



Rolls-Royce

Engine Investigation Report



**Allison Model250-C20B
Engine CAE 822745**

**Bell 206B3
Registration: N240SJ**

**Casey Lehman
Air Safety Investigator**

**Samaritan Air Inc.
Wahoo, NE**

**Accident date: 26 July, 2014
Investigation date: 5 August, 2014
Report date: 15 January, 2015**

Background

On July 26, 2014, approximately 1:35 PM local time, a Bell 206B3 helicopter, N240SJ, was involved in an accident near Wahoo, Nebraska. The helicopter was registered to Samaritan Air Inc. The weather conditions were reported to be VFR. At the time of the accident the helicopter was conducting an aerial application flight of a cornfield when the engine reportedly lost power. The pilot stated that prior to the accident he had placed 25 gallons of fuel into the helicopter. He then departed and began spraying the cornfield. Approximately 12-15 minutes into the flight the engine lost power. The pilot entered an auto rotation to a soybean field directly in front of him. After landing the helicopter slid 10-15 feet prior to striking a berm. The tailboom struck the ground and separated from the helicopter.

Wreckage and Engine Examination

The author of this report did not go on scene of the event. The Aircraft wreckage was transported by trailer to Agriculture Air Services in Ashland, Nebraska for examination. On 28 July, 2014 prior to the official examination the pilot took fuel samples from his mobile fuel supply tank and the airframe fuel filter. According to the pilot both fuel samples displayed signs of heavy contamination. On 5 August, 2014 investigators from the FAA, Bell Helicopters, and Roll-Royce conducted an examination of the helicopter, engine, and fuel supply. Also present for the examination was the accident pilot and a mechanic. The below observations were noted during the examination.

Fuel Storage Examination:

During the examination a large fuel sample was taken from the stationary main fuel supply tank. The fuel from the supply tank was dark brown in color with contaminants settling to the bottom of the container over time. The fuel samples taken prior to the examination were confirmed to contain contamination as previously stated by the pilot. Contamination could also be seen settled at the bottom of the aircraft fuel tank as viewed through the fuel supply port.

Engine Examination:

The engine remained securely mounted in the helicopter engine compartment. The engine was intact and did not display any signs of external damage. All engine mounts remained attached to both the engine and helicopter. The rigging was connected to both the fuel control throttle input lever and power turbine governor throttle lever. Both connections were free of binding and had full travel when moved with the throttle and collective pitch lever. The N2 drive train was free and continuous from the 4th stage turbine wheel to the tail and main rotor drive shafts. All engine external fuel and oil lines, along with their associated fittings, were secure when checked by hand with no cracks noted. All engine pneumatic lines were normal in appearance with "B" nuts and connectors at least finger tight. The engine fuel line between the check valve and fuel nozzle was removed from the fuel nozzle and a normal amount residual fuel drained out. The engine was motored and fuel flowed from the fuel manifold line as normal. The compressor also rotated freely with no unusual noise. The engine fuel filter bowl and filter were removed. The filter was normal in appearance, however remaining fuel in the filter bowl displayed contamination. The fuel nozzle was removed and disassembled. The fuel nozzle screen was completely covered with a hardened dark brown substance. The fuel nozzle was otherwise undamaged. No further examination of the engine was deemed necessary by the NTSB IIC.

Engine Information

Engine Model	Allison 250-C20B
Rating:	420 HP
Serial Number	CAE822745
Engine Total Hours	Unknown
Last 150-Hour Inspection	Unknown
Last 300-Hour inspection	Unknown

Engine Records

Component	Serial Number	Part Number	TSO	Total Time
Engine	CAE822745	6887190	UNK	UNK
Gearbox	CAG31236	6894171	UNK	UNK
Compressor	CAC37119	6890550	UNK	UNK
Turbine	CAT20258	23038241	UNK	UNK
Fuel Control	303946	23070606	UNK	UNK
PTG	28135	23065121	UNK	UNK
Fuel Pump	T2022	6899253	UNK	UNK
Fuel Nozzle	AG39951	23077068	UNK	UNK
Bleed Valve	FF45247	23053176	UNK	UNK

Engine records and component times were not provided during the investigation.

Summary of Findings

Fuel contamination was found within the fuel storage/supply tanks and throughout the aircraft and engine fuel system. The amount of contamination observed throughout the aircraft and engine systems could have resulted in the reported loss of power. Other than the fuel contamination the engine did not reveal any damage or anomalies which would have prevented it from operating normally. Based on the fuel contamination present within the storage tanks and aircraft fuel system the NTSB IIC deemed it unnecessary to conduct further examination of the engine.



