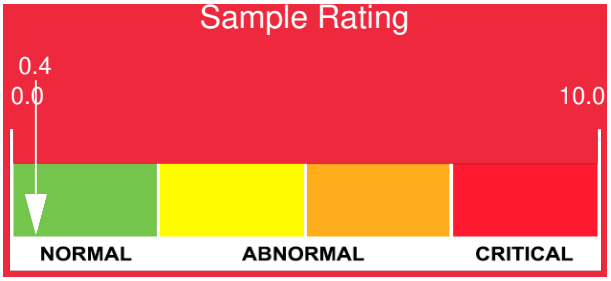
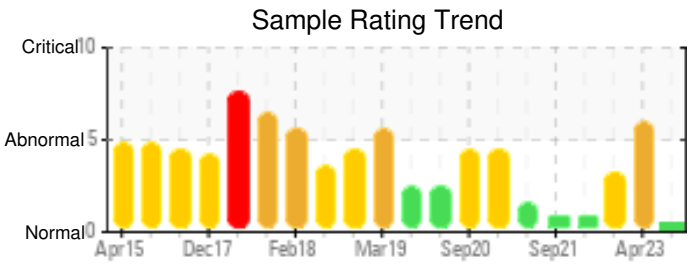




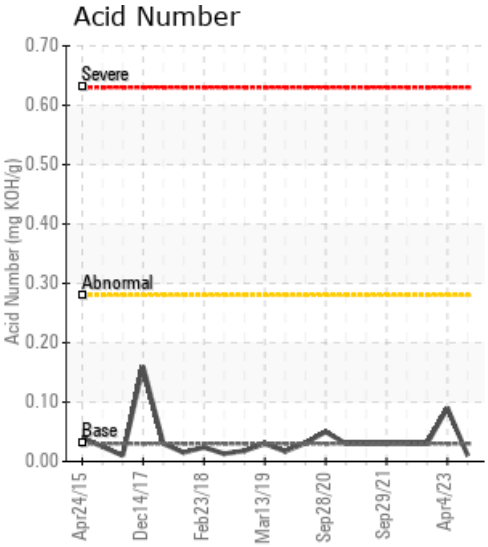
[16-11-54-15W5] TOURMALINE

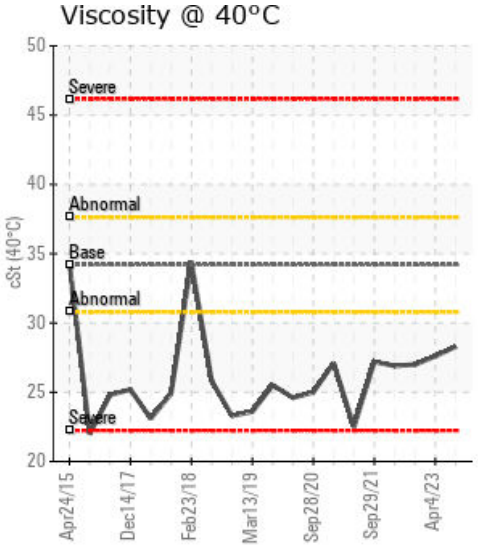
Customer: PTRHTF20158	System Information	Sample Information
Tourmaline 16-11-54-15W5 Edson, AB T0E 1W0 CA Attn: Brock Austman Tel: (780)723-1319 E-Mail: brock.austman@tourmalineoil.com	System Volume: 14000 ltr Bulk Operating Temp: 392F / 200C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02633343 Analyst: Clinton Buhler Sample Date: 04/16/24 Received Date: 05/03/24 Completed: 05/13/24 Clinton Buhler Clinton.Buhler@HFSinclair.com

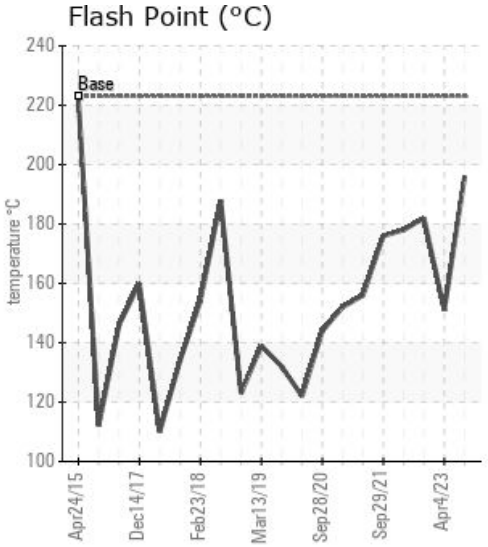
Recommendation: Results indicate an improvement from the sample taken a year prior. Low boiler vapor content has dropped from 13.33 to 6.04% and flash point has increased. Continue regular venting of the expansion tank to keep low boilers to a minimum. Please re-sample in 12 months.

