

TECHNICAL REPORT DOCUMENTATION PAGE

1. Report No. NTSB-AAR-76-16		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Aircraft Accident Report -- Condor Aero Club, Inc., Cessna 172L, N4368Q, Rear Accident, Maryland, March 12, 1976			5. Report Date July 7, 1976		
			6. Performing Organization Code		
7. Author(s)			8. Performing Organization Report No.		
9. Performing organization Name and Address Rational Transportation Safety Board Bureau of Aviation Safety Washington, D. C. 20594			10. Work Unit No. 1858		
			11. Contract or Grant No.		
			13. Type of Report and Period Covered Aircraft Accident Report March 12, 1976		
12. Sponsoring Agency Name and Address NATIONAL TRANSPORTATION SAFETY BOARD Washington, D. C. 20594			14. Sponsoring Agency Code		
			15. Supplementary Notes		
16. Abstract About 2316 e.s.t. on March 12, 1976, a Condor Aero Club, Cessna 172L, N4368Q, crashed during an emergency landing about 2 1/2 miles from the Garrett County Airport near Accident, Maryland. The aircraft was approaching the airport visually when the engine stopped operating because of fuel exhaustion. The aircraft was damaged substantially. Of the three persons aboard the aircraft, one was killed and two were injured. The National Transportation Safety Board determines that the probable cause of the accident was fuel exhaustion induced by improper preflight planning and incorrect in-flight decisions by the pilot-in-command.					
17. Key Words Pre-flight; no flight plan; headwinds; groundspeed; change destination; IFR conditions; attempted approach; missed approach; fuel exhaustion. Identifier: Cessna 172L Accident			18. Distribution Statement This document is available to the public through the National Technical Information Service, Springfield, Virginia 22151		
19. Security Classification (of this report) UNCLASSIFIED		20. Security Classification (of this page) UNCLASSIFIED		21. No. of Pages 24	22. Price

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

AIRCRAFT ACCIDENT REPORT

Adopted: July 7, 1976

CONDOR AERO CLUB, INC.
CESSNA 172L, N4368Q
NEAR ACCIDENT, MARYLAND
MARCH 12, 1976

SYNOPSIS

About 2316 e.s.t. on March 12, 1976, a Condor Aero Club, Cessna 172L, N4368Q, crashed during an emergency landing about 2 1/2 miles from the Garrett County Airport near Accident, Maryland. The aircraft was approaching the airport visually when the engine stopped operating because of fuel exhaustion. The aircraft was damaged substantially. Of the three persons aboard the aircraft, one was killed and two were injured.

The National Transportation Safety Board determines that the probable cause of the accident was fuel exhaustion induced by improper preflight planning and incorrect in-flight decisions by the pilot-in-command.

1. INVESTIGATION

1.1 History of the Flight

On March 12, 1976, a Condor Aero Club, Cessna 172L, N4368Q, was operated as a pleasure flight from Zelienople, Pennsylvania, to Clearwater, Florida. Before departure, a crewmember obtained en route weather by telephone from the National Weather Service (NWS) in Pittsburgh. The briefing included the current en route and terminal weather, the forecast en route and terminal weather, and alternate routes.

The aircraft departed Zelienople about 1900 1/ with two pilots and a passenger aboard. When the aircraft left Zelienople the pilot in the left seat was flying the aircraft. An en route refueling stop was planned for Raleigh, North Carolina; a flight plan was not filed.

1/ All times herein are eastern standard, based on the 24-hour clock.

About 2030, as the aircraft approached Morgantown, West Virginia, at 5,500 feet, ^{2/} the pilot realized that his groundspeed was slower than expected. The pilot in the right seat contacted the Morgantown Flight Service Station (FSS) and asked about the weather conditions in the Raleigh area. The FSS specialist informed him that a stationary weather front had started to move and the Raleigh area had low ceilings and poor visibility. Consequently, the flightcrew elected to change their refueling stop to the Richmond, Virginia, area and the Morgantown FSS was so advised.

The pilot who had occupied the right seat stated that he intended to fly direct to Kessel VOR (West Virginia), direct to Linden VOR (Virginia), and then direct to Richmond. He asked the passenger to get the books of approach charts from behind the seat. He selected the book which included the charts for Virginia and Maryland, opened it to the Richmond approach chart, and handed it back to the passenger. At this time, he requested that the passenger keep the book open to Richmond and available if he needed it later.

About 50 nmi southeast of Morgantown, the pilot lost visual contact with the ground. Shortly thereafter, the aircraft encountered instrument flight conditions and the pilot in the right seat assumed command and control of the aircraft.

The aircraft passed Kessel VOR without difficulty. However, the pilot stated that as the aircraft continued toward Linden VOR he was unable to stay on the desired inbound course. He then made several attempts to assure himself of the aircraft's geographical position through the use of the onboard navigational equipment; however, he later stated that he did not believe the indications he was receiving and became confused.

About 2142:57, the pilot contacted Washington Air Route Traffic Control Center (Washington Center) and said, "We ... need a little assistance here. We're not quite sure where we're at and ... wonder if you could help us out?" Washington Center confirmed the request and asked for the aircraft's heading. After receiving a "240" response from the pilot, the Washington Center controller requested the pilot to turn to headings of 090° and 360° for positive identification and to climb to 8,000 feet. The controller also requested and received a change in the aircraft's transponder code. In addition, checks were made using the aircraft's navigation equipment. The aircraft's position relative to the Kessel VOR and the Linden VOR checked with that of Washington Center. The pilot reported to Washington Center that he had about 1 hour's fuel remaining. The controller asked if the pilot was "instrument qualified." The pilot responded that he was qualified.

