![PETRO-CANADA LUBRICANTS]

Sample Rating

0.0   0.8   10.0

NORMAL   ABNORMAL   CRITICAL

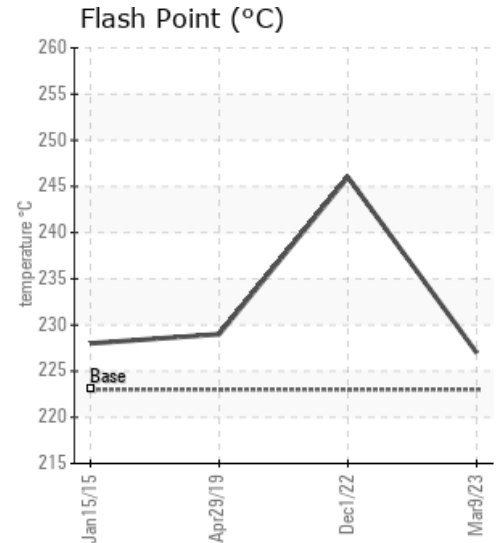## Sample Rating Trend

Critical 10
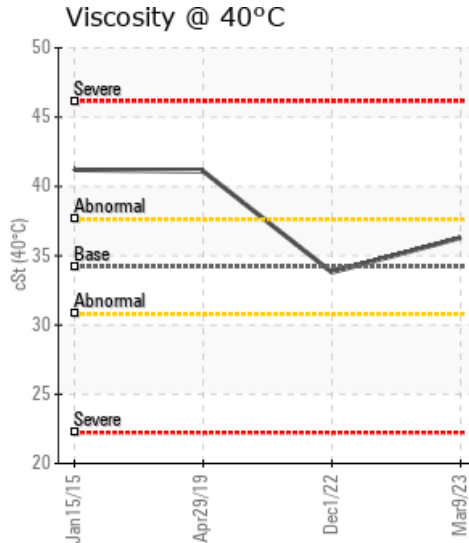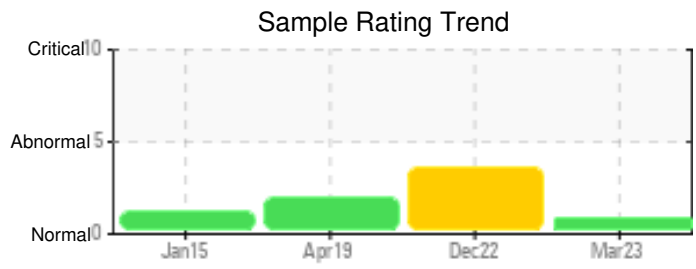Abnormal 5
Normal 0

Jan15   Apr19   Dec22   Mar23

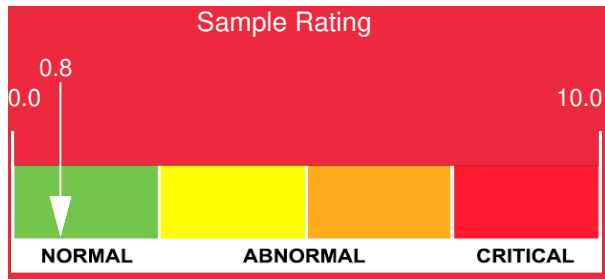# [16-2-20-01W4] HOT OIL SYSTEM/HRU

Customer: PTRHTF20152	System Information	Sample Information
PEMBINA NGL CORPORATION P.O. BOX 640 MEDICINE HAT, AB T1A 7G6 Canada Attn: Chun guang Liu Tel: (587)343-1260 E-Mail: cliu@pembina.com	System Volume: 120000 ltr Bulk Operating Temp: 482F / 250C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: Worley	Lab No: 02546135 Analyst: Lyle Dach Sample Date: 03/09/23 Received Date: 03/17/23 Completed: 03/24/23 Lyle Dach lyle.dach@HFSinclair.com

Recommendation:

