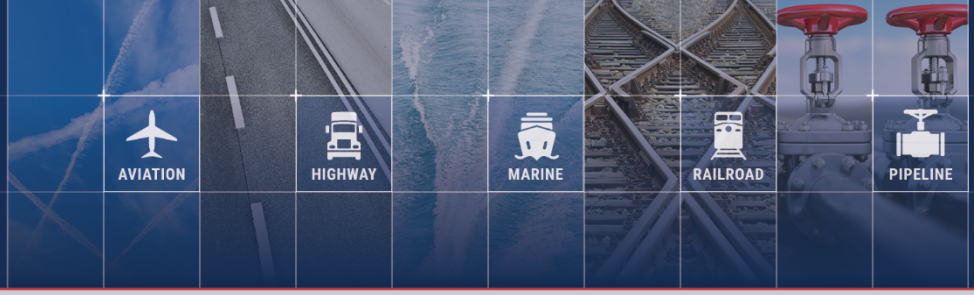

Aviation Investigation Final Report

Location:	DENALI NAT'L PK, Alaska	**Accident Number:**	ANC93FA123
Date & Time:	July 20, 1993, 20:00 Local	**Registration:**	N124KT
Aircraft:	CESSNA A185F	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	4 Serious, 1 Minor
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

THE FLIGHT HAD LANDED AT THE 5,600-FT LEVEL OF RUTH GLACIER FOR A 20 MIN TOURIST STOPOVER. ANOTHER FLIGHT, FLOWN BY A COMPANY SENIOR PILOT, ALSO HAD LANDED. THE SENIOR PILOT NOTICED A FUEL TANK FILLER CAP HANGING LOOSE ON THE ACCIDENT AIRPLANE, AND THE TWO PILOTS MEASURED THE FUEL IN THE TANKS. ONE TANK WAS FOUND EMPTY. THE PILOTS DETERMINED THAT THE AIRPLANE SHOULD BE FLOWN OFF THE GLACIER 'TO VERIFY THE FUEL LEVEL ON THE GAUGES IN LEVEL FLIGHT ATTITUDE, AND THAT IF HE (THE ACCIDENT PILOT) HAD ANY DOUBT ABOUT SUFFICIENT FUEL QUANTITY, TO RETURN (TO THE GLACIER) AND WE'D BRING HIM FUEL.' ABOUT 3 MIN AFTER TAKEOFF THE ENGINE QUIT AND THE FLIGHT MADE A CRASH LANDING AT THE 2,800-FT ELEVATION. THE PASSENGERS STATED THAT THE PILOT TOLD THEM TO 'TIGHTEN (OR FASTEN) YOUR SEATBELTS' DURING THE ENGINE-OUT DESCENT. NO PASSENGER COULD RECALL KNOWING THAT IMPACT WAS IMMINENT. THE RIGHT TANK WAS FOUND EMPTY, AND THE LEFT TANK CONTAINED 2-5 GALS. A PASSENGER STATED THAT THE RIGHT TANK WAS INDICATING EMPTY ON THE TRIP TO THE GLACIER FROM TALKEETNA.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: FUEL EXAUSTION DUE TO THE THE PILOT-IN-COMMAND'S FAILURE TO REFUEL. FACTORS IN THE ACCIDENT WERE: PRESSURE BY MANAGEMENT PERSONNEL AND LACK OF SUITABLE TERRAIN DURING THE FORCED LANDING.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL
Phase of Operation: CRUISE

Findings
1. (C) FLUID,FUEL - EXHAUSTION
2. (C) REFUELING - NOT PERFORMED - PILOT IN COMMAND
3. (F) PRESSURE - COMPANY/OPERATOR MANAGEMENT

Occurrence #2: FORCED LANDING
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Findings
4. (F) TERRAIN CONDITION - NONE SUITABLE
5. PASSENGER BRIEFING - INADEQUATE - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On July 20, 1993, at 2000, Alaska daylight time (ADT) a wheel/ski equipped Cessna A185F airplane, N124KT, operated by James Okonek, d.b.a. K2 Aviation of Talkeetna, Alaska, under 14 CFR Part 135, nonscheduled, experienced a total loss of engine power approximately 3 minutes after takeoff from the 5600 foot elevation of the Ruth Glacier in the Denali National Park. The airplane, with a pilot and 4 passengers, crashed while attempting an emergency landing at the 2800 foot elevation. The flight was being conducted in visual meteorological conditions on a company VFR flight plan. The airline transport pilot and three passengers were seriously injured, and one passenger received back injuries not requiring hospitalization. The airplane was substantially damaged.

