National Transportation Safety Board
Aviation Accident Final Report

Location:	ORLAND, CA	**Accident Number:**	LAX99LA188
Date & Time:	05/21/1999, 1725 PDT	**Registration:**	N8153Q
Aircraft:	Cessna 414	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General Aviation - Positioning		

Analysis

The pilot refueled the auxiliary tanks of the airplane at a different airport 1 month prior to the accident, and had not flown on the auxiliary tanks since that time. He was repositioning the airplane back to home base after a series of revenue flights when the accident occurred. About 20 minutes after takeoff he positioned the left and right engines to their respective auxiliary fuel tanks, and then returned to the mains 30 minutes later. The right engine began to surge and subsequently stopped running. Turning on the fuel boost pump restarted the engine. Five minutes later the engine quit and he secured it after unsuccessful restart attempts. Then the left engine began to surge and was developing only partial power. He diverted to an alternate airport with decaying altitude and power in the remaining engine. Crossing the airport, he saw he was too high to land with a tailwind so he circled to land into the wind. On the base leg he made the decision to land straight ahead in a field due to power lines in his path, rapidly decaying altitude, and power. During the landing roll, the airplane collided with a ditch. The left and right main fuel filters contained a foreign substance, which upon laboratory examination, was found to be a polyacrylamide. This is a manmade synthetic polymer that is used as an agricultural soil amendment that aids in reducing soil erosion. Distribution of the polymer is typically not done by aircraft. Inspection of the fueling facility revealed that the employees who do refueling did not have any formal or on-the-job training. There was no record that the delivery system filters had been examined or changed. The maintenance to the truck, delivery system, and storage facility are done by the employees on an as needed, time permitted basis. The fuel truck was found to be improperly labeled, and the fuel nozzle was lying in a compartment amid dirt, gravel, and other contaminates with no caps or covers for protection.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A loss of engine power in both engines due to fuel contamination, which resulted from the fueling facilities improper quality control procedures.

Findings

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

Findings
1. 1 ENGINE - LOSS,TOTAL
2. 1 ENGINE - LOSS,PARTIAL
3. (C) FLUID,FUEL - CONTAMINATION,OTHER THAN WATER
4. (C) EQUIPMENT,OTHER - NOT MAINTAINED - AIRPORT PERSONNEL
5. (C) INADEQUATE QUALITY CONTROL - AIRPORT PERSONNEL

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: LANDING - ROLL

Findings
6. TERRAIN CONDITION - DITCH

Occurrence #4: GEAR COLLAPSED
Phase of Operation: LANDING - ROLL

Findings
7. LANDING GEAR,NOSE GEAR - OVERLOAD
8. LANDING GEAR,MAIN GEAR - OVERLOAD

Factual Information

On May 21, 1999, at 1725 hours Pacific daylight time, a Cessna 414, N8153Q, made a forced landing in an open field due to the complete loss of power in one engine and the partial loss of power in the other engine near the Orland, California, airport. During the landing rollout, the airplane collided with a ditch. The airplane, operated by The Hangar, Inc., of Redding, California, under 14 CFR Part 91 as a positioning flight, sustained substantial damage. The airline transport pilot/owner, the sole occupant, received minor injuries. Visual meteorological conditions existed for the flight and no flight plan was filed. The flight originated from the Redding airport at 0800, flew several revenue segments to various airports, and had departed from San Jose, California, at 1600 for the positioning flight return to Redding.

The pilot stated that on the morning of the accident he departed from Redding and flew to San Jose. He refueled the airplane, and picked up passengers for a revenue flight under 14 CFR Part 135. He flew the passengers to a meeting at the Paradise Skypark Airport, Paradise, California, and then flew them back to San Jose. He stated that he was repositioning from San Jose to Redding when the airplane experienced engine problems.

Approximately 20 minutes after departing San Jose, he switched the right engine to the right auxiliary fuel tank, and 5 minutes later switched the left engine to the left auxiliary fuel tank. About 30 minutes later, he switched the right engine back to the right main at the "first sign that it [the right auxiliary fuel tank] was dry." Five minutes later, he returned the left engine to the left main from the left auxiliary fuel tank. He reported that he was approaching Orland airport when the right engine began to surge and subsequently stopped running. He turned on the right auxiliary fuel boost pump and the engine restarted. It ran for another 5 minutes and then stopped again. He reported that attempts to troubleshoot the problem were unsuccessful, so he secured the engine and feathered it. Simultaneous to the feathering of the right engine, the left engine began to surge. He proceeded to the Orland airport for an emergency landing with about 50 percent power on the left engine and a "high rate of descent." After crossing the north end of the airport at 2,000 feet above ground level (agl), he felt he was too high land to the south with a 25-knot crosswind. At the base leg he was about 500 feet agl, with the power decaying, and power lines in his flight path, and he made a decision to land straight ahead in a field on the southeast corner of the airport.