Comments: Fluid looks to be in very good condition and would be suitable for continued use. The 90% distillation point is slightly high, ensure blanket gas is functioning properly. Resample in 12 months. (GCD) 90% Distillation Point is marginally high.
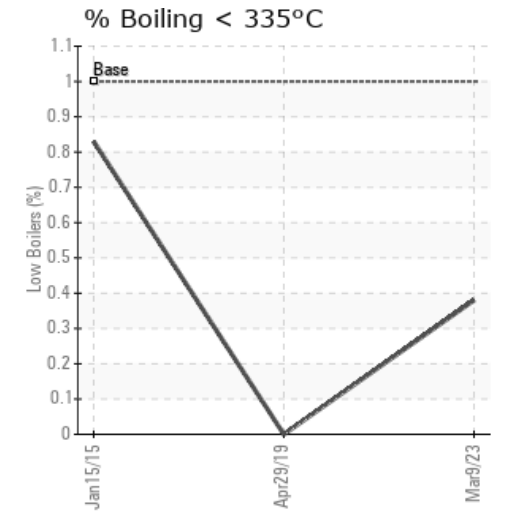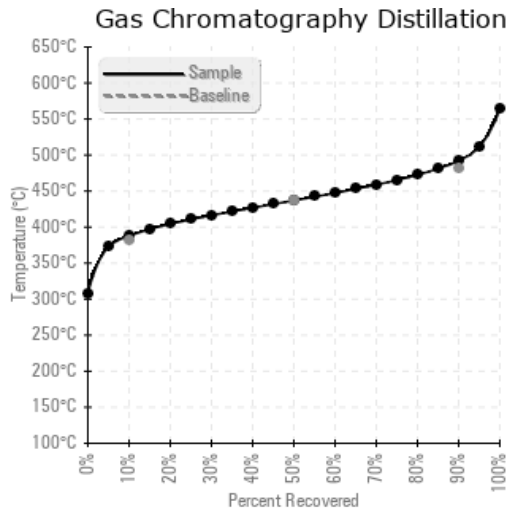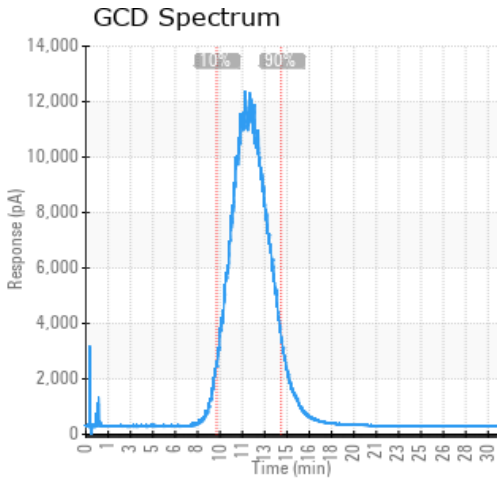
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/09/23	03/17/23	17.0y	circ pump disch	441 / 227	0.00	36.3	0.04	0.029	730 / 388	819 / 437	918 / 492	0.38
12/01/22	12/09/22	1.0y		475 / 246	155.5	33.8	0.06	0.037				
04/29/19	05/13/19	15.0y	FILTER UPSTREAM	444 / 229	1.0	41.1	0.016	0.041	731 / 388	841 / 449	968 / 520	0.00
01/15/15	01/22/15	10.0y	AFTER FILTER	442 / 228	1.6	41.2	0.03	0.029	704 / 373	809 / 432	933 / 500	0.83
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

Acid Number

Viscosity @ 40°C

Flash Point (°C)

Sample Rating

0.0 — 0.8 → — 10.0

NORMAL | ABNORMAL | CRITICAL

Sample Rating Trend

Critical 10 — Abnormal 5 — Normal 0
Jan15 — Apr19 — Dec22 — Mar23
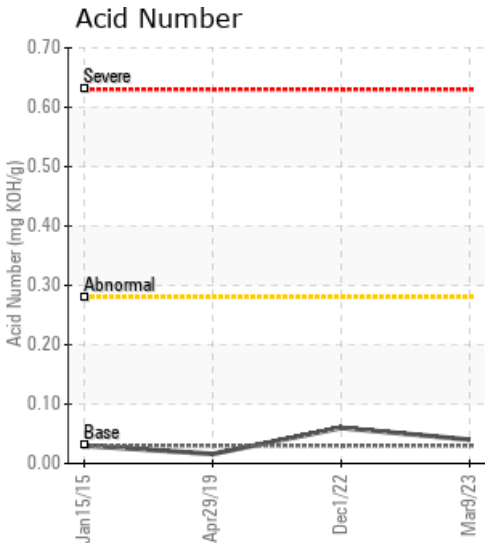
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
03/09/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/01/22	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
04/29/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/15/15	0	0	0	0	0	0	0	0	0	0	0	1	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

12/01/22	*** NOTE: Too much water present (>10% free water) in sample to conduct SimDist (GCD) analysis ***Free water concentration is very high, continue draining water and venting steam to get water levels to acceptable levels. All other available parameters appear to be at acceptable levels. Resample once free water is no longer visible in the samples.
04/29/19	Fluid is in very good condition. The viscosity and GCD 90% distillation points are higher than new Petro-Therm. If this fluid is in fact 15 years old that is normal. Petro-Therm prior to 2006 was a higher viscosity fluid.
01/15/15	Viscosity showing slight increase. In general the fluid is in good condition. Resample in 6 months to begin establishing trend. Be sure to us Customer # PTRHTF20152 to ensure future samples get linked up with prior history. (GCD) 90% Distillation Point is abnormally high.