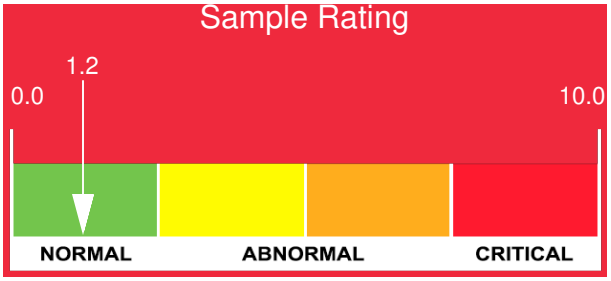
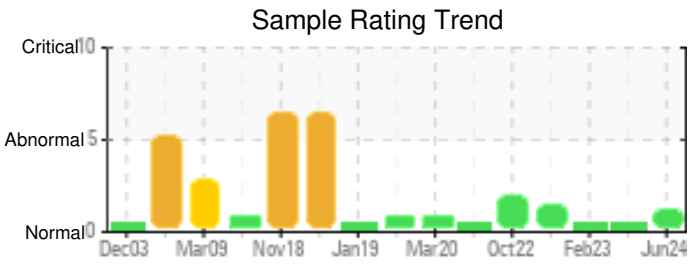




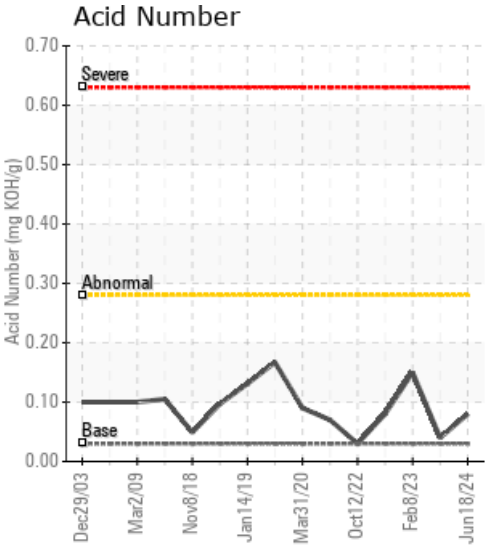
HEAT TRANSFER SYSTEM

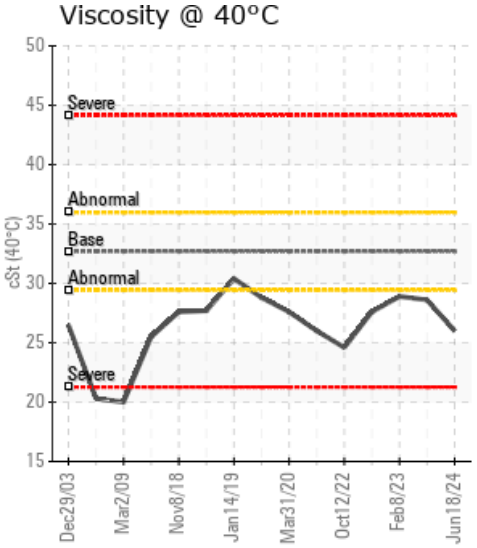
Customer: PTRHTF10008	System Information	Sample Information
ARKEMA 1415 STEELE AVENUE GRAND RAPIDS, MI 49507 US Attn: John Eshleman Tel: (616)243-4578 E-Mail: john.eshleman@arkema.com	System Volume: 3000 gal Bulk Operating Temp: 540F / 282C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make:	Lab No: 02644448 Analyst: Yvette Trzcinski Sample Date: 06/18/24 Received Date: 06/27/24 Completed: 07/02/24 Yvette Trzcinski yvette.trzcinski@HFSinclair.com

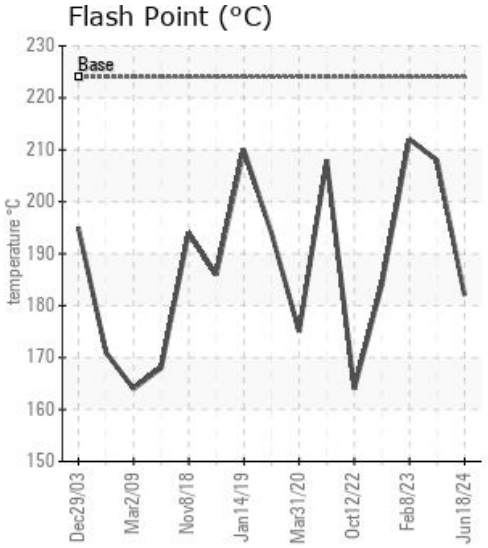
Recommendation: The Low boilers have almost doubled since the last sample and that has lowered the flash point. The viscosity has decreased and the insolubles in the oil have increased, all signs of thermal degradation of the fluid. Venting the low boilers could be helpful and then I would suggest re-sampling the fluid

Comments: Visc @ 40°C is abnormally low. COC Flash Point is marginally low.

