

## [02-11-60-04W6] H-802 Peyto Kakwa

**Customer: PTRHTF20175**  
 QUADRA CHEMICALS  
 7802 98 STREET  
 CLAIRMONT, AB T0H 0W0 Canada  
 Attn: Quadra Samples  
 Tel:  
 E-Mail: quadra\_samples@quadra.ca

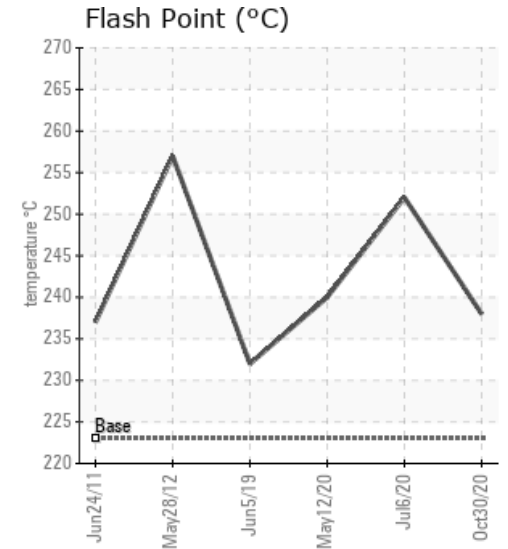
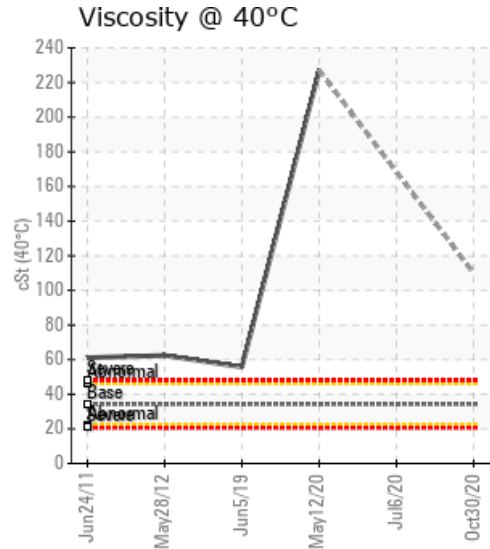
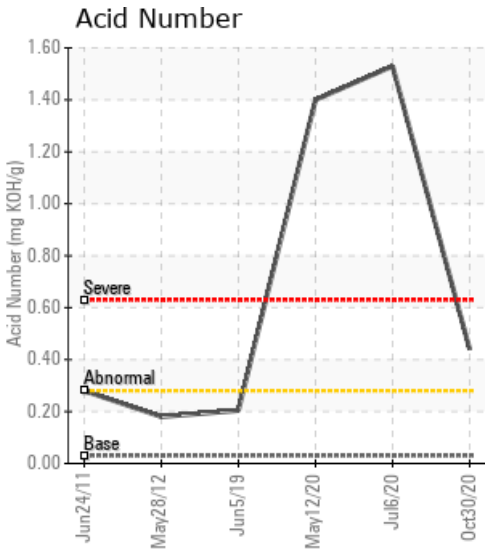
**System Information**  
 System Volume: 30000 ltr  
 Bulk Operating Temp: 752F / 400C  
 Heating Source:  
 Blanket:  
 Fluid: PETRO CANADA PETRO-THERM  
 Make: ALCO

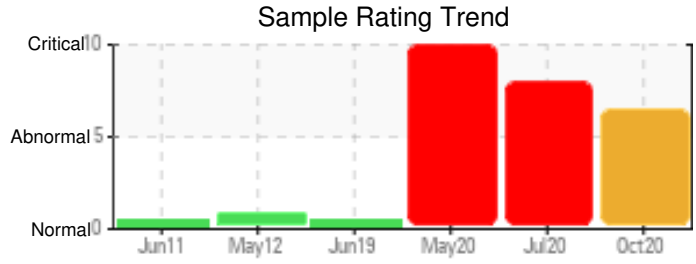
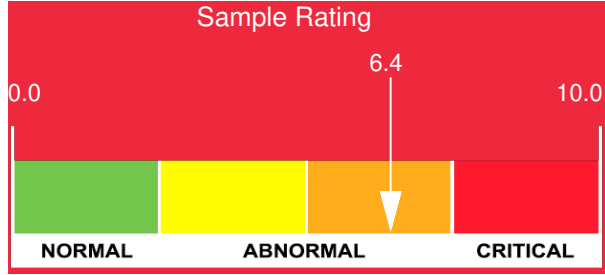
**Sample Information**  
 Lab No: 02388605  
 Analyst: Clinton Buhler  
 Sample Date: 10/30/20  
 Received Date: 11/20/20  
 Completed: 02/12/21  
 Clinton Buhler  
 Clinton.Buhler@hollyfrontier.com

**Recommendation:** The sweetening of the system has improved the condition of the fluid. Viscosity is now measurable but is quite high at 110cSt and needs to be closely monitored. The sweetening of the system has also brought down the fluid's Acid Number and Solids content although solids is still high. Please ensure blanket is set between 2-3 psi. Continue to make plans for system cleaning in 2021. Please re-sample system on or after December 30, 2020 so we can continue to trend

**Comments:** Iron ppm levels are marginal. Pentane Insolubles levels are severely high. Visc @ 40°C is severely high. Acid Number (AN) is abnormally high. (GCD) 90% Distillation Point is marginally high.

