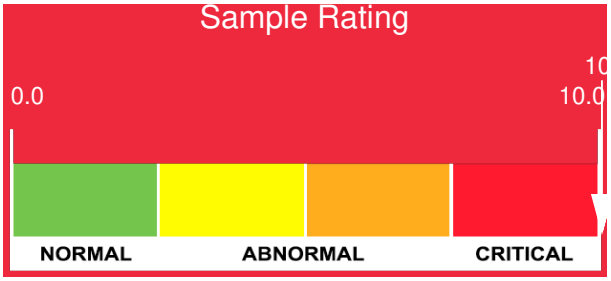
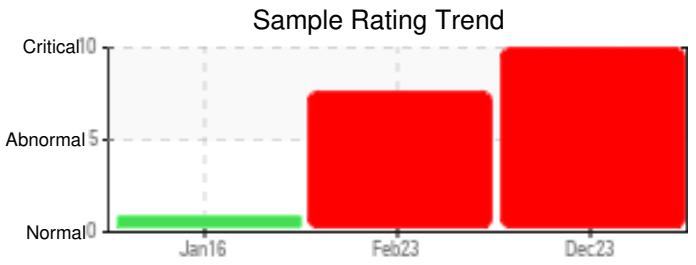




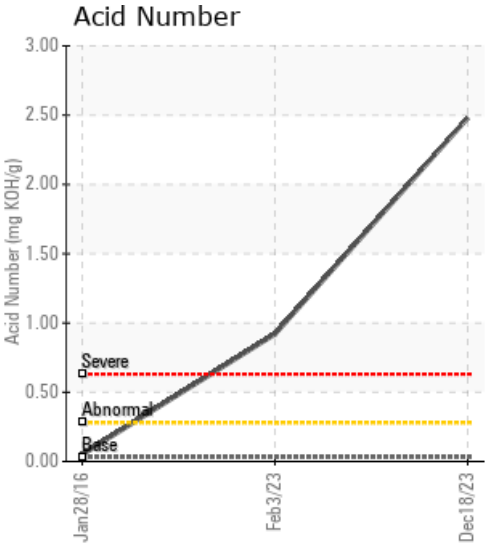
[LSD#B-88-I/94-B-1] S059-300 HEAT MEDIUM

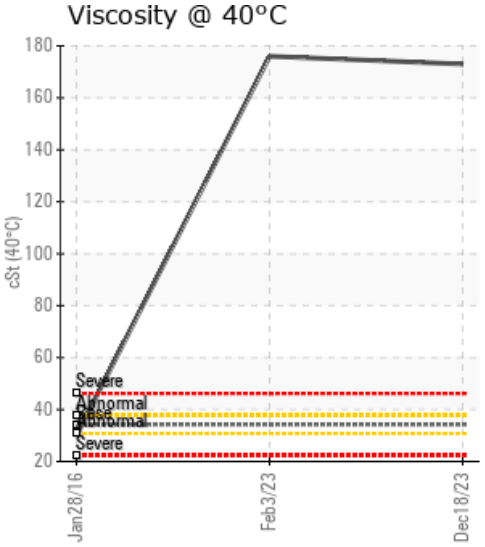
Customer: PTRHTF60051	System Information	Sample Information
Canadian National Resources - CNRL Fort St John, BC V1J 1B2 CA Attn: Austin Furgiuele Tel: (250)263-3445 E-Mail: austin.furgiuele@cnrl.com	System Volume: 22000 ltr Bulk Operating Temp: 367F / 186C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: PROPAK	Lab No: 02606857 Analyst: Clinton Buhler Sample Date: 12/18/23 Received Date: 01/05/24 Completed: 01/08/24 Clinton Buhler Clinton.Buhler@HFSinclair.com

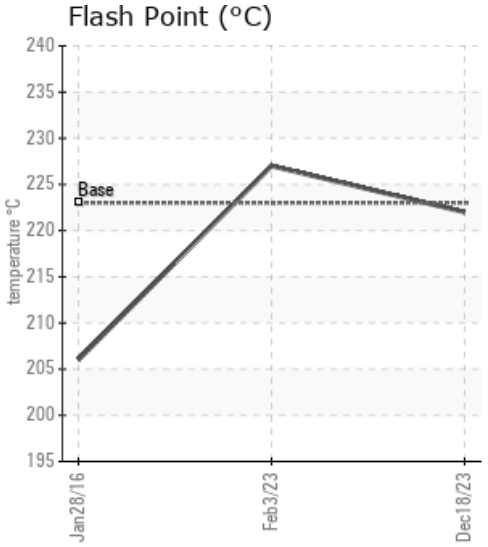
Recommendation: Sample results indicate the system requires a cleaning, flush and re-fill with fresh heat transfer fluid due to severe oxidative degradation: Acid Number is at 2.48 (limit is 1); this is likely causing significant metal corrosion as shown by 487 ppm of Iron; fluid viscosity is 173 cSt (should be close to 35) cSt. Solids content has increased to 3.47%, indicating severe system fouling. Plans need to be made for system cleaning and fluid replacement in 2024. Please contact Petro-Canada Lubricants Tech Services for further details.

