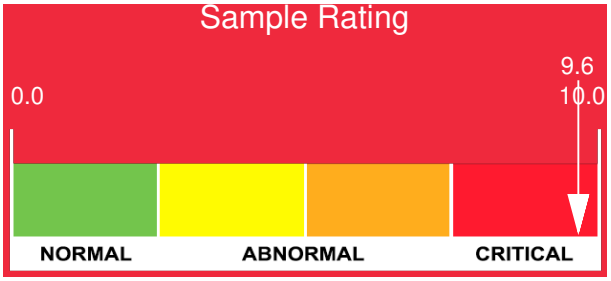
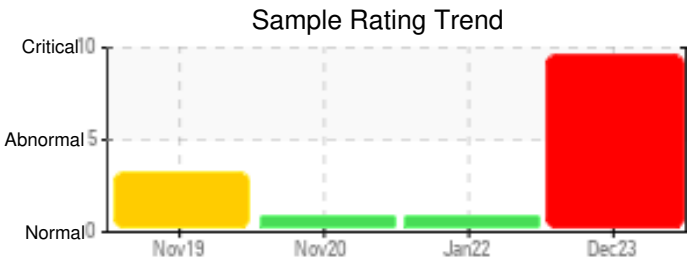




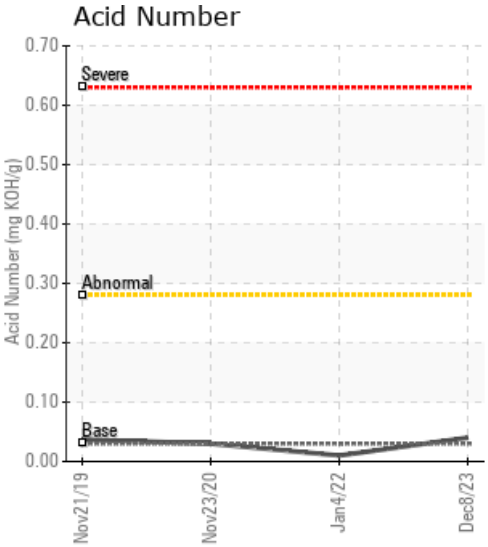
[LSD 11-21-66-3W6] PHASE #3 HEAT MEDIUM

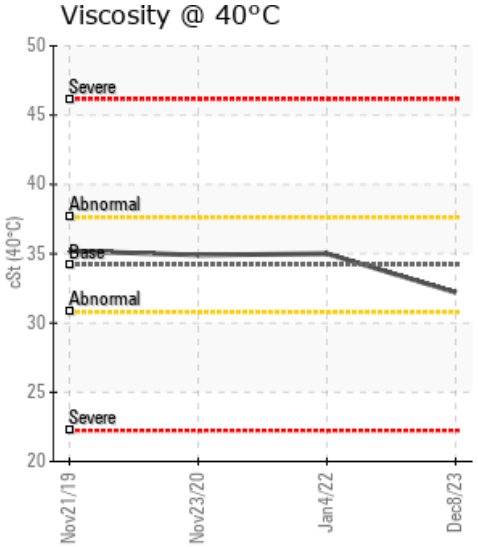
Customer: PTRHTF20236	System Information	Sample Information
Pembina - Petterson Creek Grande Prairie, AB CA Attn: Ryan Solheim Tel: E-Mail: rsolheim@pembina.com	System Volume: 55000 ltr Bulk Operating Temp: 392F / 200C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: HEATEC	Lab No: 02605134 Analyst: Clinton Buhler Sample Date: 12/08/23 Received Date: 12/22/23 Completed: 01/04/24 Clinton Buhler Clinton.Buhler@HFSinclair.com

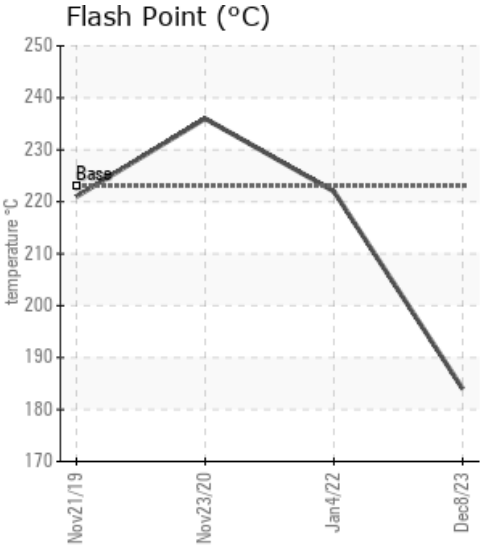
Recommendation: Sample results show that the fluid viscosity, flash point and 10, 50 and 90% distillation temperatures have all gone down, and low boiler vapor content has gone up significantly (18.53%). Typical causes can be top-up with a lighter heating oil, contamination with process fluid, too high of expansion tank blanket gas pressure or thermal degradation. Because the solids content remains very low, thermal degradation is likely not contributing. Please investigate these potential contributors, followed by a thorough venting regime of the expansion tank (if safe to do so). Venting the low boiler vapors off can help restore fluid properties. Please re-sample in 3 months but only after venting the system thoroughly.

Comments: (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 abnormally low. COC Flash Point is marginally low.

