

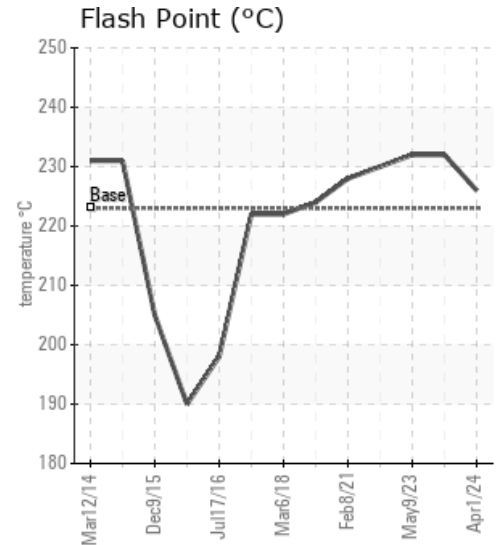
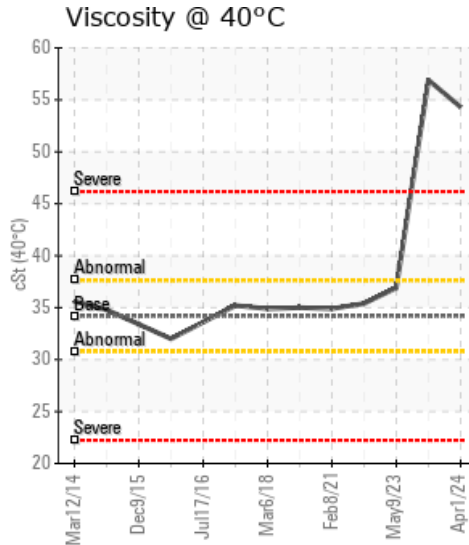
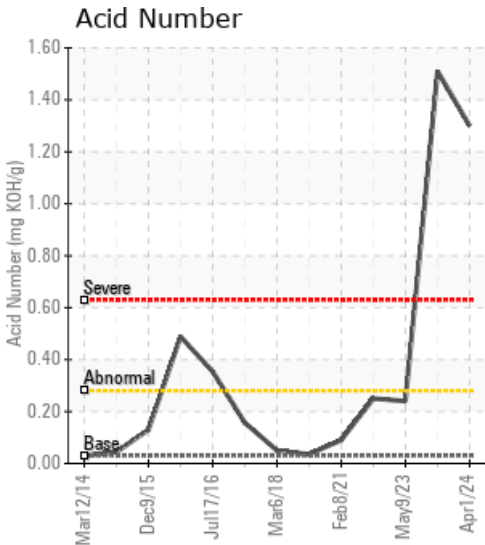
[15-12-50-21W5] TOURMALINE BANSHEE 5500-2

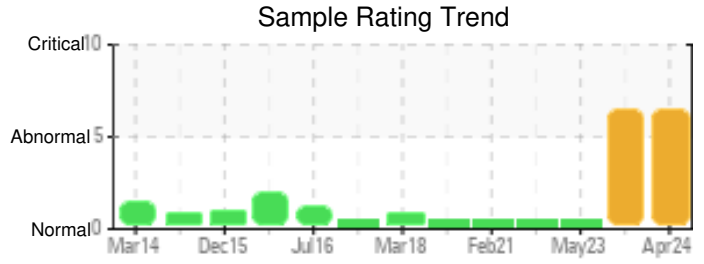
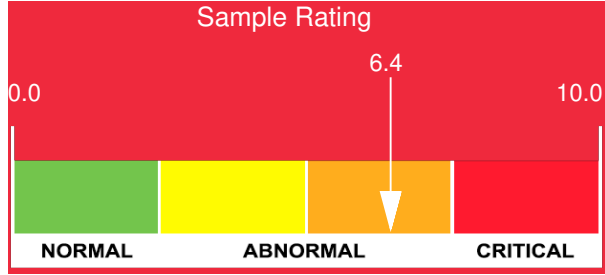
Customer: PTRHTF60079	System Information	Sample Information
Tourmaline 15-12-50-21W5 Edson, AB T7E 1R8 CA Attn: Justin Thebeau Tel: E-Mail: justin.thebeau@tourmalineoil.com	System Volume: 20000 ltr Bulk Operating Temp: 482F / 250C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: RUSHTON	Lab No: 02626251 Analyst: Clinton Buhler Sample Date: 04/01/24 Received Date: 04/02/24 Completed: 04/30/24 Clinton Buhler Clinton.Buhler@HFSinclair.com

Recommendation: Sample results indicate the fluid is severely and degraded and the system is fouled with high solids content, going from 1.11% to 2.57% in less than 3 months. Acid number is well past the condemnable limit (due to fluid oxidation) and likely has caused system corrosion, judging by the increase in Iron content at 36 ppm. Fluid needs to be replaced and the system requires a cleaning and flush to remove the excess solids (degradation byproducts.) Petro-Canada Lubricants can assist with providing guidance on the cleaning process using Calflo Cleaning Fluid followed by a flush with Calflo Flushing Fluid. After fluid replacement, please ensure that expansion tank blanket gas is operational to prevent future oxidation.