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

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At 2152:15, the Washington Center controller advised: "68 Quebec, you're in radar contact, 10 miles north and east of the Kessel VOR. Say your intentions. Now fly heading 090." The pilot replied: "090 ... where can we get down, sir; we'd like to get down."

The Washington Center controller checked the weather at Dulles International Airport, and at the Martinsburg, West Virginia, and at the Harrisburg, Pennsylvania, Airports; all were below minimums for landing. The pilot decided that Richmond was beyond the fuel capability of the aircraft, based on groundspeed and fuel remaining. The nearest favorable airport given by Washington Center was at Hagerstown, Maryland, where the weather was 800 feet overcast with 2 1/2 miles visibility. At 2154, the pilot elected to proceed to Hagerstown.

At 2155:42, the pilot was advised; "68 Quebec, ... Morgantown, sir, is carrying 4,500 broken with 10 miles, if you'd like to go back towards Morgantown." The pilot replied, "Maybe that'd be better yet. Lets go back there." The pilot received and acknowledged instructions to turn to a heading of 270" for radar vectors to Morgantown.

At 2204:15, the pilot, at the request of Washington Center, contacted Cleveland Center. Radio and radar contact were established. Pertinent radio transmissions between Cleveland Center and the pilot of N4368Q were as follows:

2207:10 (Cleveland Center) 4368 Quebec, turn left to a heading of 260.

2207:17 (N4368Q) 260, 4368 Quebec.

2207:44 (Cleveland Center) I'm gonna vector you over to Garrett County airport which is at your 12 o'clock position, 25 miles. It's a lighted field and may be able to make it in there.

2207:58 (4368Q) Okay, roger, 4368 Quebec.

2208:56 (Cleveland Center) - And, 4368 Quebec, in about another 10 miles, I can start you down. If I start you down now I'll lose you on radar.

2209:03 (4368Q) - Okay, roger, we'll (unintelligible) whenever you're ready.

2209:06 (Cleveland Center) - Roger, you say about an hour's fuel left?

2209:09 (4368Q) - Ah - (Unintelligible) probably about 45 minutes.

2209:14 (Cleveland Center) - Roger.

At 2210:34, N4368Q was about 7 miles south of Cumberland and 25 miles east of Garrett County Airport in Maryland. The Cleveland Center controller asked the pilot if he thought he could make an approach to Cumberland, Maryland, if the controller read the approach chart to him. The pilot said he thought he could. The Cumberland weather was given as 2,500 feet overcast and 5 miles visibility. The pilot was given the nondirectional beacon frequency. When the pilot was receiving the nondirectional beacon frequency the controller said "You can proceed out on the 316° radial; your inbound radial is 208°.

As the aircraft turned toward Cumberland the following conversation ensued:

2213:42 (Cleveland Center) - 68 Quebec, did you receive?

2213:55 (Cleveland Center) - 4368 Quebec, Cleveland.

2214:07 (Cleveland Center) - 4368Q, if you received Cleveland Center the Cumberland Airport is at 12 o'clock 2 miles.

2214:21 (4368Q) - 4368Q, we have the beacon, I-the squawk turned on, I didn't the last transmission from you.

2214:27 (Cleveland Center) - 68 Quebec, roger, if you have the field in sight, you are cleared to land.

2214:32 (4368Q) - We're still 8,000 feet, can we start down now?

2214:36 (Cleveland Center) - That is correct, I'm going to lose you on frequency. You are cleared to land. You do say you have the airport in sight?

2214:43 (4368Q) - We don't. I'm at 8,000 feet with, an overcast beneath me.

2214:47 (Cleveland Center) - 68 Quebec, roger, you are cleared to circle to land at the Cumberland Airport.

2214:53 (4368Q) - Roger, cleared to circle to land at the Cumberland Airport.

2214:57 (Cleveland Center) - 68 Quebec that is correct. Now I'm going to lose you on center frequency here. Cancel with Martinsburg radio. Call Martinsburg radio with your ground time.

2215:36 (Recorded Cleveland Center background conversation) - He most certainly did have it in sight. He had the rotating beacon in sight.

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2216:31 (Cleveland Center) - 68 Quebec, you receive Cleveland?

2216:35 (4368Q) - Yeah we gotcha.

2216:37 (Cleveland Center) - Roger, you are 2 miles north of the field now.

2216:41 (4368Q) - We're circling here trying to descend to get it down. I'm still coming out of 7,000 descending. We just passed the beacon.

2216:51 (Cleveland Center) - 68 Quebec roger, but you do still have the field in sight?

2217:49 (Cleveland Center) - 68 Quebec, you still hear Cleveland?

2217:52 (4368Q) - Yeah.

As the aircraft continued a slow descent from 7,000 feet, the Cleveland controller asked "... you will be turning southbound toward the field?" The pilot indicated that he was still attempting to lose altitude and requested the airport's location relative to the nondirectional beacon. Cleveland Center replied "... the airport is 2 miles southwest of the beacon." At 2220:35, Cleveland Center advised the pilot to "... cross the beacon inbound at 3,000 on heading 208."

