

AVIATION OCCURRENCE REPORT

CONTROLLED FLIGHT INTO TERRAIN

**PREFERRED FLIGHTS INC.
PIPER PA31-350 NAVAJO CHIEFTAIN C-GNPG
BATHURST, NEW BRUNSWICK
04 JANUARY 1994**

REPORT NUMBER A94A0003



The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

Aviation Occurrence Report

Controlled Flight into Terrain

Preferred Flights Inc.
Piper PA31-350 Navajo Chieftain C-GNPG
Bathurst, New Brunswick
04 January 1994

Report Number A94A0003

Synopsis

C-GNPG, a Piper Navajo Chieftain operating as Empress 204, departed Moncton, New Brunswick, at 1805 Atlantic standard time (AST), on a scheduled courier flight to Bathurst. The aircraft carried a two-pilot crew, and there was no cargo on board. During the non-precision instrument approach to runway 10, the aircraft struck trees .75 nautical miles (nm) inside the Bathurst beacon and 3.75 nm from the airport. The crew was fatally injured during the accident.

The Board determined that the crew of Empress 204 allowed the aircraft to descend below the minimum descent altitude for the approach.

Ce rapport est également disponible en français.

Table of Contents

	Page
1.0 Factual Information	1
1.1 History of the Flight	1
1.2 Injuries to Persons	1
1.3 Damage to Aircraft	1
1.4 Other Damage	1
1.5 Personnel Information	1
1.5.1 General	1
1.5.2 Captain's History	2
1.5.3 First Officer's History	2
1.6 Aircraft Information	2
1.7 Meteorological Information	3
1.7.1 Forecasts	3
1.7.2 Bathurst Weather Observations	3
1.7.3 Pilot Weather Reports	3
1.8 Aids to Navigation	3
1.9 Communications	4
1.10 Aerodrome Information	4
1.11 Flight Recorders	5
1.12 Wreckage and Impact Information	5
1.13 Medical Information	6
1.14 Fire	6
1.15 Survival Aspects	6
1.16 Additional Information	6
1.16.1 Crew Co-ordination	6
1.16.2 Radar Information	7
2.0 Analysis	9
2.1 Introduction	9
2.2 Descent Profile	9
2.3 Airframe Icing	9
2.4 Controlled Flight Into Terrain	9
2.5 Unserviceable Radio Altimeter	10
2.6 Flap and Gear Position	10
2.7 Survival Aspects	10
3.0 Conclusions	11
3.1 Findings	11

3.2 Causes 11

4.0 Safety Action 13

5.0 Appendices

 Appendix A - Approach Profile and Crash Site Location 15

 Appendix B - List of Supporting Reports 17

 Appendix C - Glossary 19

1.0 Factual Information

1.1 History of the Flight

At 1805 Atlantic standard time (AST)¹, C-GNPG, a Piper Navajo Chieftain operating as Empress 204, departed Moncton, New Brunswick, on a scheduled courier flight to Bathurst. The aircraft carried a two-pilot crew, and there was no cargo on board.

The aircraft proceeded direct to Bathurst at 8,000 feet above sea level (asl)² and at 1820 AST was cleared by Moncton Area Control Centre (ACC) for an approach at Bathurst. The co-pilot contacted the Bathurst UNICOM and advised the operator that the crew would be flying the non-directional beacon/distance measuring equipment (NDB/DME) runway 10 approach. (See Appendix A.)

During the non-precision instrument approach to runway 10, the aircraft struck trees .75 nautical miles (nm)³ inside the Bathurst beacon and 3.75 nm from the airport.

-
- 1 All times are Atlantic standard time (Coordinated Universal Time (UTC) minus four hours) unless otherwise stated.
 - 2 See Glossary for all abbreviations and acronyms.
 - 3 Units are consistent with official manuals, documents, reports, and instructions used by or issued to the crew.

The accident occurred at latitude 47°36'N and longitude 065°49'W, at approximately 1845 AST, during the hours of darkness in instrument meteorological conditions, at an elevation of 450 feet asl.

