

[CNRL Ferrier 7-18-40-09w5] H-633

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

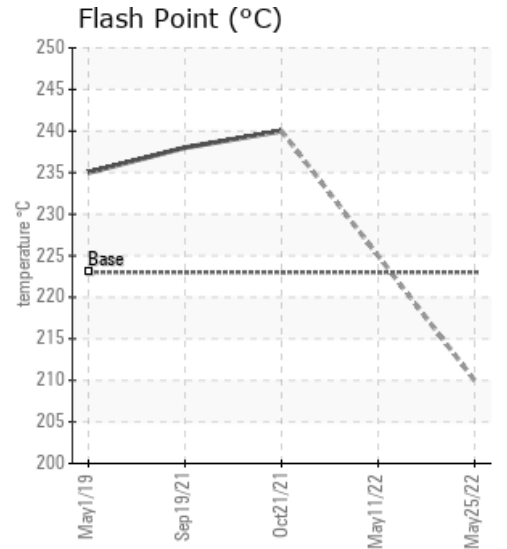
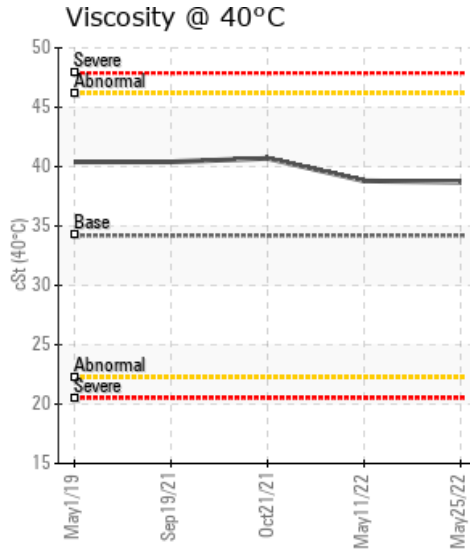
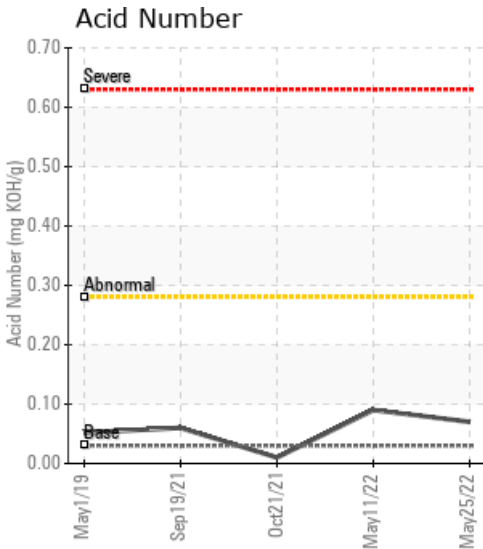
System Information
 System Volume: 5000 ltr
 Bulk Operating Temp: 352F / 178C
 Heating Source:
 Blanket:
 Fluid: PETRO CANADA PETRO-THERM
 Make: PROPAK SYSTEMS

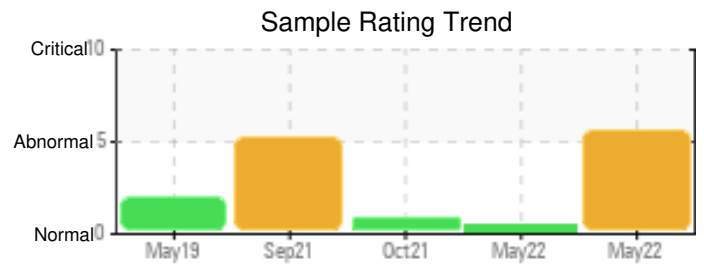
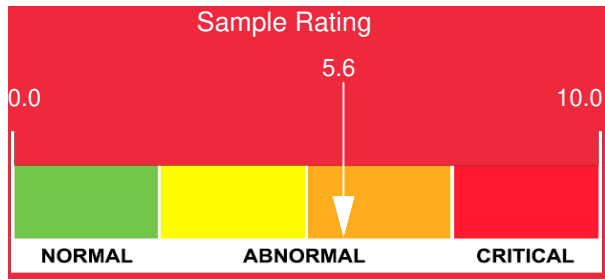
Sample Information
 Lab No: 02491689
 Analyst: Lyle Dach
 Sample Date: 05/25/22
 Received Date: 05/31/22
 Completed: 06/06/22
 Lyle Dach
 lyle.dach@hollyfrontier.com

Recommendation: Very high water content from the failed fire tube, fluid condition other than water looks to be acceptable for continued use. Water should be boiled off while venting steam to help avoid unwanted boil overs to reduce corrosion risk. Resample after water is boiled off.