At this time, radio contact was lost between Cleveland Center and N4368Q. The pilot stated that after the loss of radio contact he crossed the Cumberland nondirectional beacon (NDB) at 3,000 feet on a heading of 208° as directed by Cleveland Center. At that time he was in heavy rain and could not see the ground. Remembering the reported ceiling, he descended to 2,500 feet. He could see the lights from the ground glowing through the clouds as he passed through, but he could not identify particular objects. He then decided to descend to 2,000 feet. At that altitude he could see the tops of houses and other objects, but the airport was not in sight. He then elected to execute a 360° turn in an attempt to locate the airport; the attempt was not successful.

The pilot stated that during the 360° turn he recalled the mountains on both sides of the airport and decided to discontinue his search for the airport and to start a climbout on a southwest heading.

During the climbout, the pilot again contacted Cleveland Center. He informed them that he had missed the approach at Cumberland because of low ceilings and heavy rain showers. Cleveland Center cleared the aircraft to climb and maintain 5,000 feet on a heading of 200°.

At 2236:07, Cleveland Center instructed the pilot to turn to a heading of 270° for Morgantown and asked him to report the amount of fuel remaining. The pilot complied with the instructions and reported that he had 30 minutes of fuel remaining. 1

At 2244:28, Cleveland Center advised the pilot that "the rain showers seem to have passed by the Cumberland Airport. Would you like to try another approach. With the amount of fuel you have there and the winds, its going to be rather close to Morgantown." The pilot declined to return to Cumberland because of the low visibility and heavy rain conditions he had encountered. 1

At 2256:50, after verifying with Cleveland Center that Garrett County Airport had a rotating beacon, the pilot stated he had the beacon in sight. Cleveland Center gave the pilot a heading to the airport and advised him to remain at 5,000 feet until he was 4 miles from the airport. Cleveland Center also advised the pilot of the weather and of the runway heading, elevation, and surface conditions at Garrett County Airport.

The Cleveland Center controller continued to give the pilot range and descent information. The Center, through Morgantown FSS, had telephone communication with personnel at Garrett County Airport. The controller advised the pilot when the airport personnel had the aircraft's landing lights in sight.

Shortly before the accident, the following radio conversation was recorded:

2313:18 (Cleveland Center) - 68 Quebec, I have lost you on radar 2.5 miles northeast of the field at 0412 (2312 e.s.t.)

2313:26 (4368Q) - Roger, 68 Quebec. We have the field (unintelligible) runway.

2313:29 (Cleveland Center) - 68 Quebec roger. You can standby with the airport personnel on 122.8 now for your down time.

2312:35 (4368Q) - 122.8, thank you very much now. We appreciate everything you've done.

According to the pilot, he tuned his radio to 122.8 MHz as instructed and had made one transmission when the aircraft's engine stopped. He then selected an open field in which to land the aircraft. During the landing roll, the aircraft struck a line of trees which were indiscernible to the pilot before the landing. The crash site was about 2 miles from the approach end of runway 26 at the Garrett County Airport.

The accident occurred on a moonlit night at 2316. The geographical coordinates of the accident site were 90° 36'N and 79° 20'W.

1.2 Injuries to Persons

<u>Injuries</u>	<u>Crew</u>	<u>Passengers</u>	<u>Others</u>
Fatal	1	0	0
Nonfatal	1	1	0
None	0	0	

1.3 Damage to Aircraft

The aircraft was damaged substantially.

1.4 Other Damage

None

1.5 Crew Information

Both pilots were certificated in accordance with Federal Aviation Administration (FAA) regulations. (See Appendix B.)

The pilot who occupied the left seat was a private pilot with limited experience. The pilot who occupied the right seat was instrument rated and was a certified flight instructor.

1.6 Aircraft Information

N4368Q was owned and operated by the Condor Aero Club of Zelienople, Pennsylvania. It was certificated and maintained in accordance with FAA regulations and requirements. The aircraft was filled with 100 octane fuel in Zelienople.

The pilot stated that he "leaned" the aircraft's fuel mixture at every opportunity in order to conserve fuel. According to the Cessna 172 Owner's Manual, Performance Data Chart, the Cessna 172L cruise performance at 5,000 feet with a lean mixture is as follows:

	<u>75</u> Percent BHP	<u>82</u> Percent BHP
RPM	2,600	2,700
Indicated airspeed	128 mph	134 mph
Endurance	4.7 hrs	4.2 hrs

1.7 Meteorological Information

The pilot of N4368Q stated that he was flying in clouds at 5,000 feet between Kessel VOR and Linden VOR. He also stated that the turbulence in the Cumberland area was of such magnitude that he reduced his rate of descent to maintain aircraft control.

The weather report for Cumberland given to the pilot of N4368Q by Cleveland Center, was 2,500 feet overcast with 5 miles visibility. This information was given by a pilot who had departed Cumberland at 2135. This pilot originally reported the ceiling at 2,700 feet m.s.l. This information was passed from the reporting aircraft to Martinsburg FSS, to the Cleveland Center coordinator position, and then to the Cleveland Center controller who was in contact with N4368Q.

Surface weather observations were, in part, as follows for the stations and times indicated:

Morgantown, West Virginia

1555, ceiling - estimated 5,000 feet broken, 10,000 feet broken, visibility -- 15 miles, temperature -- 58°F, dewpoint -- 39°F, wind -- 180° at 12 knots, gusts 20 knots, altimeter setting -- 29.83 in. pressure falling rapidly.

