National Transportation Safety Board
Aviation Accident Final Report

Location:	Lapine, AL	**Accident Number:**	ERA18LA073
Date & Time:	01/27/2018, 1140 CST	**Registration:**	N900L
Aircraft:	AERO COMMANDER 680 F	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The commercial pilot reported that he had recently purchased the airplane and that he had completed two full-stop takeoffs and landings. Just as he began to rotate the airplane during a third takeoff, the left engine lost all power, and the airplane veered left and struck trees, which resulted in substantial damage to both wings and the fuselage.

Postaccident examination of the airplane revealed that both fuel selectors were set to the "center" tank position. Examination of the left engine and its accessories revealed no evidence of any preaccident mechanical malfunctions or failures that would have precluded normal operation. When power was applied to the left engine's electric boost pump, it was not operational. Fluid that smelled like automotive gasoline and a small amount of water were drained from the fuel line between the electric boost pump and the fuel controller. Additionally, a dark-colored fluid that smelled like automotive gasoline was drained from the fuel strainer bowl located between the electric boost pump and the fuel controller.

The airplane had not been flown for about 13 years before the pilot bought it. Two days before the accident, a mechanic completed an annual inspection of the airplane. The previous owner reported that he told the mechanic that the left engine fuel controller had been malfunctioning, that the boost pump had to remain on until the engine warmed up, and that he believed that the fuel controller needed to be overhauled or replaced. A review of the airplane's maintenance logbooks revealed that there were no entries indicating which tasks were performed during the inspection, including whether the fuel lines had been flushed. A review of the left and right engines' logbooks revealed entries in both that stated, "checked fuel injectors and inspected fuel system." No entries were found indicating that any fuel system components were replaced.

The mechanic reported that he added 100LL aviation gasoline to the center and auxiliary fuel tanks before the flight, and the previous owner said that he observed the mechanic sump "a great deal of fuel" before the flight. Both the mechanic and the pilot said that they ran the engines after the annual inspection and conducted several high-speed taxi checks, and they noted no anomalies. The pilot also said he flew the airplane for 30 minutes the day before the

accident; however, this contradicted the time noted on the hour meter between the time that the annual inspection was completed and the time of the accident, which was about 0.2 hour (or 10 to 15 minutes).

Although fresh fuel was added to the center fuel tank, given that no entries were found in the maintenance logbooks indicating that the fuel lines had been flushed or that any fuel components had been replaced when the airplane was inspected and that contaminated fuel was found in the fuel lines going to the left engine, the loss of engine power was likely due to contaminated fuel.

Although the pilot held a commercial pilot certificate with a multiengine land rating, he had not flown in the airplane make and model in about 25 years. He also said that he did not use the checklist for an engine failure during takeoff and that he was not provided a checklist when he purchased the airplane.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's failure to maintain directional control during takeoff after a total loss of left engine power due to fuel contamination, which resulted in impact with trees. Contributing to the accident were the mechanic's failure to properly flush the fuel system during the annual inspection.

Findings

Aircraft	Fuel - Fluid condition (Cause)
	Directional control - Not attained/maintained (Cause)
	Scheduled maint checks - Incorrect service/maintenance (Factor)
Personnel issues	Aircraft control - Pilot (Cause)
	Scheduled/routine inspection - Maintenance personnel (Factor)
	Recent experience - Pilot

Factual Information

On January 27, 2018, about 1140 central standard time, an Aero Commander 680F, N900L, was substantially damaged on takeoff from the T.W. Spear Memorial Airport (4AL9), Lapine, Alabama. The commercial pilot was not injured. The airplane was registered to and operated by the pilot. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight that was conducted under the provisions of 14 *Code of Federal Regulations* Part 91. The flight was originating from 4AL9 at the time of the accident.

The pilot stated that he had just recently purchased the airplane and had just completed two takeoffs and landings to a full stop and was taking off on runway 4 for a third time when the accident occurred. The pilot said that as he started to rotate, he lost power on the left engine, and the airplane veered to the left and struck trees damaging both wings and the fuselage. The airplane came to rest in a swamp adjacent to the runway. The pilot said the left engine was not running and he had to shut down the right engine before exiting the airplane.

The previous owner stated that the airplane had not been flown since 2005 or 2006. He had just sold the airplane to the pilot, and a mechanic (hired by the pilot) completed and signed-off on an annual inspection two days before the accident on January 25, 2018. The previous owner told the mechanic that the left engine fuel controller had been malfunctioning and the boost pump had to remain on until the engine warmed-up. He believed that controller needed to be overhauled or replaced. A review of the maintenance logbooks found no entry regarding the inspection or flush of the airplane's fuel system. However, there was an entry in both the left and right engine logbooks that stated, "checked fuel injector and inspected fuel system" but no fuel components were replaced.

Both the mechanic and the pilot said they ran the engines after the annual inspection and did several high-speed taxi checks and all was normal. The pilot also said he flew the airplane for 30 minutes the day before the accident with no discrepancies noted.

At the time of the annual inspection, the airframe had 3,562.5 total flight hours, the left engine had 42.2 hours, and the right engine had 466.7 hours. According to the airplane's hour meter, when the accident occurred, the airplane had accrued .2 hours (about 10-15 minutes) since the annual inspection.

