National Transportation Safety Board
Aviation Incident Data Summary

Location:	Peach Springs, AZ	**Incident Number:**	WPR09IA140
Date & Time:	03/03/2009, 1045 MST	**Registration:**	N197AE
Aircraft:	EUROCOPTER AS 350 B2	**Injuries:**	7 None
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled - Sightseeing		

Analysis
The pilot heard a loud pop while descending into a canyon and had a loss of main rotor rpm. The pilot entered an autorotation to an open area and landed successfully. Examination of the engine revealed that it was intact and exhibited minimal impact related damage. Disassembly of the engine revealed that the rear bearing support housing was intact and undamaged. The number three bearing was intact, however, did not rotate freely. The inner race and ball bearings exhibited heavy rub marks and thermal damage and the outer race exhibited thermal damage. No oil residue was observed on the bearing components. The damage to the number three bearing was consistent with oil starvation. Debris was observed within the oil scavenge passage of the rear bearing support housing near the oil feed ring assembly. The rear bearing support housing (RBSH) was removed and placed on a flow test bench. The RBSH assembly flowed approximately one-half of the normal oil flow rate and irregular flow patterns were observed. Examination of the RBSH revealed no significant damage; however, the oil passages that feed oil to the number three bearing assembly contained deposits that most likely obstructed oil flow to the bearing. Analysis of the deposited material found that it was composed of coked synthetic oil. Prior to the incident, the engine manufacturer issued an Operating Information Letter that outlined recommended engine shutdown procedures. The two-step process consisted of a two minute idle period prior to shutdown followed after shutdown by motoring the engine with the starter motor for 10 seconds. The Operating Information Letter indicated that not following the procedures could result in coke build up in the number 2 and number 3 bearing oil jets and sump area. The operator reported that company pilots were instructed to comply with the recommended engine idle cool down procedure; however, company policy did not direct pilots to comply with the recommended post shutdown motoring after engine shutdown procedure due to concerns about depletion of oil in the engine oil reservoir. It was not determined if the bearing failure was a direct result of the operator not complying with the complete recommended shutdown procedure outlined by the engine manufacturer.

Flight Events
Enroute-descent - Powerplant sys/comp malf/fail
Enroute-descent - Loss of engine power (total)
Emergency descent - Off-field or emergency landing

Probable Cause
The National Transportation Safety Board determines the probable cause(s) of this incident to be:
A loss of engine power due to the failure of the number three engine bearing as a result of oil starvation due to coked oil obstructing the oil passages.

Findings
Aircraft-Aircraft power plant-Engine (turbine/turboprop)-(general)-Failure - C

Pilot Information

Certificate:	Flight Instructor; Commercial	**Age:**	27
Airplane Rating(s):	Single-engine Land	**Instrument Rating(s):**	Airplane; Helicopter
Other Aircraft Rating(s):	Helicopter	**Instructor Rating(s):**	Helicopter; Instrument Helicopter
Flight Time:	1968 hours (Total, all aircraft), 503 hours (Total, this make and model), 1078 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	EUROCOPTER	**Registration:**	N197AE
Model/Series:	AS 350 B2	**Engines:**	1 Turbo Shaft
Operator:	Papillon Airways	**Engine Manufacturer:**	Honeywell
Air Carrier Operating Certificate:	On-demand Air Taxi (135)	**Engine Model/Series:**	LTS 101
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled - Sightseeing		

Meteorological Information and Flight Plan

Observation Facility, Elevation:	LAS	**Weather Information Source:**	Pilot
Conditions at Accident Site:	Visual Conditions	**Lowest Ceiling:**	Broken / 16000 ft agl
Condition of Light:	Day	**Wind Speed/Gusts, Direction:**	Calm
Temperature:	17°C / 5°C	**Visibility**	10 Miles
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Boulder City, NV (61B)	**Destination:**	Grand Canyon, AZ

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Minor
Passenger Injuries:	6 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None

Administrative Information

Investigator In Charge (IIC):	Dennis J Hogenson	**Adopted Date:**	07/22/2010
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		

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