1.2 Injuries to Persons

	Crew	Passengers	Others	Total
Fatal	2	-	-	2
Serious	-	-	-	-
Minor/None	-	-	-	-

Total	2	-	-	2
-------	---	---	---	---

1.3 Damage to Aircraft

The aircraft was destroyed by the impact.

1.4 Other Damage

None.

1.5 Personnel Information

1.5.1 General

	Captain	First Officer
Age	26	27
Pilot Licence	ATPL	CPL
Medical Expiry Date	27 Dec. 1994	01 May 1994
Total Flying Time	3,500 hr	685 hr
Total on Type	2,600 hr	350 hr
Total Last 90 Days	152 hr	85 hr
Total on Type Last 90 Days	152 hr	85 hr
Hours on Duty Prior to Occurrence	4 hr	4 hr
Hours off Duty Prior to Work Period	20 hr	20 hr

1.5.2 Captain's History

The captain held an Airline Transport Pilot (ATP) licence and a category 1 medical with the limitation, glasses must be worn. His ATP licence was valid only in aircraft operated by Preferred Flights Inc. His last medical examination was on 27 September 1993, temporarily extending his privileges for 90 calendar days. As he had not received formal issue of the pilot's Licence Validation Certificate (LVC), the captain's medical privileges expired at midnight, 27 December 1993, seven days prior to the accident.

The captain was not wearing his glasses at the time of the accident; however, his most recent Medical Examiner's Reports indicated that his uncorrected vision was within the limits for the issue of a category 1 LVC without the limitation of wearing glasses.

The captain had been employed by Preferred Flights since April 1989, flying the PA31-350 Navajo, and at the time of the accident, he held the position of company chief pilot. He had considerable experience flying into the Bathurst Airport.

1.5.3 First Officer's History

The first officer held a Commercial Pilot's licence with a class 1 medical and a class 1, group 1 instrument rating. He had been employed by Preferred Flights for three months, flying the PA31-350 Navajo, and had previous experience on this aircraft type working for an operator in Newfoundland.

The first officer's last pilot proficiency check was conducted on 17 December 1993, during which he successfully upgraded to a captain position. Since this time, all of his flying was done with either the chief pilot or the company training captain, to gain captain experience under supervision.

1.6 Aircraft Information

Particulars	
Manufacturer	Piper Aircraft Corporation
Type	PA31-350 Navajo Chieftain
Year of Manufacture	1977
Serial Number	317752119
Certificate of Airworthiness (Flight Permit)	Valid
Total Airframe Time	8,162.5 hours
Engine Type (number of)	Lycoming TIO-540-J2BD (2)
Propeller/Rotor Type (number of)	Hartzell HC-E3YR (2)
Maximum Allowable Take-off Weight	7,000 pounds
Recommended Fuel Type(s)	100/130, 100 LL
Fuel Type Used	100 LL

The aircraft was certified, equipped, and maintained in accordance with existing regulations and approved procedures.

The aircraft was also equipped with a radio altimeter; however, this instrument had been unserviceable since 09 March 1993. The radio altimeter was not required by regulations. The aircraft's emergency locator transmitter (ELT) had been removed on 20 December 1993 for recertification and was not re-installed in the aircraft. This is an acceptable procedure under existing regulations.

The aircraft's weight at the time of the occurrence was estimated to be 5,646 pounds (lb), 1,354 lb under maximum all-up weight, and the centre of gravity was within the prescribed limits.

Following maintenance on the aircraft, on the day of the accident flight, the company aircraft maintenance engineer carried out a run-up. No discrepancies were noted during the run-up and the aircraft was released for return to service. The aircraft's de-icing system was functionally checked serviceable during the maintenance run-up.

