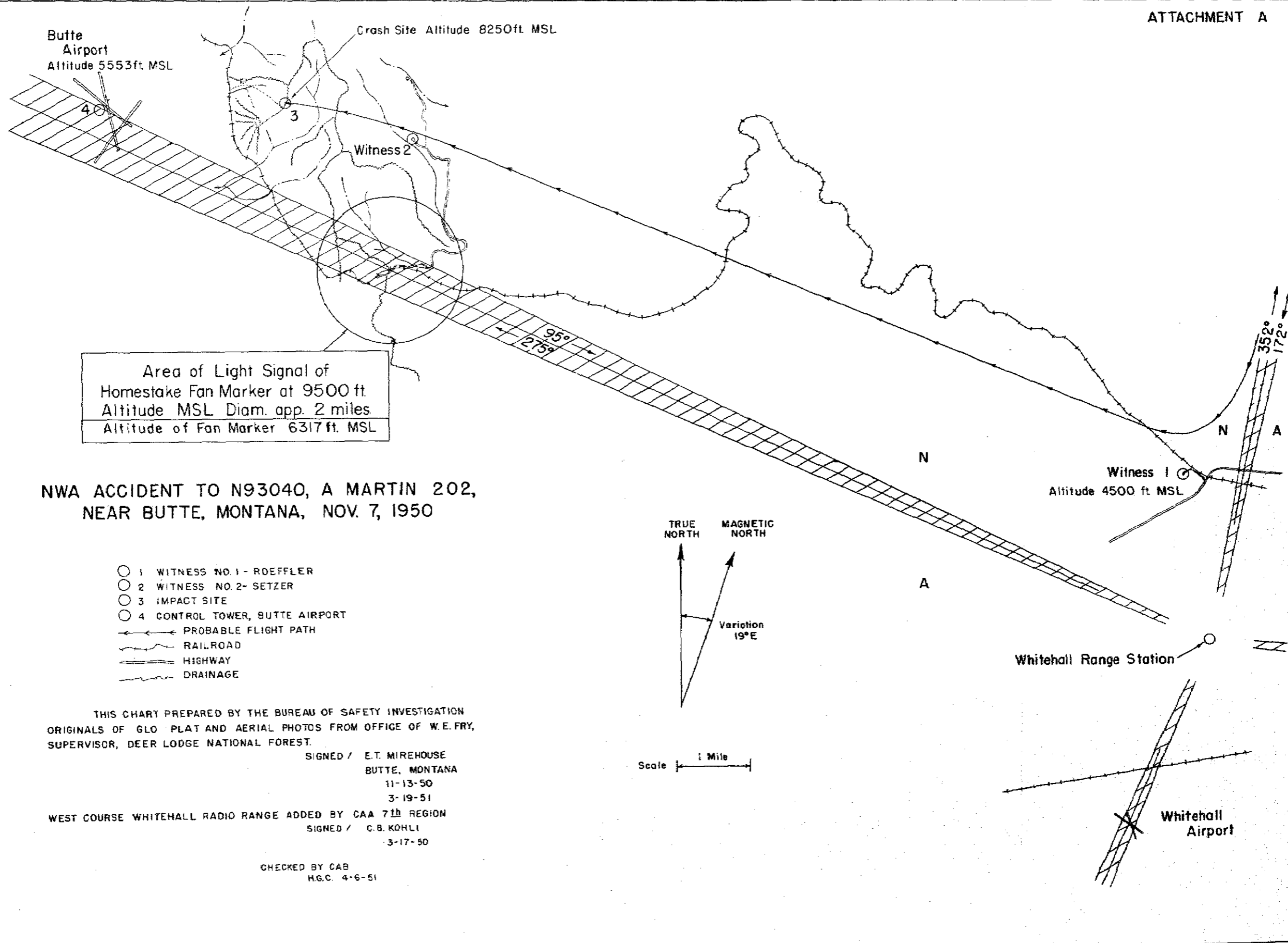
CAUTION High terrain (8300  
 MSL) located 2 miles E of  
 Butte Airport

FM

INITIAL APPROACH USING WHITEHALL RANGE Z MARKER (HIA range)  
 N course 10500 from HLN Range  
 E course 9000 from BZN Range  
 S course 10500 from DLN Range  
 NW course 10000 from BTM Range

If visual contact not established at authorized landing  
 minimums within 4.0 miles after passing Homestake FM  
 or if landing not accomplished proceed to Butte Radio Range  
 and climb to 10000 before reaching Butte Range Station





Area of Light Signal of  
Homestake Fan Marker at 9500 ft.  
Altitude MSL Diam. app. 2 miles.  
Altitude of Fan Marker 6317 ft. MSL

**NWA ACCIDENT TO N93040, A MARTIN 202,  
NEAR BUTTE, MONTANA, NOV. 7, 1950**

- 1 WITNESS NO. 1 - ROEFFLER
- 2 WITNESS NO. 2 - SETZER
- 3 IMPACT SITE
- 4 CONTROL TOWER, BUTTE AIRPORT
- ←←← PROBABLE FLIGHT PATH
- RAILROAD
- == HIGHWAY
- ~ DRAINAGE

THIS CHART PREPARED BY THE BUREAU OF SAFETY INVESTIGATION  
ORIGINALS OF GLO PLAT AND AERIAL PHOTOS FROM OFFICE OF W.E. FRY,  
SUPERVISOR, DEER LODGE NATIONAL FOREST.

SIGNED / E.T. MIREHOUSE  
BUTTE, MONTANA  
11-13-50  
3-19-51

WEST COURSE WHITEHALL RADIO RANGE ADDED BY CAA 7<sup>th</sup> REGION  
SIGNED / G.B. KOHLI  
3-17-50

CHECKED BY CAB  
H.G.C. 4-6-51