Comments: Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Visc @ 40°C is severely high. (GCD) 90% Distillation Point is marginally high.

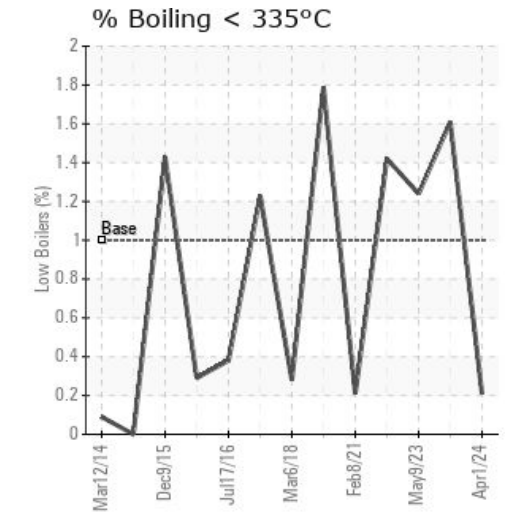
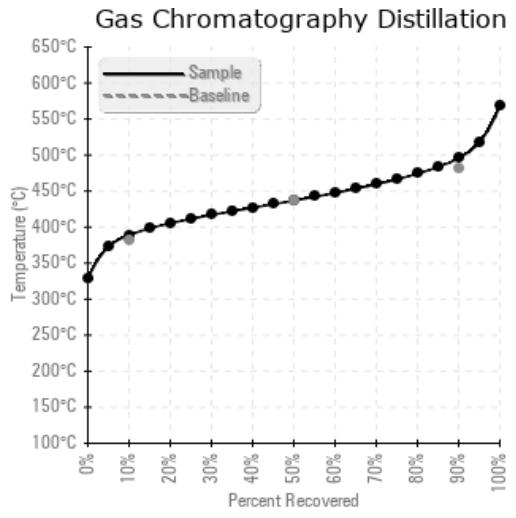
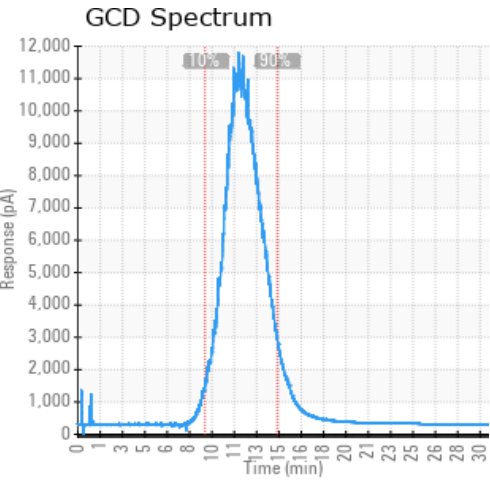
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
04/01/24	04/02/24	0.0y		439 / 226	56	54.3	1.30	2.57	732 / 389	818 / 437	924 / 496	0.21
01/20/24	02/08/24	7.5y		450 / 232	159	56.9	1.51	1.11	724 / 384	816 / 435	921 / 494	1.61
05/09/23	05/23/23	0.0y		450 / 232	11.8	36.9	0.24	0.254	724 / 385	815 / 435	915 / 490	1.24
07/05/22	07/19/22	0.0y	discharge	446 / 230	15.1	35.4	0.25	0.139	723 / 384	814 / 434	917 / 492	1.42
02/08/21	03/02/21	12.0y	Pump Discharge	442 / 228	8.5	34.9	0.09	0.099	730 / 388	817 / 436	918 / 492	0.21
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00





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
04/01/24	36	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/20/24	28	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
05/09/23	10	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/05/22	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02/08/21	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baseline Data			0	0						0			0	0					0				0	

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



Historical Comments	
01/20/24	There appears to be a significant change in the fluid viscosity, acidity and pentane insolubles in 8 months time. This would be severe degradation in that short period of time. Resample the unit, ensure the sample point is purged adequately and the sample is representative of the whole system. If equipped the pump discharge line is an ideal place to collect the sample; low point drains can collect settled materials and may not be representative of the whole system if not purged well. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Visc @ 40°C is severely high. (GCD) 90% Distillation Point is marginally high.
05/09/23	Sample results indicate that the fluid is in good condition and is suitable for continued service. Resample in 12 months.
07/05/22	Sample results indicate that the fluid is in very good condition and is suitable for continued service. Resample in 12 months. If possible please include time on oil when filling out analysis request forms.
02/08/21	Fluid remains in excellent condition. Continue to submit samples annually to proactively monitor fluid condition.

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