Aviation Investigation Final Report

Location:	Worland, Wyoming	**Accident Number:**	CEN17LA356
Date & Time:	September 12, 2017, 16:30 Local	**Registration:**	N1835R
Aircraft:	Cessna R182	**Aircraft Damage:**	Substantial
Defining Event:	Fuel exhaustion	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Aerial observation		

Analysis

The commercial pilot reported that, about halfway through the planned pipeline surveillance flight, the engine experienced a total loss of power and he performed a forced landing to a dirt road. A postaccident examination revealed that both fuel tanks appeared to be empty; the left wing fuel tank cap seal appeared to be worn, and the left wing exhibited fuel staining aft of the fuel cap, consistent with fuel siphoning from the tank in flight.

The airplane was fueled the preceding night, and the pilot had assumed the fuel tanks were full upon departing on the first flight of the day. The airplane was flown 2.7 hours on the morning of the accident before it was refueled. The pilot did not recall visually confirming the fuel level following that refueling. An additional 4.1 hours of flight time elapsed from the time the airplane was refueled until the accident. According to the pilot, the airplane's fuel gauges were unreliable. To compensate, he had adopted the practice of completely filling the fuel tanks during each refueling, tracking the intervening flight time, and calculating fuel burn based on the airplane's average fuel consumption rate. Two days before the accident, an individual refueling the airplane informed him that the left fuel cap seal was torn. A new fuel cap seal had not yet been installed.

Although the amount of fuel lost through the cap could not be quantified, the unreliable fuel gauges did not allow the pilot to monitor either the normal fuel consumption nor alert him to the potentially abnormal rate of consumption due to the siphoning fuel. In addition, the pilot failed to verify the amount of fuel onboard before departure, which further rendered his method of tracking fuel consumption inaccurate.

Probable Cause and Findings

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

The pilot's decision to operate an airplane with unreliable fuel gauges and the worn fuel cap seal that allowed fuel to siphon from the left wing fuel tank, which ultimately resulted in a total loss of engine power due to fuel exhaustion.

Findings

Personnel issues	Decision making/judgment - Pilot
Personnel issues	Preflight inspection - Pilot
Aircraft	Fuel quantity indicator - Inoperative
Aircraft	Fuel storage - Damaged/degraded
Aircraft	Fuel - Fluid level

Factual Information

History of Flight

Enroute-cruise	Fuel exhaustion (Defining event)
Emergency descent	Off-field or emergency landing

On September 12, 2017, about 1630 mountain daylight time, a Cessna R182 airplane, N1835R, was substantially damaged during a forced landing following a loss of engine power near Worland, Wyoming. The pilot was not injured. The airplane was registered to and operated by Meridian Flying Service as a 14 Code of Federal Regulations Part 91 aerial observation flight. Visual meteorological conditions prevailed. The flight was not operated on a flight plan. The flight originated from the Sloulin Field International Airport (ISN), Williston, North Dakota and was destined for the Worland Municipal Airport (WRL), Worland, Wyoming.

On the day of the accident, the pilot intended to continue a pipeline surveillance patrol that began the previous day. The initial flight of the day was from the Sidney-Richland Regional Airport (SDY) to ISN to pick-up a passenger. After departing from ISN, two sections of the pipeline system near ISN were observed and then the flight proceeded to the Stanley Municipal Airport (08D) to obtain fuel. After fueling, the pilot departed for ISN to drop off the passenger. After departing ISN again, he planned to fly directly to the next pipeline system near WRL. However, smoke from forest fires prevented a direct flight as planned. He deviated as required, ultimately arriving at the start of the pipeline patrol route.

About 1620, approximately halfway through the patrol, the engine lost power. The pilot turned toward a road in the area in preparation for a forced landing. The engine regained power momentarily, but it quit again. He turned toward a highway and during that time the engine regained power and quit three or four more times. He recalled thinking that plenty of fuel should have been onboard as he attempted to determine the source of the problem. When he was unsuccessful restoring engine power, he setup for a forced landing to a dirt road. To clear a set of power lines, he "stretched" the glide causing the airspeed to decay and the airplane began to stall. He ultimately executed a forced landing to the dirt road with the landing gear retracted.

The pilot noted that the airplane fuel gauges were unreliable. Attempts to repair the gauges in the months before the accident were not successful and replacement of the entire gauge cluster was required; however, the airplane owner reportedly did not have the financial resources to complete the work. To compensate, the pilot had adopted the practice of completely filling the fuel tanks during each refueling and tracking the intervening flight time. Two days before the accident an individual refueling the airplane informed the pilot that the left fuel cap seal was torn. The pilot was in the process of obtaining a new fuel cap seal but had not been able to have one installed.

The pilot stated that the airplane was fueled at SDY the preceding night. He assumed that the fuel tanks were full upon his departure from SDY the morning of the accident. The airplane fuel capacity was 75 gallons useable. When the airplane was subsequently fueled at 08D, the self-service fuel pump required prior input of the desired amount of fuel. As a result, he decided to dispense 40 gallons based on the

anticipated burn that morning. However, he did not recall visually confirming the fuel level. The pilot reported that the flight time from SDY until refueling at 08D was 2.7 hours. An additional, 4.1 hours elapsed from the time the airplane was refueled at 08D until the accident.

A Federal Aviation Administration inspector reported that the airplane sustained firewall and fuselage damage. The upper surface of the left wing exhibited fuel staining aft of the fuel cap. The upper surface of the right wing was clean. The left and right fuel tanks appeared to be empty; no fuel was present when the sump drains were opened. The left fuel cap seal was worn; the right fuel cap seal appeared to be intact. The fuel selector was set to both tanks at the time of the examination. No other anomalies consistent with a preimpact failure or malfunction were observed.

FAA regulations (14 CFR 91.205) required an operable fuel gauge indicating the quantity of fuel in each tank for any powered civil aircraft with a standard category airworthiness certificate.

Pilot Information

Certificate:	Commercial	**Age:**	57,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	October 11, 2016
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 30, 2017
Flight Time:	2067 hours (Total, all aircraft), 661 hours (Total, this make and model), 1957 hours (Pilot In Command, all aircraft), 138 hours (Last 90 days, all aircraft), 61 hours (Last 30 days, all aircraft), 12 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N1835R
Model/Series:	R182	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	R18200576
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	September 1, 2017 Annual	**Certified Max Gross Wt.:**	3100 lbs
Time Since Last Inspection:	24 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2083.4 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-540-J3C5D
Registered Owner:		**Rated Power:**	235 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	WRL,4252 ft msl	**Distance from Accident Site:**	12 Nautical Miles
Observation Time:	15:53 Local	**Direction from Accident Site:**	270°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.94 inches Hg	**Temperature/Dew Point:**	33°C / 4°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Williston, ND (ISN)	**Type of Flight Plan Filed:**	None
Destination:	Worland, WY (WRL)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class G

Airport Information

Airport:	Worland Municipal WRL	**Runway Surface Type:**	Dirt
Airport Elevation:	4252 ft msl	**Runway Surface Condition:**	Dry;Rough
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	43.962776,-107.950553(est)

Administrative Information

Investigator In Charge (IIC):	Sorensen, Timothy
Additional Participating Persons:	Bruce J Hanson; FAA Flight Standards; Casper, WY
Original Publish Date:	July 5, 2018
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=96026