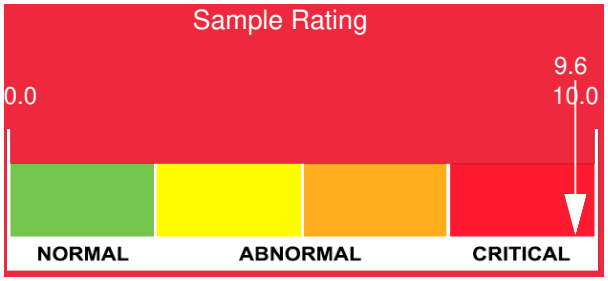
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
12/08/23	12/22/23	0.0m		363 / 184	23	32.2	0.04	0.021	598 / 315	711 / 377	872 / 467	18.53
01/04/22	01/24/22	24.0m	Pump suction	432 / 222	4.5	35.0	0.01	0.058	729 / 387	818 / 437	923 / 495	0.69
11/23/20	12/14/20	12.0m	Pump suction	457 / 236	9.1	34.9	0.03	0.088	732 / 389	819 / 437	927 / 497	0.00
11/21/19	02/03/20	1.0m	PUMP SUCTION	430 / 221	814.9	35.2	0.037	0.050	736 / 391	814 / 435	916 / 491	0.00
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

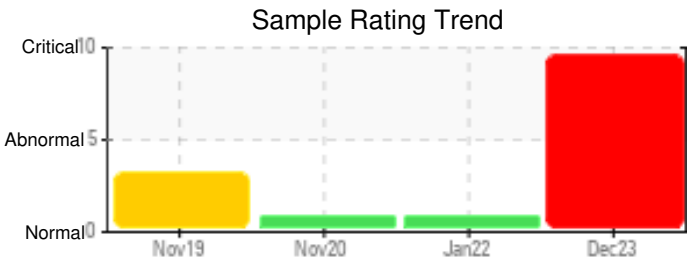






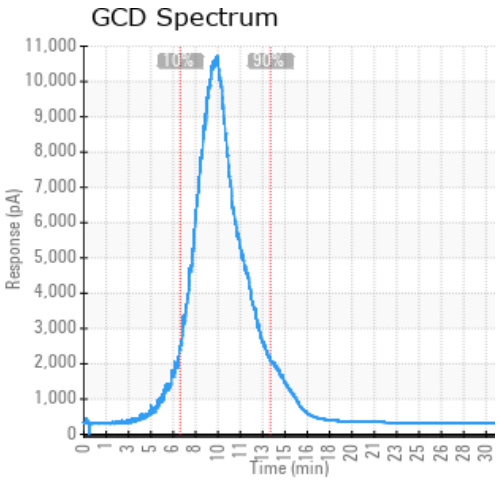
PETRO-CANADA LUBRICANTS

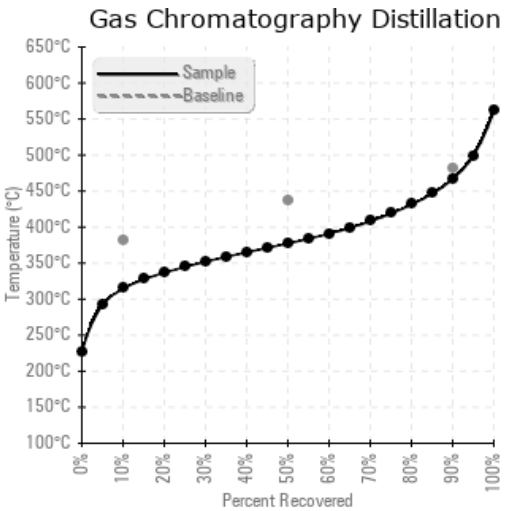


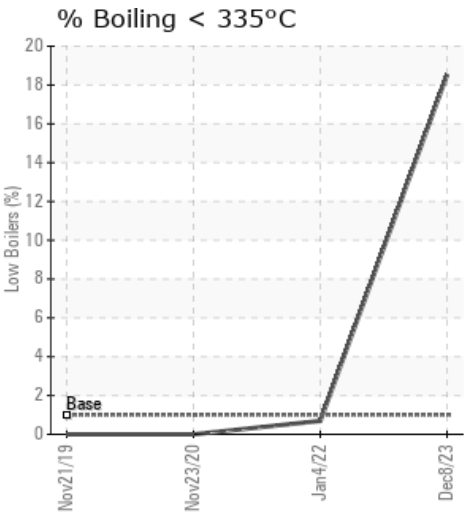


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
12/08/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/04/22	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/23/20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/21/19	3	0	0	0	0	0	0	0	0	0	0	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

01/04/22	Sample results indicate the fluid is in suitable condition for continued service.Please re-sample in 12 months (GCD) 90% Distillation Point is marginally high.
11/23/20	Sample results indicate that the thermal fluid is suitable for continued service. Slightly elevated 90% GCD temperature and slightly increased viscosity may be an initial indication of oxidation. Please ensure that blanket gas is operational and applied to the expansion tank headspace. Please re-sample in 12 months (GCD) 90% Distillation Point is marginally high.
11/21/19	Sample results indicate that there is excess water in the system. This may be related to initial construction and commissioning or may also be related to where the sample could have been drawn from (stagnant low lying area where water can collect) and/or perhaps the sample valve and piping was not purged out thoroughly before taking the sample. Water vapor should be safely and thoroughly vented from the system expansion tank. Check for water at low spots in the system. Once this is completed, please re-sample in ~3-6 months, being cognizant to thoroughly purge the sample valve and piping before obtaining the sample. Water contamination levels are abnormally high