The mechanic stated that he purchased 100LL fuel at a nearby airport and placed about 100 gallons in the airplane's center tank and about 5 gallons in the auxiliary tanks to make sure they weren't leaking. The previous owner said he observed the mechanic sump "a great deal of fuel" prior to the flight. According to the company that recovered the airplane, about 135 gallons of 100LL blue aviation fuel was recovered from the center tank. The fuel was absent of debris and water.

In a postaccident examination, the left engine crankshaft was rotated via manual rotation of the propeller and valve train and compression were established on each cylinder. The right magneto sparked at all ignition leads. The left magneto was removed and the leads were cut at each terminal. A power drill was used to spin the magneto and spark was observed at each

terminal. The spark plugs were removed and were gray in color and exhibited normal wear as per the Champion Check-A-Plug chart. No mechanical deficiencies were observed that would have precluded normal operation of the engine at the time of the accident.

The fuel selectors for both engines were found in the "center" tank position. Examination of the electric boost pump revealed it and the area around the pump was dirty and littered with mud-daubers. When power was applied to the pump, it did not operate. The main fuel line from the electric boost pump to the fuel controller was disassembled and shop air was blown thru the line. Fuel from the line was captured in a mason jar and was a yellowish color. The fuel smelled like auto-gas and small bubbles of water were observed. The fuel strainer that was installed between the electric boost pump and the fuel controller was removed. The screen was absent of debris. A plastic syringe was used to drain the fuel from the strainer-bowl. The fuel was black in appearance and smelled like auto gas.

The pilot held a commercial pilot certificate with ratings for airplane single-engine and multiengine land, and instrument airplane. He also held a flight instructor certificate and had a type-rating for a Douglas DC-3 airplane. The pilot's last Federal Aviation Administration (FAA) third-class medical was issued on January 20, 2017. At that time, he reported a total of 3,000 flight hours. The pilot told an FAA inspector that he had accumulated about 15-20 hours in an Aero Commander, but that was about 25 years prior to the accident.

According to the airplane's flight manual emergency procedures section, the procedure for an engine failure on takeoff at speeds over 105 MPH (91 knots) is:

A. Push prop controls FULL FORWARD.

B. Throttles 48" Hg.

C. Landing gear UP

D. Flaps UP slowly

E. Maintain heading and airspeed (105 - 115 MPH desired) (91-100 knots).

F. Fully determine inoperative engine.

G Feather prop on inoperative engine.

H. Close mixture on inoperative engine.

I. Reduce power on operating engine to rated HP (320) 45" - 3200 RPM

J. Ignition switch Off, Fuel Off, Generator Off on inoperative engine

K. Booster pump ON

L. Trim aircraft as required.

The pilot said that he did not use a checklist during the flight and that a checklist was not provided with the airplane when he purchased it.

Weather at the Mac Crenshaw Memorial Airport (PRN), Greenville, Alabama, about 21 miles north, at 1156, was reported as wind from 110° at 11 knots, visibility 10 miles, overcast clouds at 10,000 ft, temperature 16°, dewpoint 11°, altimeter setting 30.34 inches of mercury.

History of Flight

Prior to flight	Aircraft inspection event Fuel contamination
Takeoff	Loss of engine power (total) (Defining event) Loss of control on ground Collision with terr/obj (non-CFIT)

Pilot Information

Certificate:	Flight Instructor; Commercial	**Age:**	70, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	No
Medical Certification:	Class 3 With Waivers/Limitations	**Last FAA Medical Exam:**	01/30/2017
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	01/31/2017
Flight Time:	3000 hours (Total, all aircraft), 20 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	AERO COMMANDER	**Registration:**	N900L
Model/Series:	680 F F	**Aircraft Category:**	Airplane
Year of Manufacture:	1963	**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	680F-1341-136
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	01/25/2018, Annual	**Certified Max Gross Wt.:**	8093 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	3562.7 Hours at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Not installed	**Engine Model/Series:**	IGSO-540B1A
Registered Owner:	Arkansas Round Engine	**Rated Power:**	380
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	PRN, 451 ft msl	**Distance from Accident Site:**	21 Nautical Miles
Observation Time:	1156 CST	**Direction from Accident Site:**	360°
Lowest Cloud Condition:		**Visibility**	10 Miles
Lowest Ceiling:	Overcast / 10000 ft agl	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	110°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.34 inches Hg	**Temperature/Dew Point:**	16°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lapine, AL (4AL9)	**Type of Flight Plan Filed:**	VFR
Destination:	Lapine, AL (4AL9)	**Type of Clearance:**	None
Departure Time:	1140 CST	**Type of Airspace:**	Class G

Airport Information

Airport:	T W SPEAR MEMORIAL (4AL9)	**Runway Surface Type:**	Asphalt
Airport Elevation:	438 ft	**Runway Surface Condition:**	Dry
Runway Used:	04	**IFR Approach:**	None
Runway Length/Width:	2909 ft / 30 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	31.000000, -86.000000 (est)

Administrative Information

Investigator In Charge (IIC):	Leah D Read	**Report Date:**	04/20/2020
Additional Participating Persons:	Nina McBride; FAA/FSDO; Montgomery, AL		
Publish Date:	04/20/2020		
Note:	The NTSB did not travel to the scene of this accident.		
Investigation Docket:	http://dms.ntsb.gov/pubdms/search/dockList.cfm?mKey=96669		