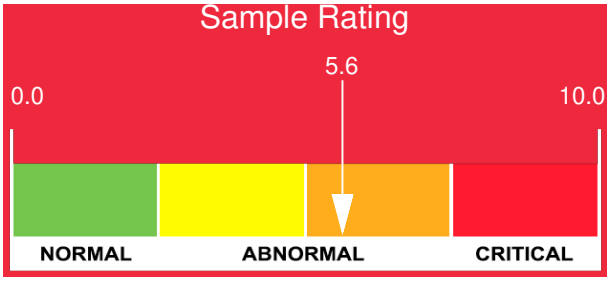
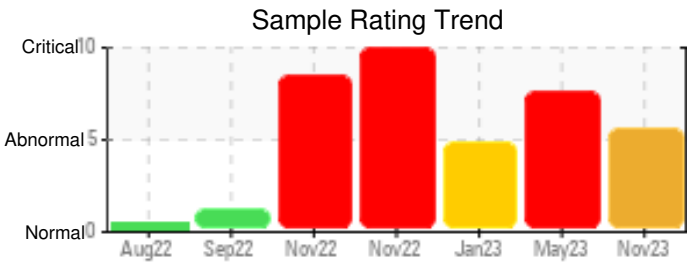




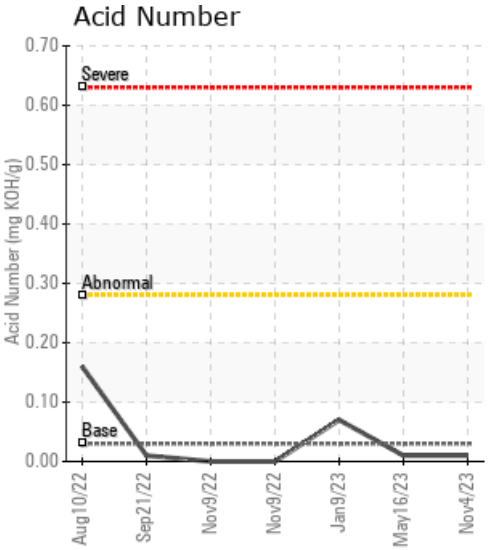
[TOURMALINE / 01-35-060-5W6] H-730

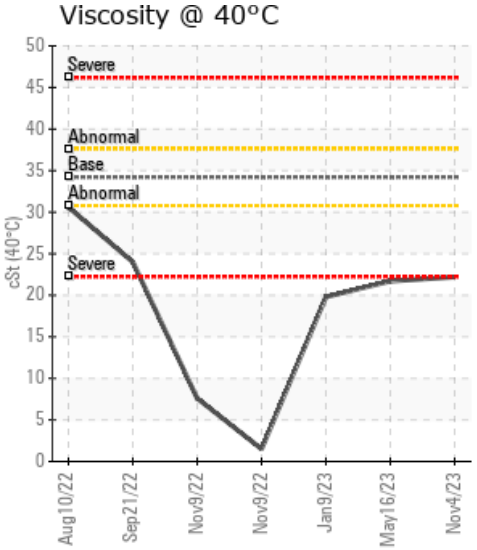
Customer: PTRHTF20175	System Information	Sample Information
QUADRA CHEMICALS 7802 98 STREET CLAIRMONT, AB T0H 0W0 CA Attn: Quadra Samples Tel: E-Mail: quadra_samples@quadra.ca	System Volume: 6000 ltr Bulk Operating Temp: Not Specified Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: HEATECH	Lab No: 02595913 Analyst: Clinton Buhler Sample Date: 11/04/23 Received Date: 11/13/23 Completed: 11/15/23 Clinton Buhler Clinton.Buhler@HFSinclair.com