2255 - ceiling -- estimated 4,500 feet overcast; visibility -- 15 miles, temperature -- 55°F; dewpoint -- 44°F; wind -- 210° at 18 kn, gusts 25 kn; altimeter setting -- 29.66 in.; rain ended at 2215, breaks in the overcast, pressure falling rapidly.

2355 - ceiling -- measured 4,100 feet overcast, visibility -- 10 miles, light rain showers; temperature -- 55°F; dewpoint -- 46°F; wind -- 210° at 15 kn, gusts 20 kn; altimeter setting -- 29.64 in.; rain began at 2332.

Martinsburg, West Virginia

1558, Record Special, 1,000 feet scattered, ceiling - estimated 2,500 feet overcast, visibility - 7 miles, temperature - 39°F, dewpoint -36°F, wind - 130" at 12 knots, altimeter setting - 30.15 in. ridge top obscured west.

2256 - ceiling -- indefinite, 300 feet obscured; visibility -- 1 mile, light rain, fog; temperature -- 38°F, dewpoint -- 38°F, wind -- calm; altimeter setting -- 29.87 in., pressure falling rapidly.

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2340 Special - ceiling -- indefinite 400 feet obscured;
visibility -- 3/4 mile variable, light rain, fog; wind --
calm, altimeter setting -- 29.81 in.

The 1900 NWS winds aloft observation from 5,000 feet to 8,000 feet at Pittsburgh, Pennsylvania, and at Washington, D.C., varied from headings of 210" to 240" at velocities of 47 kn to 62 kn.

Pertinent in-flight weather advisories that were issued by the National Weather Service Forecast Office at Washington were as follows:

Issued at 1640, valid 1640 to 2100:

"SIGMET Alfa 4. Flight precautions. Ohio, adjacent Great Lake, West Virginia, western and central Maryland, and Virginia, District of Columbia, North Carolina, and South Carolina for occasional moderate turbulence below 20,000 feet east of mountains with frequent moderate below 17,000 feet, locally severe over mountains and west of mountains. Also winds 30 knots or greater within 2,000 feet of surface mountains westward. Continue advisory beyond 2100."

Issued at 1845, valid 1845 to 0100

"AIRMET Bravo 3. Flight precautions. Ohio, adjacent Great Lake, West Virginia, Maryland, Virginia, District of Columbia, Delaware, western North Carolina and South Carolina for occasional moderate mixed icing in clouds and in precipitation above freezing level. Freezing level 4,000 to 6,500 feet north sloping to 8,000 feet South Carolina. Multiple freezing levels north portion 2,000 to 6,500 feet. Continue advisory beyond 0100."

Issued at 1935, valid 1935 to 0200:

"AIRMET Foxtrot 1. Flight precautions. Western South Carolina, western North Carolina northward through western Virginia, extreme east portion West Virginia, and extreme east portion western Maryland along eastern slopes of mountains for ceilings and visibilities frequently at or below 1,000 feet and 3 miles in rain and fog, higher terrain generally obscured. Conditions may spread slowly eastward over the central portions of the Carolinas. Continue advisory beyond 0200."

Issued at 2035, valid 2035 to 0100:

"SIGMET Alfa 1. Flight precautions. Ohio, adjacent Great Lake, West Virginia, western and central Maryland, and Virginia, District of Columbia, North Carolina, and South Carolina for occasional moderate turbulence below 20,000 feet east of mountains with frequent moderate below 17,000 feet, locally severe over mountains and west of mountains. Also, winds 30 knots or greater within 2,000 feet or surface mountains westward, spreading slowly eastward over remainder of forecast area. Continue advisory beyond 0100."

At 1345, the winds and temperatures aloft forecast, based on 0700 data, were issued by the National Meteorological Center at Washington. These forecasts were valid at 1900 and were for use from 1300 to 2200. The following forecasts were issued for the locations indicated:

Pittsburgh, Pennsylvania

Feet	Direction (degrees)	Speed (kn.)	Temp. (°C)
3,000	190	33	
6,000	230	58	4
9,000	230	63	1

Westminster, Maryland

Feet	Direction (degrees)	Speed (kn.)	Temp. (°C)
3,000	180	30	
6,000	220	50	2
9,000	230	54	2

1.8 Aids to Navigation

Cumberland Airport is equipped with a nondirectional beacon approach, a nonprecision approach to circle to land on runways 19 or 24. (See Appendix D.) The minimum descent altitude is 2,300 feet; minimum visibility for the approach is 2 miles. The minimum sector altitudes vary from 3,700 to 4,300 feet.

Garrett County Airport is equipped with a VOR approach, a nonprecision approach to runway 26. The aircraft must cross the initial approach fix at 5,000 feet or above; then, proceed on the 262° radial to cross the final approach fix at 5,000 feet. The aircraft may then descend to the minimum descent altitude of 3,520 feet. The minimum visibility requirements vary from 1/2 to 2 miles depending on type of aircraft. The minimum sector altitudes vary from 4,200 to 4,600 feet.

1.9 Communications

No communications difficulties were reported between the pilot and ground stations during the flight, except when the aircraft descended below the mountains at Cumberland.