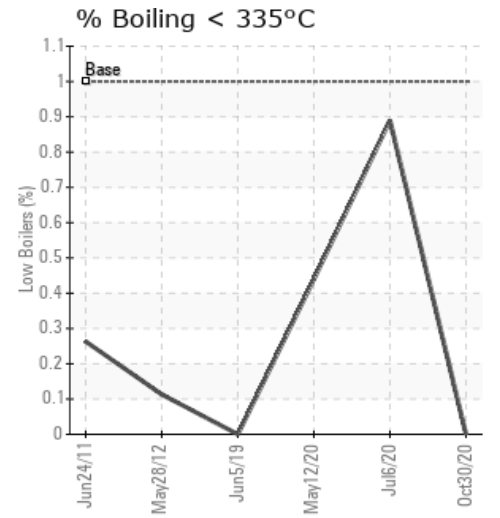
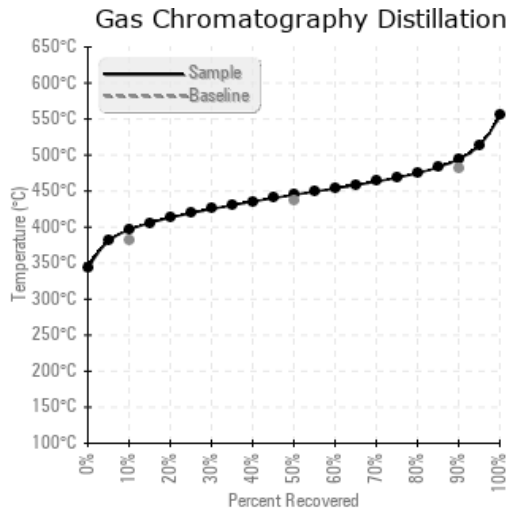
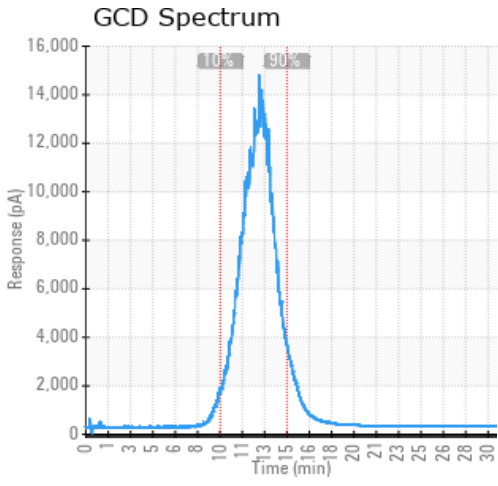
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
10/30/20	11/20/20	0.1m	24 hour sample	460 / 238	51.6	110	0.44	2.15	745 / 396	833 / 445	922 / 494	0.00
07/06/20	10/13/20	0.0m	FILTER INLET	486 / 252	545.9		1.53	7.07	769 / 409	845 / 452	898 / 481	0.89
05/12/20	05/21/20	0.0m	AFTER PUMP	464 / 240	212.6	227	1.40	3.14	786 / 419	848 / 453	893 / 479	0.44
06/05/19	06/19/19	0.0m	OIL RETURN	450 / 232	34.8	55.7	0.204	0.184	793 / 423	843 / 451	887 / 475	0.00
05/28/12	06/25/12		HOT OIL PUMP DISCH L	495 / 257	55	62.4	0.18		799 / 426	844 / 451	887 / 475	0.113
<b>Baseline Data</b>				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	
10/30/20	164	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	2	2	
07/06/20	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/12/20	523	1	0	0	0	0	0	0	0	0	1	0	3	0	0	0	4	0	0	0	0	0	0	0	0
06/05/19	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/28/12	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	15	1	
<b>Baseline Data</b>			0	0						0			0	0					0				0		

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



Historical Comments	
07/06/20	This fluid is heavily oxidized. Pentane Insolubles are at 7.07, viscosity is too high to measure, and acid number is severely high. Fluid needs to be changed. Pentane Insolubles levels are severely high. Water contamination levels are marginally high. Water contamination levels are marginally high.. ppm Water contamination levels are marginally high. Acid Number (AN) is severely high. (GCD) 10% Distillation Point is abnormally high. (GCD) 50% Distillation Point is marginally high. Viscosity is too high to measure.
05/12/20	The oil is in a poor condition and no longer suitable for use. Fe content and AN are high. These are indications of the oil being acidic and corrosive wear is taking place. The viscosity is very high as a result of degradation. The Pentane Insoluble (solids) content of the fluid has exceeded the reportable limit of 0.5% sixfold. It is recommended to change out the fluid and prior to that do a system clean and flush. Please contact your Petro-Canada Tech Service Advisor for assistance. System volume and fluid service life are required to work on this. Iron ppm levels are severe. PQ levels are severe. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. (GCD) 10% Distillation Point is severely high. Visc @ 40°C is severely high. (GCD) 50% Distillation Point is marginally high.
06/05/19	This sample of Sunoco Heat Transfer 21 still looks to be in good condition and is OK for continued use. Flash point is normal and Pentane insolubles are low. Resample in 6 months.
05/28/12	The fluid is not in bad shape but our Petro-Therm would increase the heat transfer performance due to its lower viscosity. Better (more rapid) heat transfer means more heat carried away, so higher productivity and/or could run the boiler a few degrees lower to do the same job, which saves on gas. Petro-Therm can handle up to 316C in closed systems so 185C is a walk in the park. Its flash point is >220C so even above the operating temp.

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