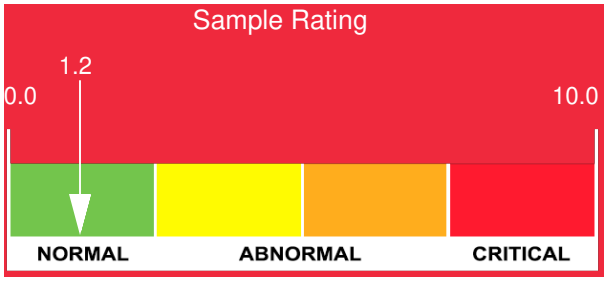
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
06/18/24	06/27/24	0.0m	PUMP AREA	360 / 182	41	26.0	0.08	0.233	673 / 356	792 / 422	897 / 481	6.39
08/09/23	08/15/23	0.0m	pump area	406 / 208	26.3	28.6	0.04	0.159	692 / 367	794 / 423	893 / 479	3.70
02/08/23	02/23/23	0.0m	pump area	414 / 212	2.9	28.9	0.15	0.147	697 / 369	795 / 424	893 / 479	2.98
11/10/22	11/15/22	59.0m	PUMP AREA	363 / 184	36.0	27.6	0.08	0.411	693 / 367	793 / 423	890 / 476	3.49
10/12/22	10/28/22	47.0m		327 / 164	11.9	24.6	0.03	0.018	678 / 359	789 / 421	890 / 476	5.48
Baseline Data				435 / 224		32.7	0.03		693 / 367	790 / 421	887 / 475	2.5

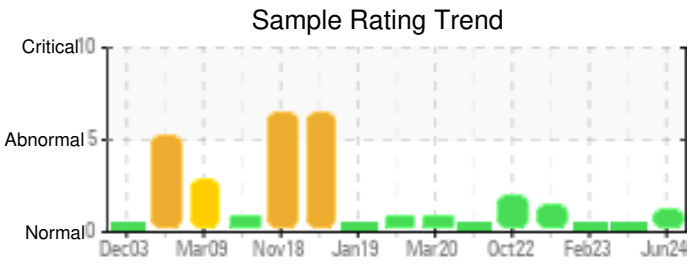






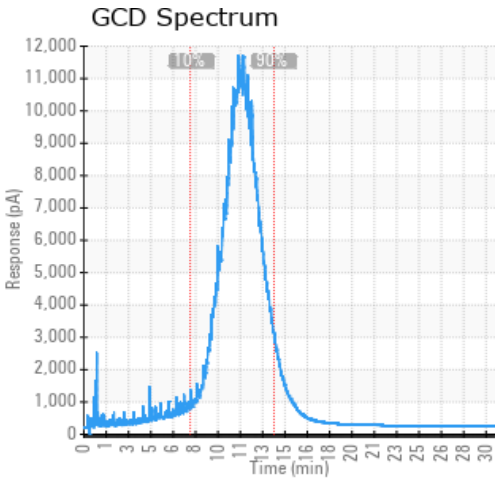
PETRO-CANADA LUBRICANTS

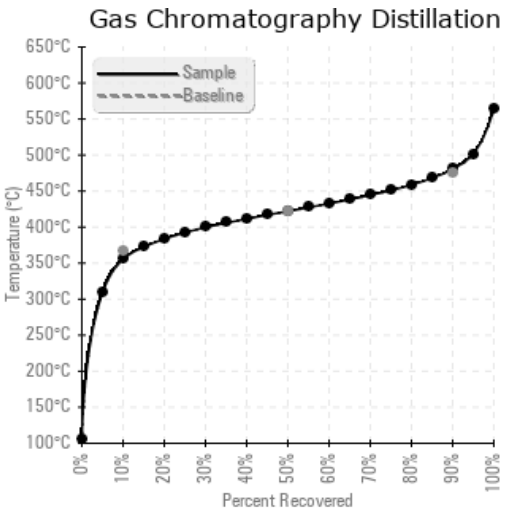


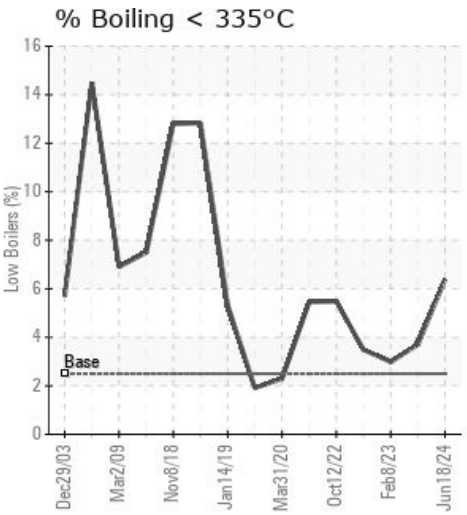


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
06/18/24	166	2	6	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	115	1
08/09/23	109	2	5	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	97	2
02/08/23	85	1	4	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	90	0
11/10/22	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85	0
10/12/22	66	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	78	0
Baseline Data			0	0						0			0	0					0				270	

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







Historical Comments

08/09/23	acid number, flash point, GCD boiling points and insolubles are within specifications and viscosity has stayed constant from the last sample. Resample in 9-12 months
02/08/23	Viscosity has risen slightly as well as the flash point - probably due to top up of small amount of oil since the last sample. The GCD boiling points, and solids, flash point, viscosity and acid number are all within specification. Resample in 6 - 9 months Visc @ 40°C is abnormally low.
11/10/22	after replacing 1300 -1500 gallons of the fluid from the last sample in October 2022 the viscosity has improved by 10% up to 27.6 cSt and the flash point has increased to 184 F. The solids level has increased, recommend operating the system monitor filters if they are on the system and resample in 6 months Pentane Insolubles levels are abnormally high. Visc @ 40°C is abnormally low. COC Flash Point is marginally low.
10/12/22	The viscosity continues to decrease and is 24% below the original viscosity of the fluid which happens due to thermal cracking which is causing some lower viscosity material which is what we call low boilers (GCD % <335 C) which are at 5.48 % that is also negatively affecting the flash point causing it to be very low at 164 C /327 F recommend venting the low boilers and consider sweetening the system adding a minimum of 30% new oil to the system and re send a new oil sample COC Flash Point is severely low. Visc @ 40°C is abnormally low.