1.7 Meteorological Information

1.7.1 Forecasts

The New Brunswick FACN1 area forecast, which covers the area of the intended flight, was issued on 04 January at 1730 Coordinated Universal Time (UTC), and was valid from 1800 to 0600 UTC the following day. It forecast a layer of overcast cloud with bases between 500 and 1,000 feet asl and with tops between 6,000 and 24,000 feet asl. Visibility was forecast to be between one-quarter and two miles in snow and blowing snow. Surface winds were forecast to be 080 degrees at 25 knots, gusting to 40 knots, giving occasional obscured and frequent snow ceilings between 200 and 500 feet asl. Light to moderate rime icing in cloud was forecast above the freezing level, which was at the surface in the Bathurst area.

1.7.2 Bathurst Weather Observations

The recorded Bathurst Airport weather at 1800 AST, approximately 45 minutes prior to the accident, was precipitation ceiling 400 feet above ground level (agl) obscured, visibility one-half mile in snow and blowing snow, winds from 090 degrees magnetic at 14 knots, gusting to 20 knots, and a temperature of minus 13 degrees Celsius. A special weather observation recorded at 1853 AST, approximately eight minutes after the accident, reported precipitation ceiling 400 feet agl obscured, visibility one-quarter mile in snow and blowing snow, and winds from 070 degrees magnetic at 14 knots, gusting to 20 knots.

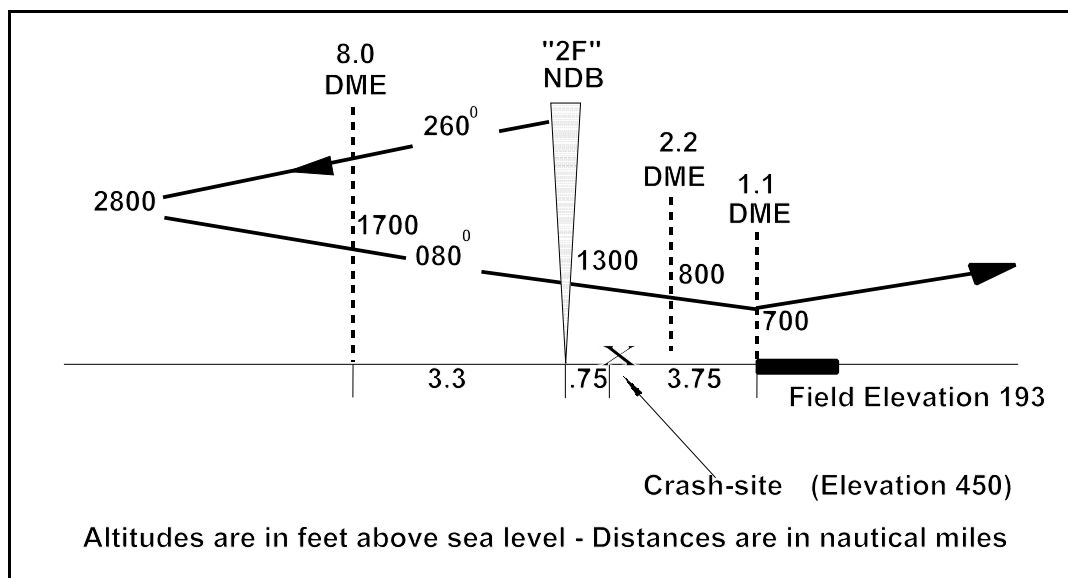
The Bathurst Airport weather conditions were virtually unchanged during the four hours preceding the accident. The captain of Empress 204 telephoned the Bathurst Airport manager at 1710 AST, prior to departing Moncton, to request an update on the current weather. The manager, a licensed commercial pilot, has 17 years experience in aviation during which he has acquired 2,700 hours total flying time, including 700 hours in multi-engined aircraft on charter and scheduled domestic flights. The manager confirmed that the weather observation was correct, adding that: "it's just like being in a pea soup up here." The pilot-in-command telephoned Bathurst again at 1745 AST and talked to the UNICOM operator who also told him that the weather had not improved.