There was a misunderstanding between the pilot and the Cleveland Center controller concerning the meaning of the word "beacon" during N4368Q's attempted approach to Cumberland. The controller stated that he believed the pilot was referring to the rotating beacon at Cumberland Airport while, actually, the pilot was referring to the nondirectional beacon to be used for the approach fix. During the conversation, the controller was listening through an overhead speaker, the quality of

transmissions from the aircraft was only fair because of overmodulation of the aircraft's microphone, and conversations were taking place in the vicinity of the controller's position.

1.10 Aerodrome and Ground Facilities

Cumberland Airport does not have a control tower. There are three macadam surfaced runways; the three runways have runway edge lights. Runways 19 and 24 are the instrument runways for the nonprecision approach. Runway 19 is 3,000 feet long and 100 feet wide. Runway 24 is 5,776 feet long and 100 feet wide and is equipped with runway end identifier lights. All runway lights were on. The airport elevation is 790 feet.

Garrett County Airport does not have a control tower. There is one macadam surfaced runway. Runway 8/26 is 2,500 feet long and 50 feet wide; the runway is equipped with runway edge lights. The airport elevation is 2,933 feet.

1.11 Flight Recorders

The aircraft was not equipped, nor was it required to be equipped, with a cockpit voice recorder or a flight data recorder.

1.12 Wreckage

The aircraft made an emergency landing on rolling terrain in a plowed field. During the rollout, the aircraft struck a large tree which penetrated the aircraft where the left wing's leading edge intersects the windshield.

Aircraft damage was limited to the left wing root's leading edge forward of the main spar, the engine cowling aft of the engine, the engine mount's left side, the left side of the instrument panel, the cabin floor forward of the left front seat, and the right wingtip.

The aircraft's fuel tanks were empty. The main fuel line to the carburetor was removed and no fuel was found in the line. No other anomalies were found.

1.13 Medical and Pathological Information

The pilot in the left seat died of injuries received when the tree trunk penetrated the left side of the passenger compartment. The pilot in the right seat received chest and head injuries. The passenger received injuries to her hips and legs.

1.14 Fire

There was no fire.

1.15 Survival Aspects

The impact damage to the left side of the cockpit area made the accident nonsurvivable for the occupant of the left front seat.

1.16 Tests and Research

None

1.17 Other Information

1.17.1 Controller and Pilot Statements

When deposed by the Safety Board, the Cleveland controller was asked why he did not complete the reading of the let down procedure for Cumberland as he had told the pilot he would do. The controller stated that it was his understanding that the pilot had the beacon (rotating beacon) in sight and, therefore, had the airport in sight. The controller also stated that he did not hear the "we don't" transmission made by the pilot at 2214:43 in answer to the controller's query "... you do say you have the airport in sight?"

During an interview, the pilot was asked why he did not question the Cleveland controller about the details of the approach chart for Cumberland. The pilot answered that he was so busy flying the aircraft to maintain aircraft control that he did not have the opportunity to do anything but respond to the radio communications.

The pilot was asked also about the approach chart book, which he had earlier stated was open to the Richmond chart on the passenger's lap directly behind him. He again stated that he was too busy controlling the aircraft to think of asking the other pilot to turn to the Cumberland chart. In addition, he stated, "the passenger did not know what to look for."

The pilot was asked further if he had prepared a flight log of any kind. He responded that he never did. He stated that he always "had a good idea in his head what the time and fuel estimates should be."

1.17.2 Pilot Weather Briefing Procedures

The following is extracted from the National Weather Service, Operations Manual, dated December 16, 1969:

"5.2 Adequate Pilot Weather Briefing.

An adequate pilot weather briefing provides sufficient weather information for the aircrew to make a sound flight decision and/or efficiently execute the flight plan. The information required for an adequate briefing varies with the type of flight, aircraft, pilot capability, weather situation, and terrain.

The following briefing checklist is recommended as a guide to provide adequate weather briefings:

- a. Background information (concerning the pilot, aircraft, ETD, ETE, etc.)
- b. Weather synopsis
- c. Current weather (limited en route and terminal, including alternate, if marginal)
- d. Forecast weather (en route and terminal, including alternate, if requested)
- e. Alternate routes,
- f. Hazardous weather,
- g. Forecast winds aloft, and
- h. Request for pilot reports."

2. ANALYSIS AND CONCLUSIONS

2.1 Analysis

The aircraft was certificated, equipped, and maintained according to FAA requirements. The aircraft's powerplant, airframe, electric and pitot/static instruments, flight controls, and electrical system were not factors in the accident. The pilots were certificated in accordance with FAA requirements.

According to the pilot's statement, he leaned the aircraft's engine fuel mixture. The Cessna 172L Owner's Manual states that, with a lean mixture, the aircraft's endurance at 5,000 feet can vary from 4.2 hrs to 4.7 hrs. N4368Q flew for about 4.3 hrs before fuel was exhausted. Therefore, the Safety Board concludes that the forced landing was the result of fuel exhaustion since there was no evidence that aircraft performance was a causal factor.

When the pilot checked the weather before departing Zelenople, he was not provided with the following items: The synoptic situation, SIGMET Alpha 4, and winds and temperatures aloft forecasts. Although en route ceilings and visibilities were considerably worse than forecast, the forecast was amended at 1935 by AIRMET Foxtrot 1, which was accurate. If the pilot had availed himself of this information by a radio request or a VOR monitor; or had an en route FSS relayed the information to the pilot, his decision to continue may have been altered.