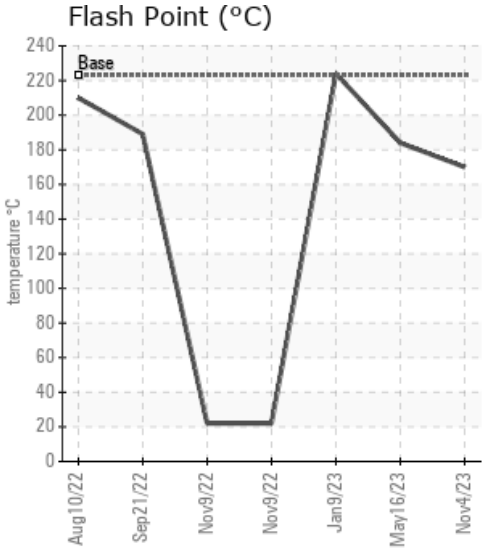
Recommendation: Sample results indicate continued high low boiling vapor content @ 13.11%, which is an improvement from the last sample which was at 18.87%. This directly impacts the lower fluid viscosity and lower fluid flash point. Flash point has gone down to 170°C. System needs to be vented to reduce the amount of low boiling vapors. Please re-sample in 6 months but only after a thorough venting regime. Please also lower blanket gas pressure as low as possible; 2-3 psi is ideal for the fluid.

Comments:

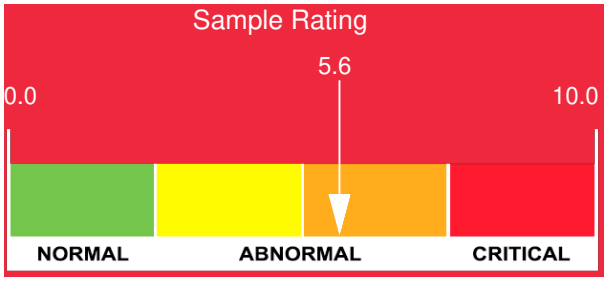
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/04/23	11/13/23	11.0m	TOP OF FILTER	338 / 170	1.8	22.2	0.01	0.048	539 / 281	804 / 429	906 / 486	13.11
05/16/23	06/05/23	21.0m		363 / 184	0.4	21.7	0.01	0.060	474 / 246	780 / 416	890 / 477	18.87
01/09/23	01/27/23	1.0m		435 / 224	13.3	19.8	0.07	0.050	532 / 278	805 / 429	904 / 484	13.15
11/09/22	11/15/22	15.0m	ACCUMULATOR BOTTOM	72 / 22	40.3	1.5	0.00	0.164	90 / 32	218 / 103	860 / 460	60.46
11/09/22	11/15/22	15.0m	TOP OF ACCUMULATOR	72 / 22	7.3	7.6	0.00	0.170	200 / 93	784 / 418	897 / 480	23.08
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