1.7.3 Pilot Weather Reports

The flight crew of an Air Nova Dash 8 which landed at approximately 1600 AST reported that the recorded Bathurst weather was correct and that they were able to visually obtain the runway environment just prior to the missed approach point. The crew of this flight and the crew of another Air Nova flight which departed at 2100 AST both reported that there was only a trace of airframe icing in the vicinity of the Bathurst Airport.

1.8 Aids to Navigation

The navigational aids available at the Bathurst Airport are an NDB and DME, which were both serviceable at the time of the accident.



An
aircr
aft

Figure 1 - Approach Profile

conducting the NDB/DME runway 10 approach would cross the Bathurst beacon 4.5 nm from the airport, at an altitude of 1,300 feet asl and on a heading of 080 degrees magnetic, and begin a final descent to the minimum descent altitude (MDA) of 700 feet asl. Figure 1 shows the appropriate altitudes, the normal approach profile, and location of the accident site.

1.9 Communications

Communications between Air Traffic Services (ATS), Bathurst UNICOM, and Empress 204 had been normal throughout the accident flight. Company personnel listened to the Moncton ACC audio tape and identified the co-pilot as the flight crew member communicating with the ACC.

The co-pilot of Empress 204 established initial contact with Bathurst UNICOM as they passed Chatham. The last contact between Bathurst UNICOM and Empress 204 was a request for the

ort approach lights were turned on. Empress 204 made no distress call and at no time did the crew indicate they were experiencing any difficulties.

1.10 Aerodrome Information

The Bathurst Airport, at a reference elevation of 193 feet asl, is certified as a public-use aerodrome and is operated and maintained by the Bathurst Regional Airport Commission. Runway 10/28 is asphalt, 4,000 feet long and 75 feet wide; runway 10 has a 0.38 per cent downslope. Aerodrome lighting for runway 10 consists of low intensity approach lights, flashing runway identification strobe lights, green threshold lights, and medium intensity runway edge lights.

The Bathurst Airport has an airport emergency procedures (AEP) manual outlining the basic procedures to be followed to deal with emergencies, including an "Emergency Crash Off Airport." This manual is not a requirement for this type of airport, but is based upon the generic Transport Canada AEP manual.

1.11 Flight Recorders

The aircraft was not equipped with a flight data recorder or a cockpit voice recorder, nor was either required by regulation.

1.12 Wreckage and Impact Information

UN
IC
OM
ope
rator
to
con
firm
that
all
airp

When the aircraft struck the trees, it was on a heading of 080 degrees magnetic in a wings-level, slightly nose-down attitude.

The main impact was with a 90-foot-high pine tree that had a seven-foot circumference at the base. The aircraft hit this tree 36 feet above the ground, breaking the tree into three sections, each about 30 feet long. The sections of this tree were thrown 34 feet beyond the main impact point. Two trees to the left and another one to the right of the large pine tree were also struck at this time.

The aircraft started breaking up at the main impact point and the wreckage path extended forward 225 feet to where the right engine was located. The fuselage and wings broke up into five major pieces, with the largest piece, the fuselage and inboard section of the right wing, located 140 feet forward of the main impact point.

Flight control system continuity could not be confirmed because of the degree of destruction to the aircraft. However, no pre-impact failures were found in any of the components of the flight control system. All major aircraft components were accounted for at the accident site and there was no evidence of any airframe icing.

Flap position was determined to be seven degrees of deflection at the time of impact. The company policy for flap deflection on approach in this aircraft is to select 25 degrees when the aircraft is one mile outside the beacon or final approach fix on a non-precision approach.

The right main landing gear was determined to be in the down-and-locked position at the time of impact. The nose gear and the left main gear were down at impact, but it could not be determined if they were in the locked position. The right inboard gear door, commonly known as the "D" door, was not in the closed position at impact. The position of the left "D" door at impact could not be determined.