The route of flight from Zelenople to Raleigh was to be direct. The distance was 347 statute miles. The aircraft could indicate about 134 mph; 144 mph true airspeed at 5,500 feet and 0°C. Under a no-wind condition, the flight time to Raleigh would have been about 2 hours 25 minutes. After flying for about 1 hour 30 minutes, the aircraft arrived in the vicinity of Morgantown -- a distance of 80 statute miles from Zelenople. The aircraft's groundspeed, therefore, was about 53 mph.

The pilot stated that he did not make a flight log because he had a "pretty good idea" of what his fuel and time estimates should be. However, after using better than half of the normal no-wind time to Raleigh and using about 1/3 of the total fuel available to progress only 80 statute miles, his reason for changing his destination to Richmond was the lowering weather conditions at Raleigh. Richmond is about 200 statute miles from Morgantown. Had the pilot used a flight log and a computer he would have known at Morgantown that, because of the winds aloft, Richmond was beyond the aircraft's fuel capability.

The Safety Board believes that under these conditions, a prudent pilot, would have elected either to return to Zelenople or to land at Morgantown or another suitable airport in the vicinity to reassess the situation before proceeding.

When the aircraft was between the Kessel VOR and the Linden VOR, en route to Richmond, the pilot was unable to maintain his desired course and could not believe the indications on his VOR receivers. The pilot stated "I could not get back to the right and get on course." He interpreted the cause of this situation to be aircraft VOR equipment malfunction. The pilot did not consider the strong southwest winds as a possible cause of the off-course indications. The winds were from the aircraft's right side about 50 kn.

The pilot elected to circle in the area for about 10 minutes before he contacted Washington Center for assistance in determining his position. By this time, the aircraft had been airborne about 2 hours 45 minutes and had progressed about 160 statute miles. At 2152, the pilot indicated that he wanted to land. All airports to the east of N4368Q's position were unusable because of low ceilings and poor visibilities. After discussing with Washington Center the weather conditions in the immediate sections of Virginia, Pennsylvania, and Maryland, the pilot elected to return to Morgantown. The aircraft was handed-off from Washington Center to Cleveland Center. Since the aircraft had only 1 hour's fuel remaining and since its groundspeed was slow, it became apparent to the Cleveland Center controller that the aircraft could not reach Morgantown. The controller told N4368Q that he was going to vector the aircraft to Garrett County Airport.

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The aircraft's position then was 7 miles south of the Cumberland Airport. The weather conditions at Cumberland were reported to N4368Q as ceiling -- 2,500 feet; visibility -- 5 mi. This report came from an aircraft and was originally reported as 2,700 feet m.s.l. This information was passed through two persons before the Cleveland Center controller received it. When the ceiling was passed to the controller, he interpreted it as 2,500 feet agl. Since the airport elevation at Cumberland is 790 feet, the actual ceiling at Cumberland was 1,910 feet agl.

During the approach to Cumberland, there was also a misunderstanding in the terminology used during the radio transmissions between the pilot and controller. The Cleveland controller believed that when the pilot said "beacon", he meant the rotating beacon at Cumberland Airport and, therefore, must have the airport in sight. The controller, because of this interpretation, discontinued reading the approach chart and began giving instructions. Although the controller had stopped reading the approach chart, the pilot believed that the limited instructions he was receiving were relative to the nondirectional beacon used for the instrument approach to Cumberland. Neither the pilot nor the controller understood completely what the other was doing; yet neither made any attempt to question the other. The Safety Board believes that two-word phrases used in radio communications in which the second word is the same, i.e., rotating beacon and nondirectional beacon, should be transmitted in their entirety to avoid ambiguity.

The misunderstanding between the pilot and the controller concerning the beacon and the misunderstanding regarding the actual weather conditions at Cumberland created a difficult situation for the pilot. This difficult situation was compounded when the pilot elected to descend below 2,500 feet to search for the airport. The Safety Board believes that the pilot was prudent when he elected to discontinue the approach. However, the Safety Board believes that the pilot made a critical error in judgment when he continued the flight beyond Morgantown into adverse weather conditions. He also showed poor judgment when he did not avail himself of the approach chart for Cumberland and of the assistance of the other pilot.

2.2 Conclusions

(a) Findings

1. A complete weather briefing was not given to the pilot nor did he request the information which was omitted.
2. The en route ceilings and visibilities were worse than forecast during the preflight weather briefing.

3. The pilot overflew Morgantown, West Virginia, without sufficient fuel to reach his alternate destination, Richmond, and without regard for the adverse weather conditions.
4. The pilot attributed his northeast displacement from his desired route of flight to a VOR malfunction rather than to the strong southwesterly winds.
5. The pilot expended 10 minutes of time and fuel before he asked for assistance from Washington Center in locating his position.
6. Weather conditions at Cumberland Airport were worse than reported by Cleveland Center; however, the controller provided the pilot with the only information available.
7. There was a misunderstanding between the Cleveland controller and the pilot as to the meaning of the word "beacon".
8. There was a misunderstanding regarding the ceiling at Cumberland which led the pilot to believe that the ceiling was higher than it actually was.
9. About 20 minutes of time and fuel were expended during an attempt to land at Cumberland.
10. The pilot did not use the approach chart that was available to him for the approach to Cumberland.
11. The pilots did not preplan their flight adequately before takeoff nor did they utilize a flight log.

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(b) Probable Cause

The National Transportation Safety Board determines that the probable cause of the accident was fuel exhaustion induced by improper preflight planning and incorrect in-flight decisions by the pilot-in-command.

