NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Materials Laboratory Division
Washington, D.C. 20594

August 6, 2009

MATERIALS LABORATORY FACTUAL REPORT Report No. 09-054

A. ACCIDENT

Place	:	Weaverville, California
Date	:	August 5, 2008
Vehicle	:	Sikorsky S-61N
NTSB No.	:	LAX08PA259
Investigator	:	Jim Struhsaker AS-WPR

B. COMPONENTS EXAMINED

Fuel testing report for fuel samples from fueling truck and aircraft fuel filter

C. DETAILS OF THE EXAMINATION

Two fuel samples were sent to an outside independent laboratory for examination. The report was submitted to the Material Laboratory for review. The bulk sample from the fuel truck that fueled the accident aircraft was analyzed using the following test methods.

MIL-STD-3004A(1)	Appearance
ASTM D 1319 - 08	Aromatics (% vol)
ASTM D 4294 - 08a	Total Sulfur (% mass)
ASTM D 86 - 09	Distillation
	10% Recovered (°C)
	20% Recovered (°C)
	50% Recovered (°C)
	90% Recovered (°C)
	End Point (°C)
	Residue (% vol)
	Loss (% vol)
ASTM D 56 - 05	Flash Point (°C)
ASTM D 4052 - 96	Density @ 15°C (kg/m^3)

ASTM D 5972 - 05e1	Freezing Point (°C)
ASTM D 445 - 06	Viscosity @ -20°C (mm^2/s)
ASTM D 130 - 04	Copper Strip Corrosion (2 h @ 100°C)
ASTM D 3241 - 08a	Thermal Stability @ 260°C
	Change in Pressure (mmHg)
	Tube Deposit Rating-Visual
ASTM D 381 - 04	Existent Gum (mg/100 mL)
ASTM D 2624 - 07	Conductivity (pS/m)
GC Gas Chromatographic Analysis	

The sample from the fuel filter was analyzed using the following test methods.

ASTM D 3242 – 08	Total Acid Number (mg KOH/g)
ASTM D 1319 - 08	Aromatics (% vol)
ASTM D 3227 - 04a	Mercaptan Sulfur (% mass)
ASTM D 4294 - 08a	Total Sulfur (% mass)
ASTM D 4052 - 96	Density @ 15°C (kg/m^3)
ASTM D 5972 - 05e1	Freezing Point (°C)
ASTM D 130 - 04	Copper Strip Corrosion (2 h @ 100°C)
ASTM D 381 - 04	Existent Gum (mg/100 mL)
GC Gas Chromatographic Analysis	

The results are found in the attached reports. The sample from the fuel truck was within specification for all the tests except ASTM D 3241 - 08a (Tube Deposit Rating-Visual), ASTM D 2624 - 07 (Conductivity) and ASTM D 381 - 04 (Existent Gum). The fuel filter sample was within specification for all the tests except ASTM D 381 - 04 (Existent Gum). The out of the specification results are consistent with fuel aging and long-term storage. The samples were stored for 10 months prior to testing.

Nancy B. McAtee
Chemist

AFPET LABORATORY REPORT

HQ AFPET/PTPLA
2430 C Street
Building 70, Area B
Wright-Patterson AFB, OH 45433-7632

Lab Report No: 2009LA18879001 Protocol: FU-AVI-0031 Cust Sample No: Not Specified
Date Sampled: 06/04/2009 Date Received: 06/18/2009 Date Reported: 06/18/2009

Sample Submitter:
NTSB
75-1027 Henry St.
Ste. 111A, PMB 403
Kailua Kona, HI 96740

Reason for Submission: Aircraft Crash/Incident IAW T.O. 42B-1-1
Product: Aviation Turbine Fuel, Kerosene
Specification: ASTM D 1655 - 08a Grade:Jet A

Source: Comp1/Comp2 Qty Submitted: 1 L

Method	Test	Min	Max	Result	Fail
MIL-STD-3004A(1)	Appearance			Pass	
ASTM D 1319 - 08	Aromatics (% vol)		25	20.0	
ASTM D 4294 - 08a	Total Sulfur (% mass)		0.30	0.06	
ASTM D 86 - 09	Distillation				
	10% Recovered (°C)		205	169	
	20% Recovered (°C)			177	
	50% Recovered (°C)			203	
	90% Recovered (°C)			247	
	End Point (°C)		300	274	
	Residue (% vol)		1.5	1.3	
	Loss (% vol)		1.5	0.3	
ASTM D 56 - 05	Flash Point (°C)	38		44	
ASTM D 4052 - 96	Density @ 15°C (kg/m³)	775	840	812	
ASTM D 5972 - 05e1	Freezing Point (°C)		-40	-50	
ASTM D 445 - 06	Viscosity @ -20°C (mm²/s)		8.0	4.4	
ASTM D 130 - 04	Copper Strip Corrosion (2 h @ 100°C)		1 (Max)	1a	
ASTM D 3241 - 08a	Thermal Stability @ 260°C				
	Change in Pressure (mmHg)		25	12	
	Tube Deposit Rating, Visual		<3 (Max)	>4A	X
ASTM D 381 - 04	Existent Gum (mg/100 mL)		7	19.0	X
ASTM D 2624 - 07	Conductivity (pS/m)	50	450	0	X
GC	Gas Chromatographic Analysis			See Below	

Dispositions:
For information purposes only.
GC scan is that of a typical Jet A.
Sample size insufficient to perform full specification testing.
Coordinated with Gordon Walker (PTOT), phone: DSN 785-6208, COM 937-255-6208

Approved By **Date**
Miguel Acevedo, Chief 06/18/2009
\\SIGNED\\

This report was electronically delivered to:
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AFPET LABORATORY REPORT

HQ AFPET/PTPLA
2430 C Street
Building 70, Area B
Wright-Patterson AFB, OH 45433-7632

Lab Report No: 2009LA18879002 Protocol: FU-AVI-0031 Cust Sample No: Not Specified
Date Sampled: 06/04/2009 Date Received: 06/18/2009 Date Reported: 06/18/2009

Sample Submitter:
NTSB
75-1027 Henry St.
Ste. 111A, PMB 403
Kailua Kona, HI 96740

Reason for Submission: Aircraft Crash/Incident IAW T.O. 42B-1-1
Product: Aviation Turbine Fuel, Kerosene
Specification: ASTM D 1655 - 08a Grade:Jet A

Source: Filter Qty Submitted: 400 mL

Method	Test	Min	Max	Result	Fail
ASTM D 3242 - 08	Total Acid Number (mg KOH/g)		0.10	0.002	
ASTM D 1319 - 08	Aromatics (% vol)		25	20.0	
ASTM D 3227 - 04a	Mercaptan Sulfur (% mass)		0.003	0.000	
ASTM D 4294 - 08a	Total Sulfur (% mass)		0.30	0.06	
ASTM D 4052 - 96	Density @ 15°C (kg/m³)	775	840	812	
ASTM D 5972 - 05e1	Freezing Point (°C)		-40	-52	
ASTM D 130 - 04	Copper Strip Corrosion (2 h @ 100°C)		1 (Max)	1a	
ASTM D 381 - 04	Existent Gum (mg/100 mL)		7	21.0	X
GC	Gas Chromatographic Analysis			See Below	

Dispositions:
For information purposes only.
Sample size insufficient to perform full secification testing.
GC scan is that of a typical Jet A
Coordinated with Gordon Walker (PTOT), phone: DSN 785-6208, Comm 937-255-6208

Approved By **Date**
Miguel Acevedo, Chief 06/18/2009
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michael.thiede@wpafb.af.mil, miguel.acevedo@wpafb.af.mil