

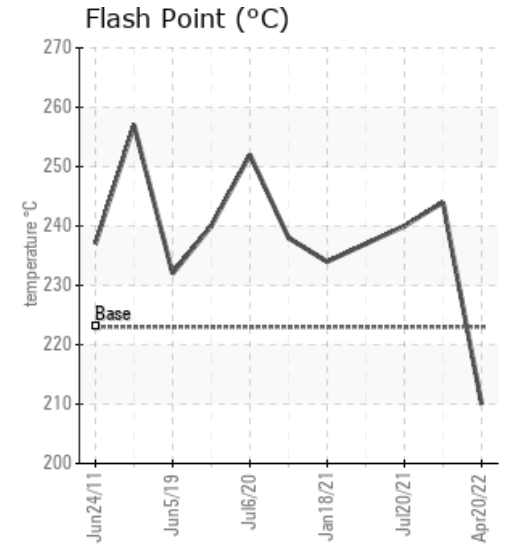
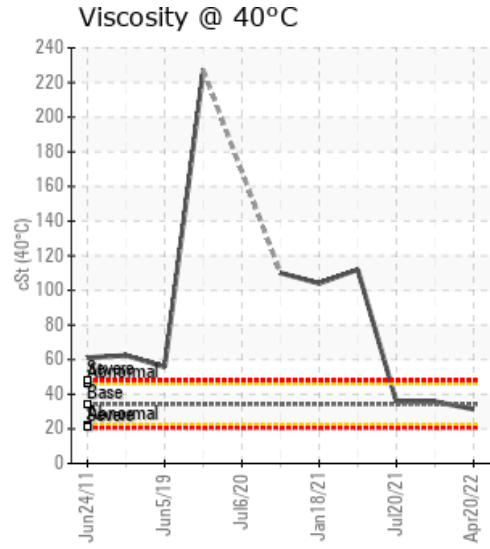
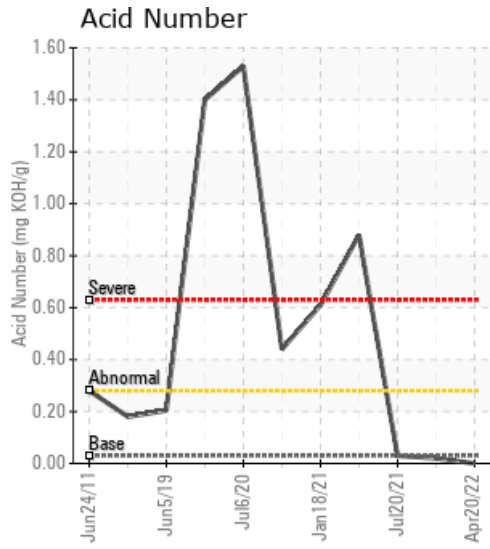
[02-11-60-04W6] H-802 Peyto Kakwa

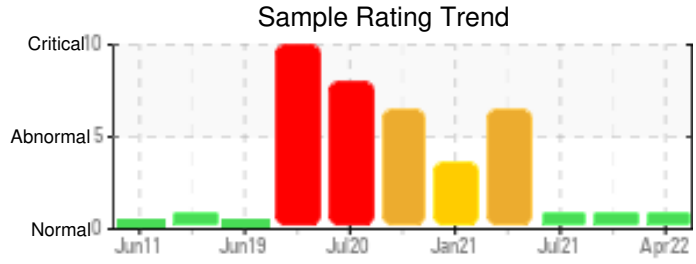
Customer: PTRHTF20175	System Information	Sample Information
QUADRA CHEMICALS 7802 98 STREET CLAIRMONT, AB T0H 0W0 Canada Attn: Quadra Samples Tel: E-Mail: quadra_samples@quadra.ca	System Volume: 30000 ltr Bulk Operating Temp: 752F / 400C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: ALCO	Lab No: 02492528 Analyst: Clinton Buhler Sample Date: 04/20/22 Received Date: 06/03/22 Completed: 06/06/22 Clinton Buhler Clinton.Buhler@HFSinclair.com

Recommendation: Sample results indicate that the fluid is in suitable condition for continued service. Low boiling vapor content has increased to 2.5%; this along with slightly reduced fluid viscosity and flash point may be associated with thermal degradation or possible mixing with process fluids. Please vent off low boiling vapors from expansion tank and re-sample in 6 months.