Initial notification came during a conference call at 2110 ADT, on July 20, 1993 to the FAA Regional Operations Center (ROC), the NTSB, FAA Flight Standards and the USAF Rescue Coordination Center (RCC), a pilot who identified himself as John Wozencraft, the "senior company pilot," said that he had been on the Ruth Glacier with the accident pilot at approximately 2000 and flown off with other passengers and back to Talkeetna. Mr. Wozencraft said, "I suspect fuel starvation." He said that the accident aircraft was down on the glacier at between 3000 and 3500 feet in elevation and that he had determined that there were injuries among the passengers and that they needed help. He said that he was "real concerned about rescue efforts and that "if help didn't come soon, Brian Okonek said he was going to start up there."

Investigators were told that Brian Okonek was the son of the owner of K2 Aviation and himself a notable mountain climber.

The National Park Service, Alaska Air National Guard and a LifeFlight Helicopter participated in rescue efforts and the five survivors were airlifted to an Anchorage hospital at 2400 ADT. (Refer to witness statements of passengers attached to this report.)

The owner of K2 Aviation was contacted by the NTSB at 0910 ADT, on 7/21/93. He told the NTSB that he had spoken to the pilots of his aircraft who had been on the glacier the night before and did not know, from his discussions, of any problems with the aircraft other than "sudden engine failure." He said that the aircraft had recently had an engine change and that it was "a recently factory overhauled engine." The NTSB asked that the wreckage not be disturbed by any company personnel, as the investigation would include a complete field phase of inquiry. The owner stated that short of hiring a helicopter, no one could reach the scene and that he would comply with the NTSB request.

INJURIES TO PERSONS

The pilot in the left front seat received fractures to his left lower leg and ankle. A passenger occupying the right front passenger seat complained of back injury, was examined and released from the hospital. Both individuals occupying the front seats wore single cross shoulder harnesses and seat belts. Two passengers in the middle seats reportedly received fractures of their pelvic area, and were restrained by seat belts only. The most rear-seated passenger received fractures of her lower leg(s). Those three passengers in the middle and rear of the aircraft were hospitalized for various periods of time.

DAMAGE TO AIRCRAFT

The aircraft was substantially damaged. No preimpact or post impact fire was evident. Refer to wreckage and impact information for details of damage.

PERSONNEL INFORMATION

John Fulton, an Airline Transport Certificated pilot held additional ratings in single engine and multiengine land, single and multiengine sea airplanes. He held a glider rating and an instrument airplane rating. As an airplane instructor, he was certified in single and multiengine craft, instrument, glider and as a ground instructor. He began employment with K2 Aviation on June 10, 1993, having previously worked as flight instructor at the Palo Alto Airport, California.

The NTSB requested flight time records of the pilot at the time of the field phase of the investigation. One year of photocopied log pages were provided by the pilot, indicating a total accumulated flight time of 9761 hours as pilot. Those records indicated that the pilot had flown from Anchorage to Talkeetna to Anchorage in a Piper PA32-300 as well as to the Ruth Glacier landing site and return in the accident airplane, prior to the accident flight. Records beyond that year were reportedly not available in Alaska but, according to the pilot, would be forthcoming.

Subsequently, the pilot left Alaska and returned to California. Efforts by investigators to reestablish contact with the pilot were unsuccessful.

WRECKAGE AND IMPACT INFORMATION

The team examined the wreckage at the 2472 foot level of the Ruth Glacier. A Global Positioning System (GPS) reading of N60-49.27, W150-37.56 was taken. The initial point of touchdown could not be determined on the smooth glacial surface, however the first impact transfer of debris from the right wingtip green navigation light lens was found prior the resting place of the airplane. The Cessna travelled 84 feet from that impact on a heading of 060 degrees magnetic, coming to rest on a heading of 135 degrees magnetic in a area of moraine-broken rock and glacial ice. The left main wheel and tire were found 98.5 feet beyond the wreckage on a 060 degree bearing from the aircraft. Aircraft and debris measurements

utilized the tip of the tail fuselage cone for reference.

The wreckage of the fuselage rested 12 degrees left wing down (measured by bubble protractor on the top of wing spar) and 17 degrees nose up (measured on the chair rails). The cockpit/cabin area was found to be the same size with the exception of a penetration of the left main gear leaf spring into the floor area of the pilot's left foot. Seats were crushed downward and back rests were broken. (See photographs.)