3. RECOMMENDATIONS

This accident points out the necessity for thorough preflight planning and sound in-flight decisions based on updated information by all persons who operate light aircraft.

The use of a flight log containing the pertinent route, wind, groundspeed, and fuel consumption computations cannot be overemphasized. This information, along with updated, en route weather information, can be used by the pilot to assess more adequately his in-flight situation at any point during the flight. Therefore, his decisions can then be based on complete information.

As a result of its investigation of this accident, the National Transportation Safety Board has issued the following recommendations to the Federal Aviation Administration:

"Assure that the word "beacon" is accompanied by a qualifying word whenever it is used in the Air Traffic Control System. (Class III - Longer term followup.) (A-76-95.)

"Include all of the various meanings of the word "beacon" in a revision to the Pilot/Controller Glossary. (Class III - Longer term followup.) (A-76-96.)"

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ WEBSTER B. TODD, JR.
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ PHILIP A. HOGUE
Member

/s/ ISABEL A. BURGESS
Member

/s/ WILLIAM R. HALN
Member

July 7, 1976

APPENDIX A

INVESTIGATION AND HEARING

1. Investigation

The Safety Board's Dulles Field Office was notified of the accident about 0900 on March 13, 1976. An investigator from the Dulles Field Office went immediately to the scene.

2. Public Hearing

There was no public hearing held on this accident; however, depositions were taken of a Cleveland Center Controller and two of his supervisors on April 16, 1976. Parties represented at the depositions proceeding were the Federal Aviation Administration and the Professional Air Traffic Controllers Organization.

APPENDIX B

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CREW INFORMATION

Pilot-in-Command (Right Seat)

Mr. Donald W. Fox, 53, holds Commercial Pilot Certificate No. 1446777, with ratings in airplane single-engine, land and sea. He is a rated flight instructor and instrument pilot. He had accumulated about 2,800 total flight-hours, 1,200 hours of which were in the Cessna 172. His second-class medical certificate was updated March 9, 1975, and required the use of corrective lenses.

Pilot (Left Seat)

Mr. W. Clark Crawford, 58, held Private Pilot Certificate No. 426875, with ratings in airplane single-engine land. He had accumulated about 155 total flight-hours. His third-class medical certificate was updated July 23, 1975, and required the use of corrective lenses.