The PA-31-350 landing gear system is hydraulically operated with doors that completely cover the gear when it is retracted. The main gear "D" doors operate hydraulically and are controlled by the limit switches. During the extension and retraction cycle of the landing gear, the "D doors" open first, before the actual landing gear starts to move. When

the landing gear has fully extended or retracted, the "D" doors return to the closed position. During a non-precision instrument approach, it is standard practice to extend the landing gear when the aircraft is established on the inbound track, at or just prior to crossing the approach beacon or final approach fix.

The cockpit area was completely destroyed; however, some instruments were recovered and sent to the TSB Engineering Branch Laboratory for examination. The pilot's altimeter was found to be set at a barometric pressure of 29.75 inches of mercury (in. Hg). The actual Bathurst altimeter setting transmitted to and acknowledged by the crew was 29.82 in. Hg. This variation would have resulted in the aircraft being 70 feet asl higher than what was indicated on the pilot's altimeter. Examination of the dial faces on the left engine instrument tri-gauge and left engine fuel flow indicator showed that instrument readings at impact were as follows: oil pressure 75 to 80 psi, oil temperature approximately 200 degrees Fahrenheit, cylinder head temperature approximately 400 degrees Fahrenheit, and fuel flow of about 24 US gallons per hour.

The engines and propellers were transported to the Regional Wreckage Examination Facility in Moncton for a more detailed examination. No pre-impact discrepancies were found during the engine teardown that would have affected engine operation. Propeller teardowns determined that there were no discrepancies which would have precluded normal operation, both propellers were rotating at impact, and power was being developed.

It was determined through examination of light bulbs removed from the pilot's instrument panel that electrical power was being supplied to these bulbs at the time of impact. Therefore, it was determined that the instrument panel was illuminated.

1.13 Medical Information

The autopsies performed on the captain and co-pilot indicated that they were both fatally injured on impact. There was no evidence that incapacitation, or physiological factors affected the crew's performance.

1.14 Fire

There was no evidence of fire either before or after the occurrence.

1.15 Survival Aspects

At approximately 1900 AST, after trying unsuccessfully to contact Empress 204, the Bathurst UNICOM operator advised Charlo Flight Service Station (FSS) that the aircraft had not been heard from, and Charlo FSS began a radio search on all frequencies. The UNICOM operator next informed the Bathurst Airport manager that contact with Empress 204 had been lost. The airport manager instructed the operator to select the emergency frequency, 121.5 MHz, on the radio and listen for an ELT signal which would indicate that the aircraft had crashed. Since the aircraft's ELT had been removed for recertification, however, there was no possibility of a signal being transmitted.

The RCMP were first notified of the missing aircraft at about 1907 AST by a Moncton ACC shift manager. At 1930 AST, Moncton ACC called the RCMP and advised them that they considered that the aircraft had crashed since they had had neither radio nor radar contact with the aircraft since 1845 AST. They estimated the aircraft's position at last contact to be approximately five miles west-southwest of the airport.

At 2005 AST, a person living near the crash site reported having heard an aircraft. At 2130 AST, a search of fields in the vicinity was begun on snowmobiles but was unsuccessful. At 2205 AST, more information was received from another resident in the area and the search continued on foot in a nearby wooded area. The wreckage of the aircraft was located at approximately 2230 AST, three hours and forty-five minutes after the crash occurred.

1.16 Additional Information

1.16.1 Crew Co-ordination

The company had written Standard Operating Procedures (SOPs), which were approved by Transport Canada. Although Transport Canada does not require air carriers to have SOPs, they recommend it as SOPs greatly improve crew coordination and overall operational safety. The normal company SOP procedure for an approach would include an approach briefing, descent checks, in-range checks, and altitude calls. According to the company SOP, the pilot flying will specify the altitudes; the pilot not flying shall call out or say "standard altitude

calls." The "standard altitude calls" are 1,000 feet above minimums, 500 feet above minimums, 200 feet above minimums, and minimums.