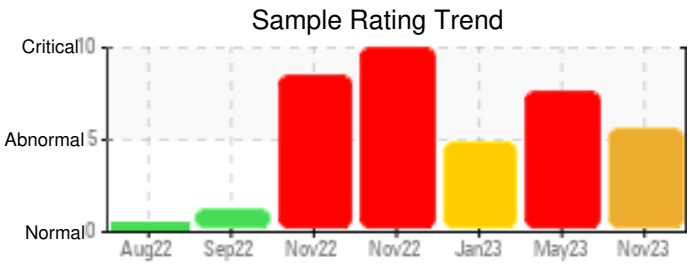






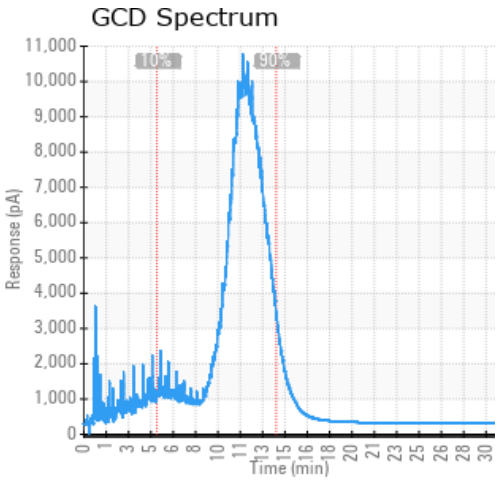
PETRO-CANADA LUBRICANTS

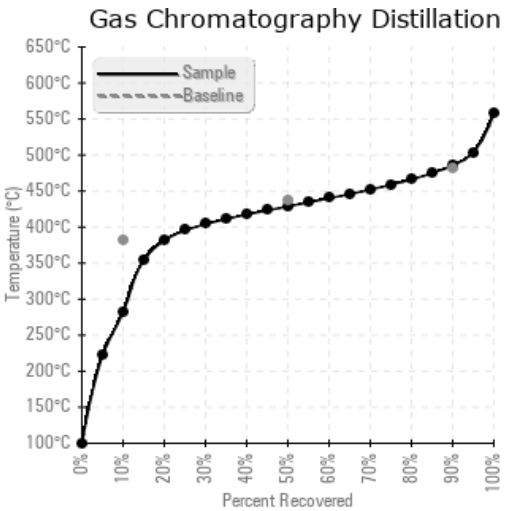


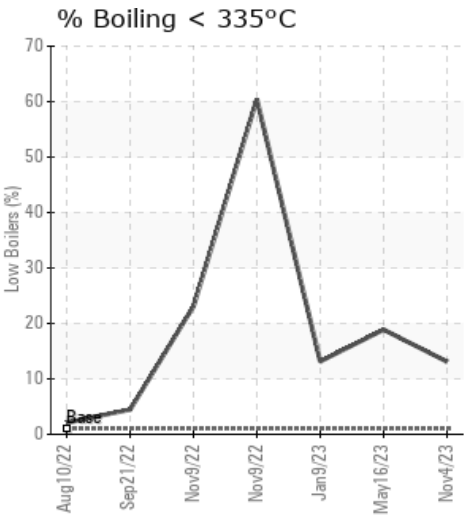


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
11/04/23	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/16/23	6	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/09/23	8	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0
11/09/22	8	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
11/09/22	8	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	2
Baseline Data			0	0						0			0	0					0				0	

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







Historical Comments

05/16/23	Sample results show increased low boiling vapor content, up from 13.15% to 18.87%. Fluid flash point has also been reduced to 184°C from 224°C. Because solids content remains low, thus likely ruling out thermal degradation, these results are most likely related to potential hydrocarbon liquid contamination or high blanket gas pressure. It is understood that expansion tank blanket gas (natural gas) pressure is set at 150 kpa (21 psi). From the fluid perspective, this should be closer to 2-3 psi (14-21 kpa) to help prevent gas entrainment in the heating fluid and to prevent outside air from entering and causing oxidation. Some systems require higher gas blanket pressure for the sake of satisfying pump NPSH requirements. Please investigate if this pressure can be lowered safely. Please again perform venting protocol, but ensure that blanket gas is turned off during venting, otherwise the low boiling vapors cannot efficiently be removed from the system. Turn gas blanket back on in between venting periods. Re-sample in 3 months but only after reducing gas blanket to 2-3 psi (if possible) and venting thoroughly.
01/09/23	This is the first sample taken after the previous fill was drained, flushed with diesel and then re-filled with fresh Petro-Therm.Sample results indicate that the fluid is in suitable condition for continued service. However, fluid viscosity is still well below fresh Petro-Therm and low boiling vapor content is quite high at 13%, possibly related to residual flushing medium. System needs to be vented to reduce the amount of low boiling vapors.Please re-sample in 3 months but only after a thorough venting regime.
11/09/22	Sample results indicate extreme contamination with process fluid. Fluid needs to be replaced immediately. Do not run the system as flash point is dangerously low. (GCD) % < 335°C is severely high. (GCD) 10% Distillation Point is severely low. (GCD) 50% Distillation Point is severely low. (GCD) 90% Distillation Point is severely low. COC Flash Point is severely low. Visc @ 40°C is severely low.
11/09/22	Sample results indicate extreme contamination with process fluid. Fluid needs to be replaced immediately. Do not run the system as flash point is dangerously low. We understand there is also evidence of solids in the accumulator and pump inlet screens, indicative of fluid degradation. Please contact Petro-Canada Lubricants tech services to discuss cleaning and flushing (GCD) % < 335°C is severely high. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. Visc @ 40°C is severely low.