The accident scene had been visited by Mr. Brian Okonek, the son of the K2 Aviation owner. Personal items from the cockpit had been placed in a central location in a sack. A hand-written note was found in the cockpit. It read, "7/21/93 Saw the wreckage from the side of the glacier and came to investigate [sic] found a burlap bag of survival gear. At 3PM. I put it in the door I pray that every one is ok. Brian Okonek."

The setting of switches, controls and readings found by investigators on 7/22/93 were recorded. (See attached Field Note Summary).

The right wing fuel tank was intact and contained no fuel. The left wing fuel tank was intact and contained aviation fuel which investigators measured. (See measurements in TESTS and RESEARCH section.)

Both wheel-skis and leaf struts were broken off of the fuselage attachments. The left ski was found diagonally under the cockpit and the right wheel, strut and ski were found detached and lying under the right aft cabin area. Both wings were bent upward at a point which approximated the top lift strut attachment location. The right wingtip was crushed and the right navigation light was missing. The left wingtip was bent and remained attached to the wing. The tailwheel assembly was crushed upward to a point flush with the fuselage lower surface.

There was deformation and crushing of the bottom and sides of the engine cowl and a separation of the upper engine mounts on the firewall. The propeller showed aft bending, approximating 9 inches rearward from the rotational disk plane.

The engine fuel system was disassembled by investigators at the accident site. No fuel lines forward of the cockpit fuel selector switch were broken (condition of fuel lines and fittings). The left wing tank feed line to the selector valve was severed by the left main gear leaf spring near the left side of the selector valve. No fuel stains were found on the ice below the cockpit, however when the airplane was leveled to measure fuel tank contents, fuel ran freely out of the severed left fuel line for about 15 seconds and stained the ice below the cockpit.

Some fuel lines contained air and some fuel lines contained amounts of aviation fuel. The mixture return line from the fuel pump contained 1/4 spoonful of fuel. The main input line between the gascolator and the fuel pump was empty of fuel. The gascolator contained one third aviation fuel and two thirds air. A small amount of glacial silt was attached to the outside

surface of the bowl, however no debris was found inside the bowl. The vapor return line from the fuel pump was empty of fuel. The line between the fuel pump and the fuel control was full of fuel.

(See powerplant on-site inspection and tear-down report attached.)

TESTS AND RESEARCH

The engine, in essentially the same condition as was found at the site, was tested in the Teledyne Continental Motors test cell in the presence of NTSB and FAA investigators. The engine was connected to fuel and ignition sources and started without hesitation. During a period of ten minutes, until shutdown, it performed normally throughout a full range of RPM and power settings. (See Continental Teledyne Motors inspection report.)

Utilizing the "Fuelhawk" dipstick found in the aircraft, investigators measured, when the aircraft was 17 degrees (seat rail measurement) nose up and wings level, the fuel quantity in both tanks. The right tank was dry upon visual examination. The left tank was measured to have between two and five gallons of fuel. (See report of Cessna investigator Brian F. Finnegan, attached.)

The on-site fuel quantity measurements were replicated in controlled tests by using water and hoisting the wreckage to its post-impact attitude. Measurements of fuel remaining in the left tank were confirmed to be between two and five gallons.

ADDITIONAL INFORMATION

The aircraft was photographed by the passengers in the position it occupied on the snow field of the mountain. The photographs showed that N124KT wings were essentially horizontal, and not leaning or canted as indicated in interviews with John Fulton or John Wozencraft. (Refer to photograph of N124KT on snowfield.)

A photograph taken by a passenger "shortly after takeoff from the glacier" showed the airplane's fuel gauges to be below empty right and between a quarter and an eighth left. The passengers said that the attitude of the airplane was straight and level until the engine sound stopped. The engine reportedly lost power between 3 to 5 minutes after the photo was taken. Passengers told investigators that the pilot made a steep turn and said, "tighten (or fasten) your seatbelts," during the engine-out descent to the glacier crash landing. No passenger could recall knowing that impact was imminent.

The NTSB investigative team, which included representatives from the FAA, National Park Service, the Cessna and Continental Teledyne companies, met briefly with the owner of K2 Aviation at his Talkeetna airport office on July 22, 1993, at 1330. The owner of K2 told the NTSB that he had "no idea" what could have caused the engine to have lost power. The team proceeded to the wreckage site.