Comments:

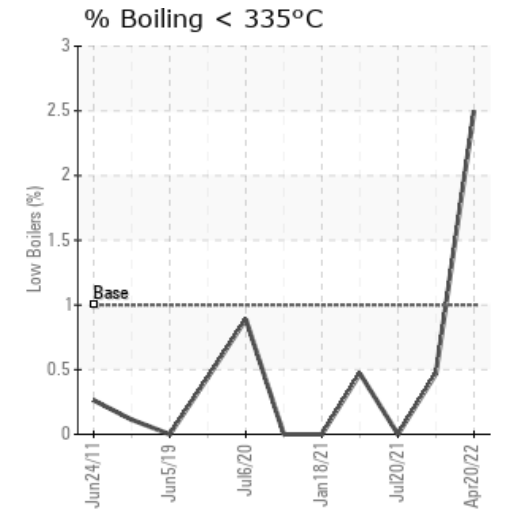
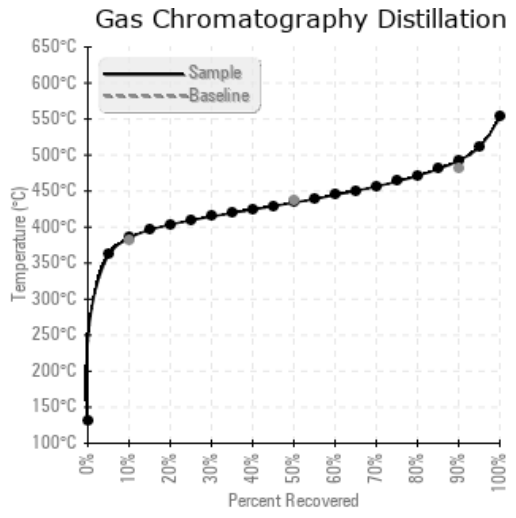
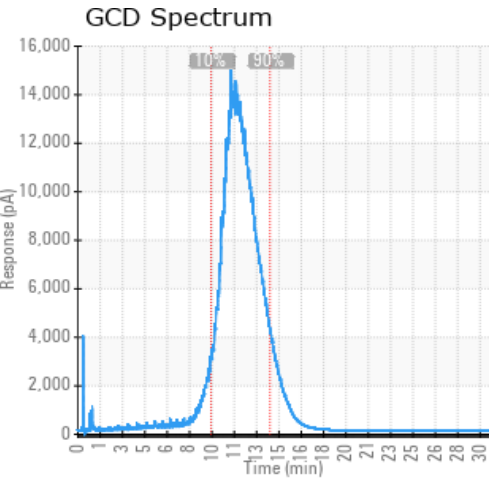
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
04/20/22	06/03/22	10.0m	oil return	410 / 210	0.00	31.3	0.00	0.057	725 / 385	813 / 434	918 / 492	2.50
10/04/21	10/26/21	3.0m	oil drain	471 / 244	4.5	35.7	0.02	0.042	738 / 392	818 / 437	924 / 496	0.47
07/20/21	08/10/21	0.0m	Discharge pump	464 / 240	25.3	35.8	0.03	0.071	742 / 394	820 / 438	922 / 495	0.00
04/21/21	05/21/21	6.0m	Discharge after pump	459 / 237	21.2	112	0.88	1.60	735 / 391	820 / 438	920 / 494	0.47
01/18/21	02/04/21	3.0m	Pump discharge	453 / 234	0.7	104	0.61	1.94	743 / 395	829 / 443	911 / 488	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
04/20/22	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/04/21	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
07/20/21	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3
04/21/21	142	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	2
01/18/21	151	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	1	0	0	0	1	0	2	2
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	
10/04/21	Sample results indicate that the fluid is in suitable condition for continued service with very similar values to the previous sample. Please re-sample in 6 months (GCD) 90% Distillation Point is marginally high.
07/20/21	This appears to be the first sample taken since the system cleaning and fluid replacement that Peyto executed the week of July 12, 2021. Fluid condition has drastically changed for the better since this work: Fluid viscosity, solids content and acid number are back closer to like new levels. There is some indication of small amounts of residual degraded fluid remaining behind (slightly elevated flash point, 10 and 90% GCD temperature and viscosity (although this is vastly improved)). Please re-sample in 1 months time to help establish a trend for the fluid. Please ensure that blanket gas is operational above the fluid level in the expansion tank to help protect the fluid from oxidation in the future. (GCD) 90% Distillation Point is marginally high.
04/21/21	Sample results indicate continued fluid oxidation; see Acid Number and viscosity increases. Solids content remains high. It is advised to perform a system cleaning and fluid replacement. Please ensure that expansion tank blanket gas is properly operational.
01/18/21	Sample results indicate that the fluid has maintained similar condition to the previous sample taken 3 months prior which was taken 24 hours after the system was sweetened. Fluid viscosity remains over 3x that of fresh fluid and Acid Number and Solids content remain elevated. It is advised to continue to make plans to clean system and re-fill with fresh fluid during warmer months. Please re-sample in 3 months. Pentane Insolubles levels are severely high. Visc @ 40°C is severely high. Acid Number (AN) is abnormally high.

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