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

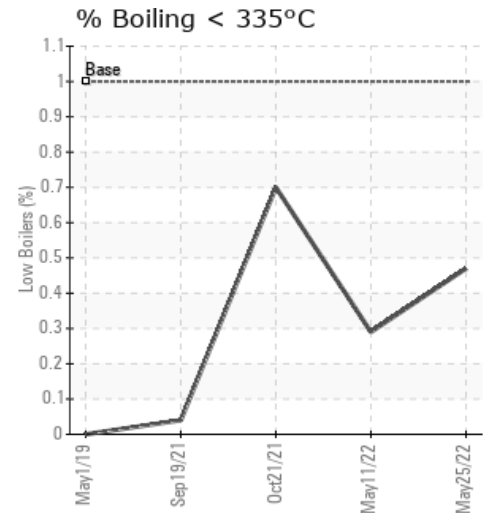
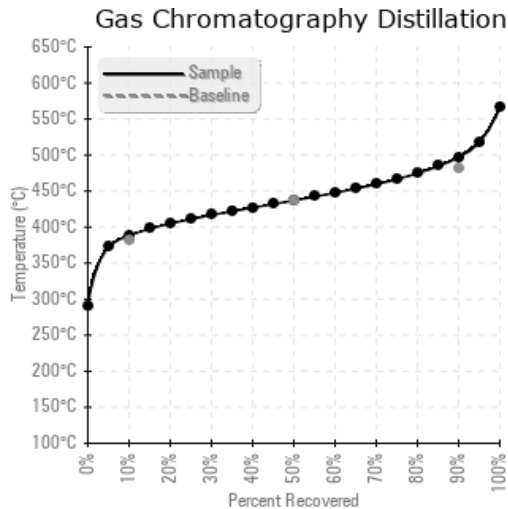
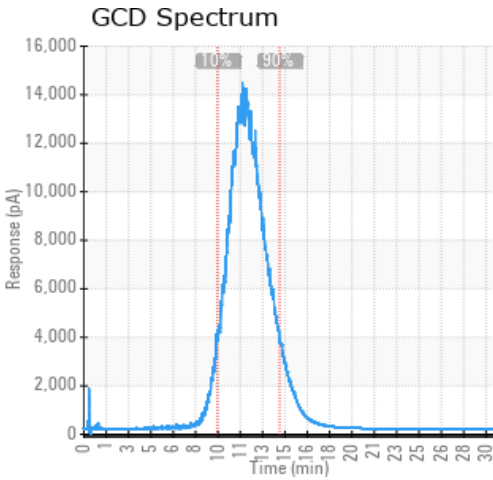
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
05/25/22	05/31/22	0.0y	drain plug and bttm	410 / 210	8241.7	38.7	0.07	0.609	730 / 388	819 / 437	927 / 497	0.47
05/11/22	05/11/22	0.0y	bath drain plug		2062.5	38.8	0.09	0.111	731 / 388	820 / 438	931 / 500	0.29
10/21/21	11/01/21	0.0y	BATH DRAIN PLUG	464 / 240	23.6	40.7	0.01	0.044	729 / 387	820 / 438	935 / 502	0.70
09/19/21	10/08/21	10.0y	de-eth line heater	460 / 238	3412.3	40.4	0.06	0.170	730 / 388	821 / 438	936 / 502	0.04
05/01/19	05/14/19	657.0y		455 / 235	43.8	40.4	0.052	0.041	723 / 384	828 / 442	958 / 514	0.00
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
05/25/22	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	6	0	0	0	0	0
05/11/22	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	6	0	0	0	0	0
10/21/21	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
09/19/21	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0
05/01/19	0	0	0	0	0	0	0	0	0	0	3	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

05/11/22	Sample is showing very high water again. When samples are being collected the sample line needs to be purged for several seconds minimum, longer time maybe necessary if there is a long sample line or if the sample point is at the very bottom of the vessel. The collected fluid should be at system operating temperature. Please resample to confirm the fluid condition.*** NOTE: The sample contained too much water to perform COC Flash Point *** ppm Water contamination levels are severely high. Water contamination levels are severely high. (GCD) 90% Distillation Point is abnormally high.
10/21/21	Sample results indicate that the fluid is in suitable condition for continued service. Metals, contamination and water are all very low. Viscosity and flashpoint are in spec and acid # and pentane insolubles are low. GCD 90% distillation point is marginally high but is trending down slightly. Resample in 6 months. (GCD) 90% Distillation Point is abnormally high.
09/19/21	Water very high - resample to confirm water content in system. If water content is correct filter or centrifuge system to remove water. Water contamination levels are severely high. ppm Water contamination levels are severely high. (GCD) 90% Distillation Point is severely high.
05/01/19	Oil looks to be a blend of older pre-2006 Petrotherm and newer Petrotherm which explains the higher slightly higher viscosity and GCD @ 90%. Resample in 6 months and confirm the age of the fluid in the system. (GCD) 90% Distillation Point is severely high.

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