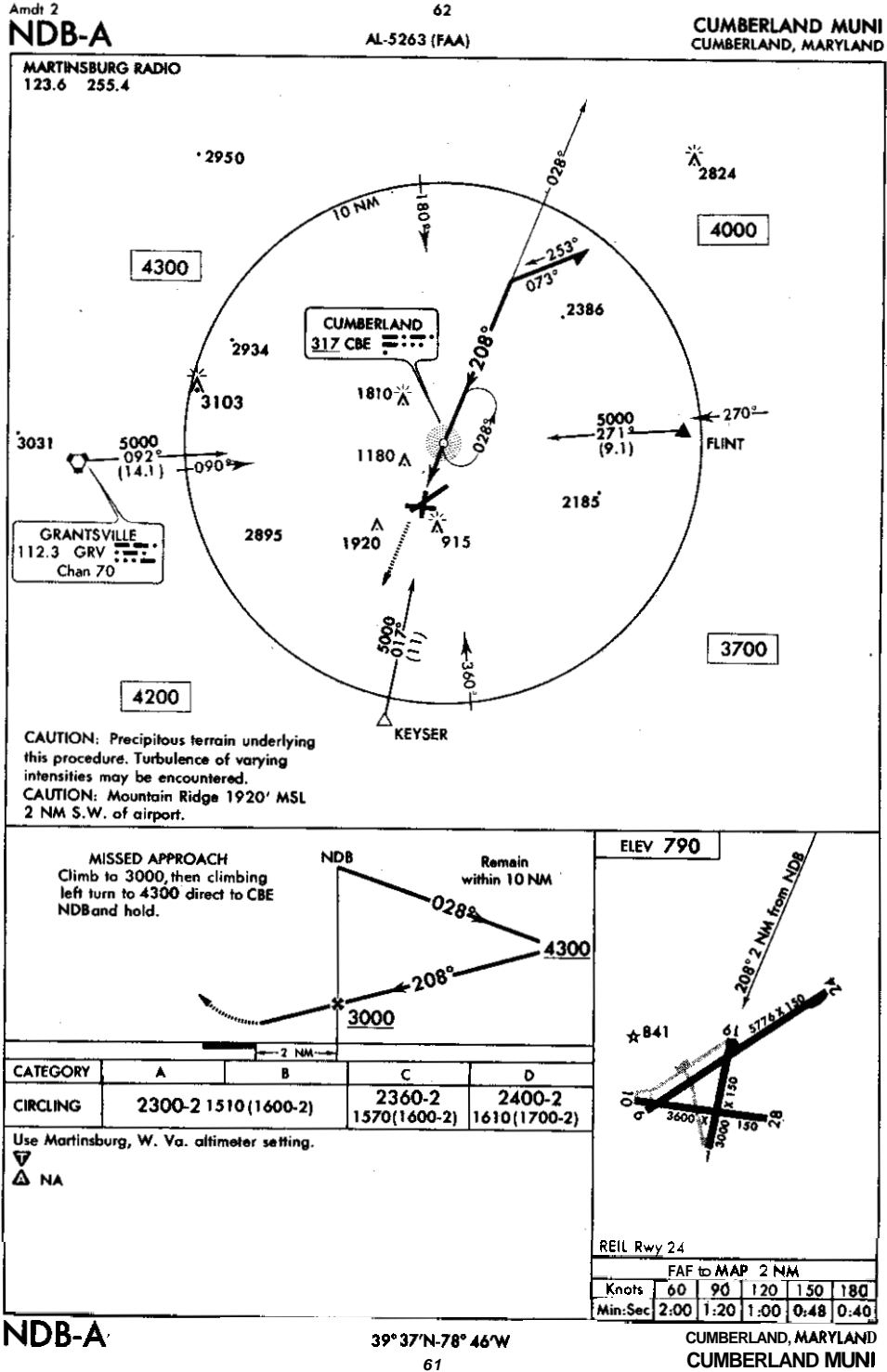
APPENDIX C

AIRCRAFT INFORMATION

N4368Q, a Cessna 172L, was owned and operated by the Condor Aero Club, Inc. of Zelienople, Pennsylvania. It was certificated and maintained according to procedures approved by the FAA. At the time of the accident, the aircraft had accumulated 1,711 flight-hours. It had accumulated 49 flight-hours since the last 100-hour inspection.

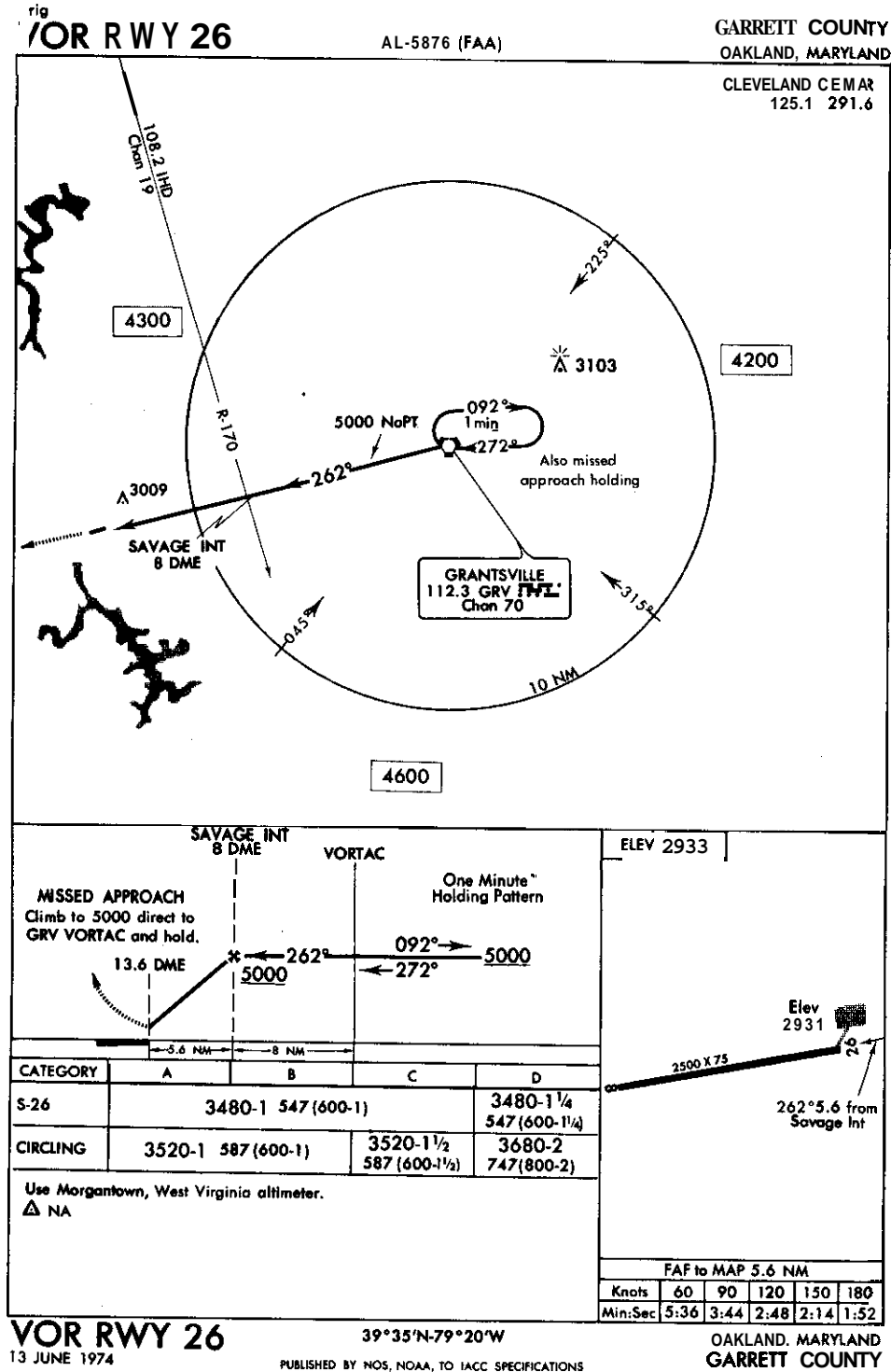
The engine was a Lycoming O-320 and had been in this aircraft since the aircraft was manufactured.

APPENDIX D



"ILLUSTRATION ONLY - NOT TO BE USED FOR NAVIGATIONAL PURPOSES"

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