The pilot stated that he lowered the landing gear and put in 30 degrees of flaps while maintaining single engine best rate of climb airspeed. On the landing rollout, the nose gear sheared off after colliding with a ditch. The airplane began to skid to the right and the left main landing gear collapsed. The left main fuel tank and about 1/4 of the field was consumed by a postimpact fire. The pilot estimated that he had 20 gallons of fuel remaining in the left main tank.

In the pilot's written statement, he stated he believes he received contaminated fuel from Paradise Skypark Airport. He stated that the fuel remained in his auxiliary fuel tanks from April 27, 1999, when he last refueled, until the date of the mishap.

The airplane was inspected on-scene by a Federal Aviation Administration (FAA) inspector. He found that the left and right main fuel filters retained a foreign substance. The filters and the foreign substance were sent to the Safety Board investigator who then sent them to the Safety Board's metallurgical laboratory for examination. A sample of the substance was then sent to Artech Testing LLC for a Fourier Transform Infrared Spectroscopic (FTIR) analysis,

and an x-ray dispersive (EDS) spectra analysis. They identified the substance as a polyacrylamide, carboxyl modified, high carboxyl content. It is a long chain manmade synthetic polymer that is used as an agricultural soil erosion control method and can be purchased in liquid, granular or solid forms. The EDS analysis of the substance also found potassium and the presence of lead, aluminum, sulfur, iron, and copper. The synthetic polymer is not hazardous and is also not regulated.

According to the products' manufacturer, the common use for the substance is to assist in the reduction of soil erosion by bonding soil particles together. General application is through a field irrigation system, and not by airplane. The polyacrylamide is soluble in water and alcohol; however, no data was available for fuel solubility.

FAA inspectors traveled to Paradise Skypark Airport to perform an inspection of the fueling facility. The airport and the fueling facilities are owned by a local construction company, who will sell fuel to itinerate airplanes if requested by the pilots. The FAA inspector stated "there is no scheduled person to operate the truck or maintain the truck or fuel storage facility." The FAA inspector further reported the maintenance to the truck, fuel delivery system, and fuel storage facility are performed by employees of the construction company on an as needed, time permitted basis. The fuel truck was found to be labeled "80 octane," but the FAA inspector was told that it was in fact 100 low lead. No records were kept regarding the last delivery system filter change. The truck sumps and filters are not checked on any regular basis for contamination. It was also found that the fuel delivery nozzle was lying in its compartment amid dirt, gravel, and other contaminates. There were no protective caps or covers found on the nozzle. He also found that the employees that fuel the airplanes have not had any formal or on-the-job training.

Pilot Information

Certificate:	Airline Transport	**Age:**	58, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	07/05/1998
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	12000 hours (Total, all aircraft), 480 hours (Total, this make and model), 10350 hours (Pilot In Command, all aircraft), 136 hours (Last 90 days, all aircraft), 39 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N8153Q
Model/Series:	414 414	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	414-0053
Landing Gear Type:	Retractable - Tricycle	**Seats:**	8
Date/Type of Last Inspection:	02/10/1999, 100 Hour	**Certified Max Gross Wt.:**	6350 lbs
Time Since Last Inspection:	72 Hours	**Engines:**	2 Reciprocating
Airframe Total Time:	4471 Hours	**Engine Manufacturer:**	Continental
ELT:		**Engine Model/Series:**	IO-520
Registered Owner:	ROBERT SCOTT	**Rated Power:**	285 hp
Operator:	ROBERT SCOTT	**Operating Certificate(s) Held:**	On-demand Air Taxi (135)
Operator Does Business As:	THE HANGAR	**Operator Designator Code:**	URSA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	CIC, 238 ft msl	**Distance from Accident Site:**	15 Nautical Miles
Observation Time:	1645 PDT	**Direction from Accident Site:**	60°
Lowest Cloud Condition:	Scattered / 7000 ft agl	**Visibility**	50 Miles
Lowest Ceiling:	None / 0 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	18 knots / 27 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	
Precipitation and Obscuration:			
Departure Point:	SAN JOSE, CA (RHV)	**Type of Flight Plan Filed:**	None
Destination:	REDDING, CA (RDD)	**Type of Clearance:**	None
Departure Time:	1600 PDT	**Type of Airspace:**	Class G

Airport Information

Airport:	HAIGH FIELD (O37)	**Runway Surface Type:**	Asphalt
Airport Elevation:	215 ft	**Runway Surface Condition:**	
Runway Used:	33	**IFR Approach:**	None
Runway Length/Width:	4500 ft / 60 ft	**VFR Approach/Landing:**	Forced Landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	On-Ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	TEALEYE C CORNEJO	**Report Date:**	11/22/2000
Additional Participating Persons:	EARL BENEDICT; SACRAMENTO, CA		
Publish Date:			
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/.		