NATIONAL TRANSPORTATION SAFETY BOARD
Office of Research and Engineering
Materials Laboratory Division
Washington, D.C. 20594

August 25, 2015

MATERIALS LABORATORY FACTUAL REPORT Report No. 15-090

A. ACCIDENT INFORMATION

Place	:	Las Vegas, Nevada
Date	:	July 5, 2013
Vehicle	:	Rockwell NA-265-65
NTSB No.	:	WPR13LA310
Investigator	:	Albert Nixon, AS-WPR

B. COMPONENTS EXAMINED

Hydraulic fluid sample

C. DETAILS OF THE EXAMINATION

A bottle containing approximately 40 mL of red hydraulic fluid was received for testing. The brand of hydraulic fluid was unknown. However, according to the Sabreliner Corporation Maintenance Manual SR-78-030,[1] the hydraulic system is serviced with MIL-H-5606 red hydraulic fluid.

The hydraulic fluid sample was sent to SGS Herguth Laboratories[2] for determination of acid number, and the resulting test report is included in Appendix A. Results showed the acid number for the hydraulic fluid sample was 0.27 mg KOH/g. The report indicated the acid number was in the warning range, and the system should be checked for proper operating temperature.

According to MIL-H-5606G, the specified maximum acid number for new hydraulic fluid is 0.2 mg KOH/g. An internet search for commercial products that claim to meet MIL-H-5606 specifications and had published values for acid numbers was conducted, and products included Mobil Aero HFA,[3] Phillips 66 X/C 5606H,[4] Texaco 5606H,[5] and AeroShell Fluid 41.[6] The published acid numbers, listed as a typical value

[1] Sabreliner Corporation (1987).
[2] SGS Herguth Laboratories, Vallejo, California.
[3] Exxon Mobil Corporation, http://www.exxonmobil.com/UK-English/Aviation/PDS/GLXXENAVIEMMobil_Aero_HF.aspx
[4] Phillips 66 Company http://www.phillips66lubricants.com/documents/phillips66/aviation_products/66%20XC%205606%20Aviation%20Hydraulic%20Fluids%20TDSw%20778520.pdf
[5] Chevron Products Company http://www.southernlubricants.co.uk/aqadmin/media/uploads/50f69a2b885e5/Hydraulic%20Oil%205606H.pdf
[6] Royal Dutch Shell,

for each product, ranged from 0.0 mg KOH/g (Texaco 5606H) to 0.05 mg KOH/g (Phillips 66 X/C 5606H).

Matthew R. Fox
Senior Materials Engineer

http://s07.static-shell.com/content/dam/shell/static/marine-products/downloads/pdf/lubricants/applications/aeroshell-fluid-41.pdf

D. APPENDIX A. ACID NUMBER TEST REPORT

SGS HERGUTH LABORATORIES

Certificate of Analysis
Lab Number V7023842

Nancy McAtee
National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington DC 20594

08/21/2015

Client Code :NATINM Sample Date : 07/16/2015 P.O. Number : POSTED CASH
Herguth ID : LABV7023842
Description :Sample ID# WPR13LA310, MIL-H-5606 Red, Hydraulic
Paperwork States: Equipment Mfg & Model: Rockwell NA-265-65 Airplane
Oil Type : Military Spec MIL-H-5606H (ME_004)
Unit Type : Hydraulic (GN_HY001)

Test Performed	Proc-Rev	Result
Acid Number ASTM D974	0974-2.3	0.27 mg KOH/g

The Acid Number is in the warning range. Check for proper operating temperature(s). Please provide the full name and grade of the lubricant in service.

Respectfully Submitted,
SGS Herguth Laboratories, Inc.

[redacted]

cc: Nancy McAtee

Bobby R Licu, Evaluations Manager