

[LSD 07-35-67-07 W6M] ENERGY TRANSFER H-933 A&B

Customer: PTRHTF20046
 QUADRA CHEMICALS
 12925 146TH STREET
 EDMONTON, AB T5L 2H6 CANADA
 Attn: Quadra Samples
 Tel:
 E-Mail: quadra_samples@quadra.ca

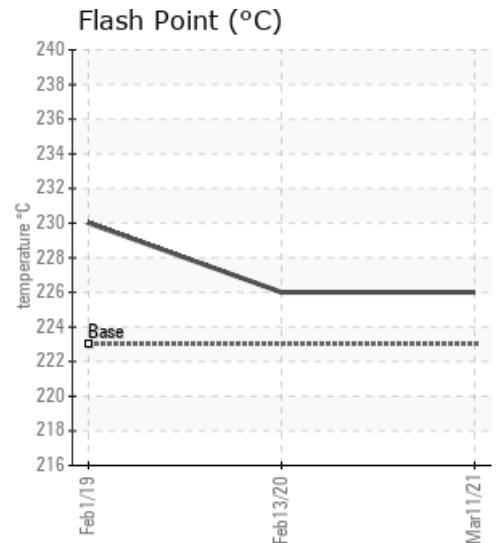
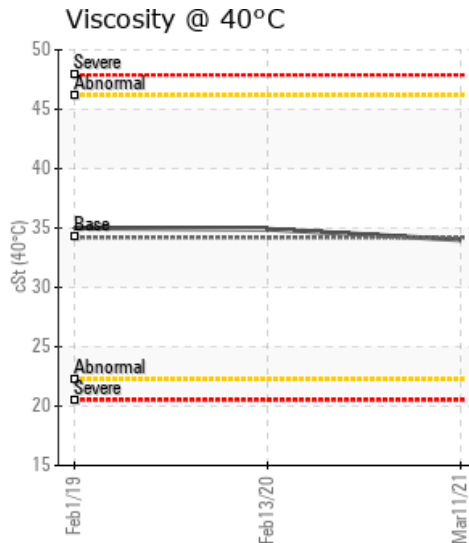
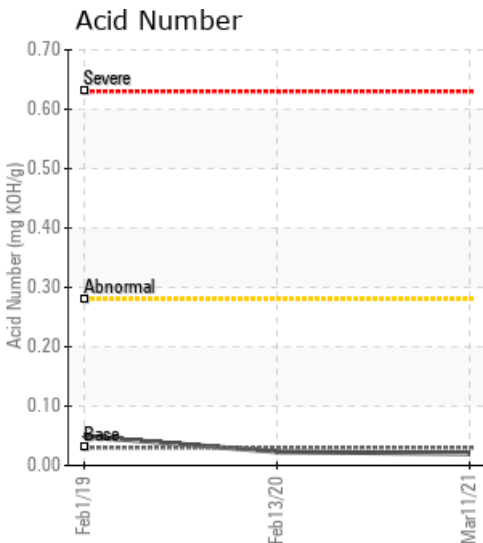
System Information
 System Volume: 209000 ltr
 Bulk Operating Temp: 437F / 225C
 Heating Source:
 Blanket:
 Fluid: PETRO CANADA PETRO-THERM
 Make: HEATECH

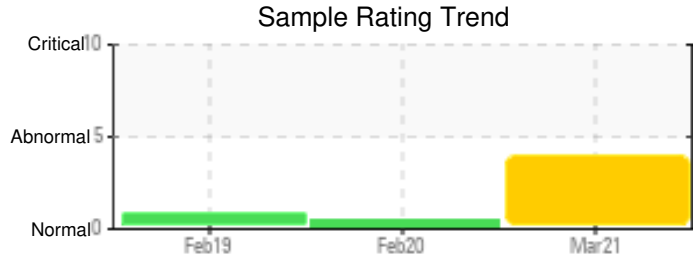
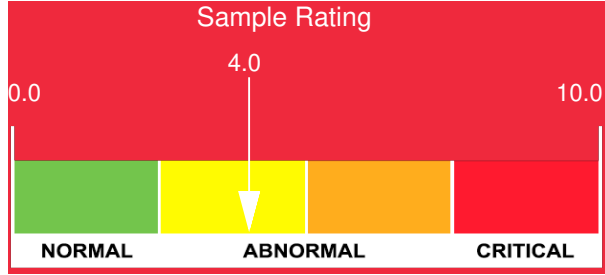
Sample Information
 Lab No: 02411586
 Analyst: Clinton Buhler
 Sample Date: 03/11/21
 Received Date: 03/26/21
 Completed: 05/14/21
 Clinton Buhler
 Clinton.Buhler@hollyfrontier.com

Recommendation: Sample results indicate that the heat transfer fluid is in suitable condition for continued service. Slightly reduced fluid viscosity may be associated with some thermal degradation but the other test results don't clearly support this. Elevated level of water in the sample could be an indication of a sample being drawn from a less than ideal location such as off of a site glass or low point. If this is representative of the system, the expansion can be vented to remove steam, but blanket gas can't be in service during venting and without blanket gas, this may negatively impact the pumps NPSH requirements. Customer recently found degradation deposits in and around the expansion tank. To support this investigation, please re-sample system now and please ensure a very thorough purge of the sample valve and related piping/tubing before filling the sample container.