Comments:

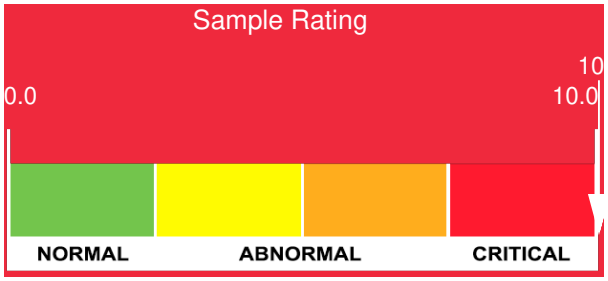
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
12/18/23	01/05/24	7.0y		432 / 222	103	173	2.48	3.47	716 / 380	801 / 427	884 / 473	1.73
02/03/23	03/17/23	0.0y	sight glass	441 / 227	119.6	176	0.92	0.500	722 / 383	803 / 428	886 / 474	0.99
01/28/16	02/16/16	6.0y	RETURN LINE	403 / 206	65.9	29.9	0.05	0.149	715 / 379	820 / 438	933 / 501	2.37
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

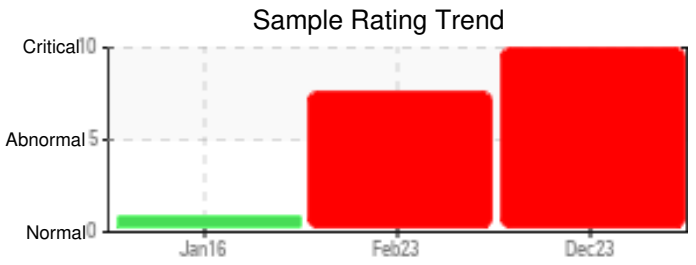






PETRO-CANADA LUBRICANTS

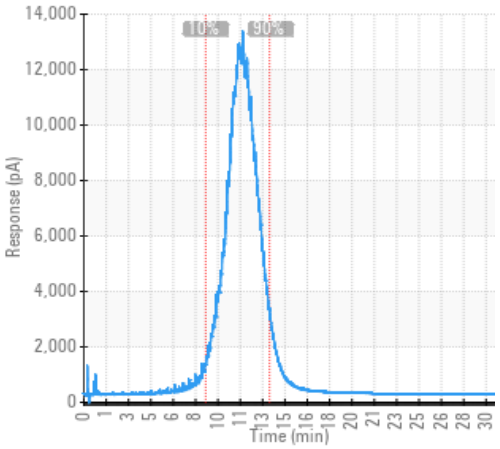




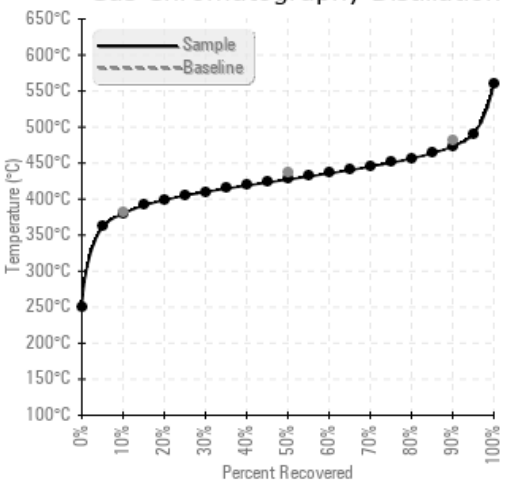
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
12/18/23	487	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	10	0	0	0	0	0	0	0
02/03/23	375	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	9	0	0	0	0	0	0	0
01/28/16	4	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
Baseline Data			0	0						0			0	0					0				0	

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

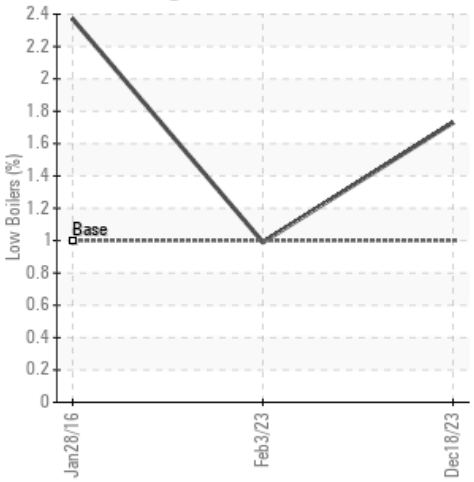
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



Historical Comments

02/03/23	Sample has several parameters that are concerning, the viscosity is significantly higher than Petro Therm oil. The acid number is also quite high which could be the reason for the higher PQ, iron and pentane insoubles. How was the sample collected? Samples should be collected from a turbulent area like the pump discharge if possible. If there are no pumps in the system and a low point must be used for collection ensure the sample point is purged well to clear any sediment that has collected in the low areas. The sample should be at or near system temperature at the time of collection, if it is not continue to purge until the fluid temperature at the sample point has reached system temperatures. Resample.PQ levels are abnormal. Iron ppm levels are abnormal. Pentane Insolubles levels are abnormally high. Acid Number (AN) is severely high. Visc @ 40°C is severely high.
01/28/16	(GCD) 90% Distillation Point is high. No history or other information makes this sample difficult to give trend analysis. (GCD) 90% Distillation Point is abnormally high.