1.16.2 Radar Information

The recorded Moncton ACC radar data shows that the captain of Empress 204 descended from his en route altitude of 8,000 feet asl about 35 miles back from the Bathurst beacon, after having received clearance for an approach at Bathurst. The aircraft levelled out at 6,000 feet asl and was still at this altitude when radar contact was lost due to limited radar coverage from the antenna site, 11 miles back from the beacon. The radar-determined ground speed for Empress 204 was about 200 knots. The ground speed for this aircraft in a no-wind condition would be about 165 knots.

2.0 *Analysis*

2.1 *Introduction*

Because no evidence could be found to indicate that the aircraft was not airworthy prior to impact, it was necessary to concentrate on the human and environmental issues in order to determine why the accident occurred. The following analysis, therefore, concentrates on the probable approach profile for Empress 204 leading to the accident site, the possibility of airframe icing, crew coordination, the unserviceable radio altimeter, flap and gear position, and controlled flight into terrain.

2.2 *Descent Profile*

Recorded Moncton ACC radar data shows that the aircraft, after being cleared for the approach at Bathurst, stopped the descent at 6,000 feet and maintained this altitude until it disappeared from radar 11 miles back from the Bathurst beacon. The aircraft was maintaining a ground speed of approximately 200 knots and the captain may have wanted to take advantage of the tail wind at this altitude as long as possible. Another possibility is that the captain may have wanted to stay above the cloud tops at 6,000 feet asl to avoid flight in the area of turbulence and/or airframe icing as long as he could.

Either of these two possibilities sets up a situation where a high rate of descent, approximately 1,500 feet per minute (fpm), would be required to successfully carry out the NDB/DME approach to runway 10. The high rate of descent would minimize the amount of time the aircraft would be in cloud.

In order to keep airspeed and engine operating temperatures within acceptable limits during the descent, the crew likely extended the flaps to 15 degrees and lowered the gear.

2.3 *Airframe Icing*

Pilot reports from other aircraft crews reported only traces of airframe icing in the vicinity of Bathurst during that period. The crew of Empress 204 did not indicate they were unable

to maintain safe flight due to airframe icing, and there was no indication of airframe icing at the accident site.

The aircraft was 1,354 lb under maximum all-up weight at the time of the occurrence. At this weight and with operational de-icing equipment, which was functionally checked serviceable prior to departure, the aircraft would not have had any problems maintaining controlled flight in the icing conditions that existed at the time. Because of these factors, it is unlikely that airframe icing was a contributing factor in this accident.

2.4 *Controlled Flight Into Terrain*

The absence of any pre-impact aircraft deficiencies, the absence of any emergency call from the crew, and the aircraft attitude when it struck the trees indicate that this was a controlled flight into terrain accident. There are two possibilities, neither of which can be established, as to why the aircraft descended to such a low altitude.

One possible explanation for the low altitude is that the crew unintentionally descended below the minimum descent altitude for the approach. Increased caution would have been required with controlling and configuring the aircraft during the high rate of descent required during this approach, particularly since the crew may have been preoccupied with checking for airframe icing.

The co-pilot was responsible for altitude callouts. The altimeter would have been decreasing quite rapidly at 1,500 fpm. Instrumentation lighting may have been turned to a minimum to help the crew visually acquire the runway environment, especially considering the weather and lighting conditions that existed at the time. This might explain why the crew did not stop their descent at the MDA for the approach.

The other possibility is that the crew intentionally descended below minimums to visually acquire the ground. The MDA ensures adequate terrain clearance for an aircraft inside the approach beacon until the crew can visually acquire the runway environment. The aircraft crashed 3.75 nm from the airport at an elevation 250 feet below the MDA. Considering the weather and light conditions that existed at the time, it is highly unlikely that

the crew could have seen the runway this far back from the airport.

the individuals involved in assessing or responding to this accident.

2.5 *Unserviceable Radio Altimeter*

Had the radio altimeter been serviceable and set correctly during the approach for the MDA, it is possible that this instrument might have alerted the crew in sufficient time for them to have recovered from their low altitude.