Following the return from the accident site, the NTSB investigative team met with the accident pilot. The pilot told investigators that he "had plenty of fuel, about 20 gallons per side", and had said "it was a normal flight" to the 5600 foot elevation of the glacier stopover, and that there was nothing unusual found during the 20 minute stay with the 4 tourist passengers. He said that the tanks were "2/3 indication" or "it could have been 3 quarters," adding that the right tank was a quarter to an eighth full. That interview was tape recorded, and the transcript is attached to this report.

Following the interview, Mr. Okonek was interviewed. He said that his son Brian "had just been climbing and come upon the crash." He told the NTSB that his son did not know the crash had occurred, prior to him seeing the accident airplane on the glacier. Mr. Okonek also told the NTSB that he did not know of any anomalies that could have affected the flight or contributed to the accident.

On July 22, 1993 an unidentified individual contacted the FAA Flight Standards District Office in Anchorage and told inspectors that a number of people at K2 aviation were discussing "a loose fuel cap on the accident airplane prior to the accident."

On July 23, 1993, the NTSB contacted Mr. Okonek. He said that he had known about the loose cap but that he did not mention it to the NTSB upon arrival at Talkeetna, "because I thought you would ask the pilot." (Fulton) Mr. Okonek was asked if he had discussed the NTSB interview with Mr. Fulton after the investigators' departure, and he answered in the affirmative. Mr. Okonek was asked if he had questioned the pilot as to the revelation of a loose gas tank cap. He said that he had, but learned that the investigators had not asked that question. The NTSB requested a written statement from the pilots who were present on the glacier landing area at the time the gas cap was found to be loose. The written statements are attached.

Mr. John Wozencraft identified himself as a company "senior pilot" and told investigators on July 23, 1993, that he had noticed a fuel tank filler cap hanging loose on the accident airplane at the glacier stopover, and with the accident pilot, he had measured the fuel in the tanks, because he did not believe the gauges. The senior pilot stated that one tank was found empty but that he and the accident pilot determined that the airplane should be flown off the glacier "to verify the fuel level on the gauges in level flight attitude, and that if he (the accident pilot) had any doubt about sufficient fuel quantity, to return (to the glacier) and we'd bring him fuel."

In an interview with the passenger who had flown in the right front passenger seat on the flight leg from Talkeetna to the glacier, investigators were told that the right tank was indicating empty on that leg of the trip. Refer to the statement of Rona V. Miller, attached.

The aircraft and the engine were released to K2 Aviation following the investigation.

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	29,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine sea	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Glider; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	September 14, 1993
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	9765 hours (Total, all aircraft), 127 hours (Total, this make and model), 9729 hours (Pilot In Command, all aircraft), 125 hours (Last 90 days, all aircraft), 81 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	**Registration:**	N124KT
Model/Series:	A185F A185F	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	18503765
Landing Gear Type:	Ski/wheel	**Seats:**	5
Date/Type of Last Inspection:	July 2, 1993 Annual	**Certified Max Gross Wt.:**	3350 lbs
Time Since Last Inspection:	76 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4408 Hrs	**Engine Manufacturer:**	CONTINENTAL
ELT:	Installed, activated, aided in locating accident	**Engine Model/Series:**	IO-520-D30B
Registered Owner:	JAMES F & JULIE OKONEK	**Rated Power:**	300 Horsepower
Operator:	JAMES OKONEK	**Operating Certificate(s) Held:**	On-demand air taxi (135)
Operator Does Business As:	K2 AVIATION	**Operator Designator Code:**	EPZC

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:		**Distance from Accident Site:**	
Observation Time:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Scattered / 20000 ft AGL	**Visibility**	50 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	340°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:		**Temperature/Dew Point:**	4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	RUTH GLACIER	**Type of Flight Plan Filed:**	Company VFR
Destination:	TALKEETNA (TKA)	**Type of Clearance:**	None
Departure Time:	20:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Serious, 1 Minor	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	4 Serious, 1 Minor	**Latitude, Longitude:**	63.779182,-148.519592(est)

Administrative Information

Investigator In Charge (IIC):	Herlihy, Douglas
Additional Participating Persons:	HARRY R SMITH; ANCHORAGE , AK JAMES D SWED; TALKEETNA , AK BRIAN F FINNEGAN; WICHITA , KS SCOTT BOYLE; ARVADA , CO
Original Publish Date:	August 18, 1994
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=2308