Aircraft at Recovery



Aircraft at Recovery



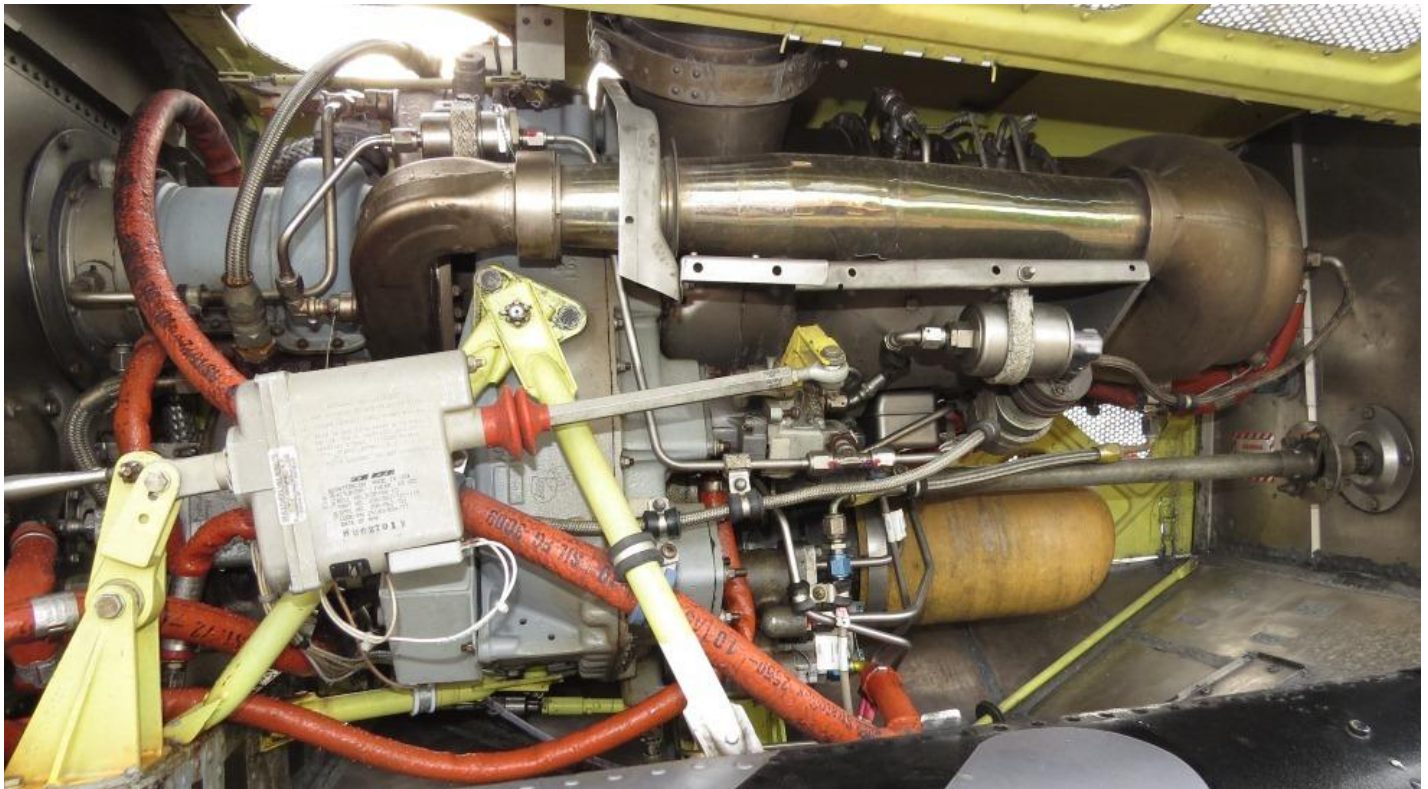
Fuel Sample from Mobile Fuel Supply Tank Filter Bowl



Fuel Sample from Aircraft Fuel Filter Bowl



Fuel Sample from Main Fuel Supply Tank Filter Bowl



Engine as Installed – Left Hand Side



Engine as Installed – Right Hand Side



Engine Fuel Filter Bowl



Engine Fuel Filter Bowl



Engine Fuel Spray Nozzle Screen