2.6 *Flap and Gear Position*

The position of the flaps and right main gear "D" door indicates the possibility that the crew may have recognized their situation and started an overshoot just moments prior to the impact. The procedure for executing an overshoot or missed approach in this aircraft is to advance the power to full, retract the flaps and landing gear, and pitch the nose up to a climb attitude.

The flaps would not normally be selected for the seven-degree deflection position that they were found in after the accident. This indicates that they were travelling either up or down at the time of impact. As the flaps would normally be selected to fifteen degrees or more, well before this point on the approach, it is more likely they were travelling up.

The position of the right main gear "D" door at impact suggests that either the gear extension cycle was just ending or the retraction cycle was just beginning. As it is likely that the captain set the aircraft up in a steep descent, it is probable that the gear had been extended early in the descent from 6,000 feet to create additional drag which would help keep the speed under control and allow the crew to maintain enough engine power to help keep engine operating temperatures at an acceptable level. Because of this probability, the landing gear was more likely beginning the retraction cycle at impact.

2.7 *Survival Aspects*

The 3³/₄ hours it took to locate the aircraft was influenced by the following factors: the aircraft was not equipped with an ELT, the Bathurst personnel assumed that the aircraft had overshoot and that the crew had not informed them, and the weather at the airport was poor.

Although the Bathurst Airport has an AEP manual, it is not apparent that this aided

3.0 *Conclusions*

3.1 *Findings*

1. The aircraft crashed on the approach to runway 10, 3¾ miles from the runway threshold during darkness.
2. The pilot and co-pilot sustained fatal injuries at impact.
3. The captain's medical was invalid at the time the accident occurred.
4. The aircraft's emergency locator transmitter had been removed for recertification and was not re-installed in the aircraft, nor was it required by regulations.
5. The aircraft was equipped with a radio altimeter, which was unserviceable during the ten months prior to the accident; this equipment was not required by regulations.
6. The aircraft's weight and centre of gravity were within limits.
7. The aircraft was complete, intact, and functioning normally before it struck trees.
8. Based on the autopsy, toxicology, and medical records, there was no evidence to indicate that the crew's performance was degraded by physiological factors.
9. It took three hours and forty-five minutes to locate the downed aircraft.

10. The crew of Empress 204 did not monitor their descent and the aircraft descended below the minimum descent altitude for the approach.

3.2 *Causes*

The crew of Empress 204 allowed the aircraft to descend below the minimum descent altitude for the approach.

4.0 *Safety Action*

The Board has no aviation safety recommendations to issue at this time.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson, John W. Stants, and members Gerald E. Bennett, Zita Brunet, the Hon. Wilfred R. DuPont and Hugh MacNeil, authorized the release of this report on 23 November 1994.

Appendix A - Approach Profile and Crash Site Location

Appendix B - List of Supporting Reports

The following TSB Engineering Branch laboratory reports were completed:

LP 08/94 - Temperature Analysis: Exhaust Stack Material;
LP 18/94 - Instruments Examination.

These reports are available upon request from the Transportation Safety Board of Canada.

Appendix C - Glossary

ACC	Area Control Centre
AEP	Airport Emergency Procedures
agl	above ground level
asl	above sea level
AST	Atlantic standard time
ATPL	Airline Transport Pilot Licence
ATS	Air Traffic Services
C of G	centre of gravity
CPL	Commercial Pilot Licence
DME	distance measuring equipment
ELT	emergency locator transmitter
FDR	flight data recorder
fpm	feet per minute
FSS	Flight Service Station
IMC	instrument meteorological conditions
in. Hg	inches of mercury
lb	pound(s)
LVC	Licence Validation Certificate
MDA	minimum descent altitude
MHz	megahertz
NDB	non-directional beacon
nm	nautical miles
SOP	standard operating procedure
TSB	Transportation Safety Board of Canada
UNICOM	a private advisory station located at an uncontrolled aerodrome
UTC	Coordinated Universal Time
'	minute(s)
°	degree(s)