Comments: Water contamination levels are abnormally high. Water contamination levels are abnormally high.. ppm Water contamination levels are abnormally high. (GCD) 90% Distillation Point is marginally high.

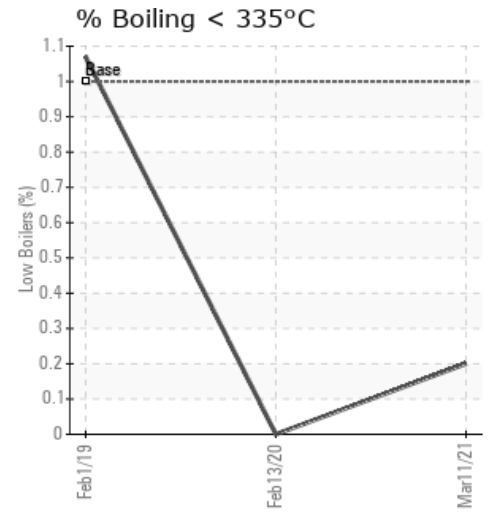
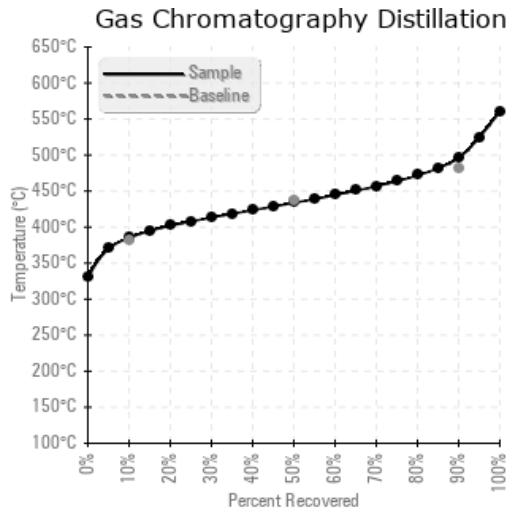
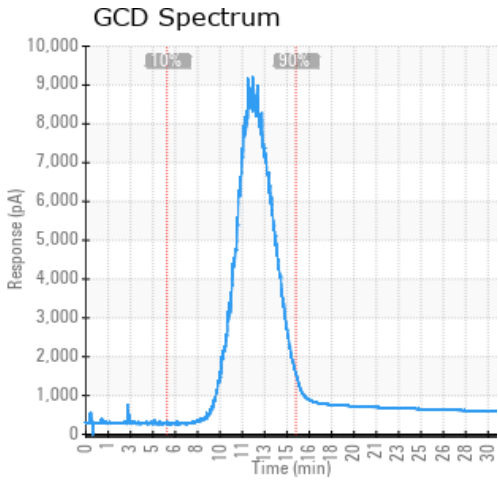
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/11/21	03/26/21	26.0m	PUMP SUCTION	439 / 226	768.7	34.0	0.02	0.033	725 / 385	813 / 434	924 / 496	0.20
02/13/20	03/11/20	13.0m	PUMP SUCTION	439 / 226	9.1	34.9	0.023	0.067	724 / 384	813 / 434	910 / 488	0.00
02/01/19	02/14/19	1.0m		446 / 230	4.7	35.0	0.049	0.032	699 / 371	784 / 418	877 / 469	1.07
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00





Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
03/11/21	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02/13/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02/01/19	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baseline Data			0	0						0			0	0					0				0	

Elemental analysis results (above) in parts per million (ppm). [10,000 ppm = 1.0%]



Historical Comments	
02/13/20	Sample results indicate that the fluid is suitable for continued service. Please re-sample in 12 months
02/01/19	Base-line fluid sample after 28 days service. Fluid is healthy. Please re-sample in 6 months (GCD) 90% Distillation Point is marginally low.

Petro-Canada makes no representation or warranty of any kind, either express or implied, as to the accuracy or completeness of the analysis and assumes no responsibility and shall have no liability whatsoever with respect to such analysis, or a party's use of it. Petro-Canada is a division of HollyFrontier Corporation.