Comments:

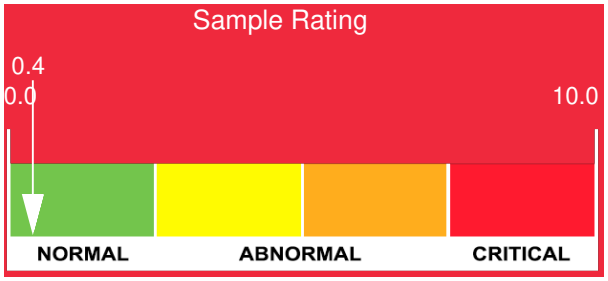
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
04/16/24	05/03/24	0.0y		385 / 196	21	28.3	0.01	0.056	679 / 360	803 / 429	912 / 489	6.04
04/04/23	04/17/23	0.0y	Pump discharge	304 / 151	1.4	27.6	0.09	0.045	562 / 295	772 / 411	889 / 476	13.33
10/12/22	12/02/22	0.0y	Pump discharge	360 / 182	12.1	27.0	0.03	0.019	670 / 355	804 / 429	915 / 490	7.06
04/20/22	06/02/22	0.0y	pump discharge	352 / 178	1.8	26.9	0.03	0.043	673 / 356	803 / 428	912 / 489	6.66
09/29/21	10/21/21	0.0y	pump discharge	349 / 176	10.4	27.2	0.03	0.016	678 / 359	803 / 429	912 / 489	6.19
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

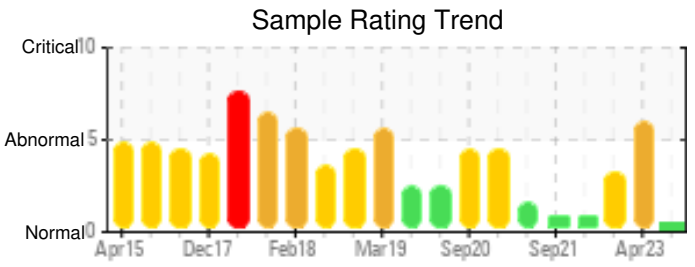






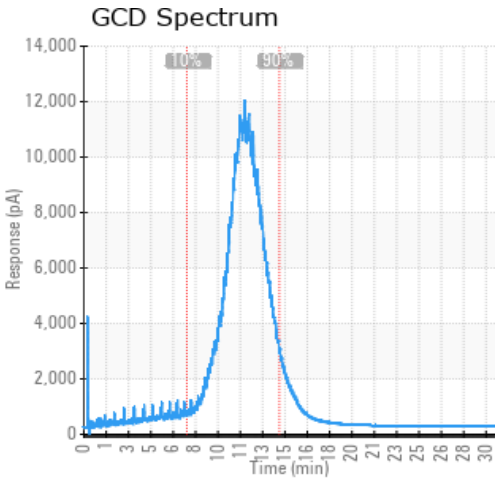
PETRO-CANADA LUBRICANTS

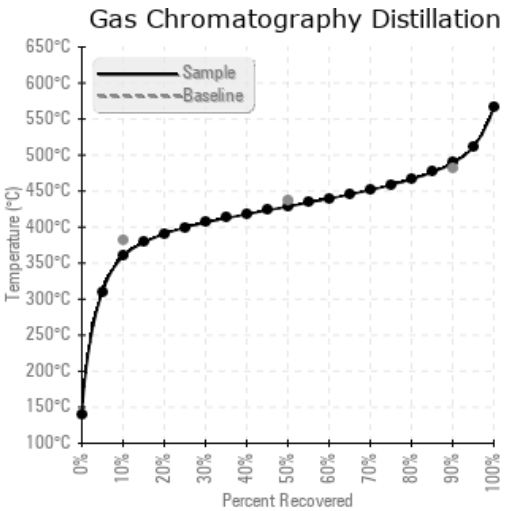


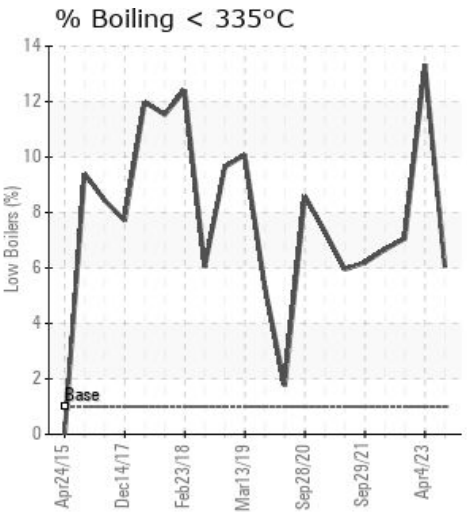


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
04/16/24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/04/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/12/22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/20/22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/29/21	0	0	0	0	0	0	0	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 anaysis results (above) in parts per million (ppm). [10,000 ppm = 1.0%]







Historical Comments

04/04/23	Sample results indicate continuing fluid dilution as noted by lowered flash point and 10% GCD temperature as well as increased low boiling vapor content (13.33%). This may be caused by contamination with process condensate, unusually high blanket gas pressure or thermal degradation, although the latter seems less likely because solids content remains quite low. REGULAR venting of expansion tank is required to reduce low boiling vapor content and to help increase flash point. Please ensure venting is happening regularly prior to re-sampling in 3 months.
10/12/22	Sample results indicate fluid condition remains similar over the last couple samples. Continue REGULAR venting of expansion tank to further reduce low boiling vapor content and to help increase flash point. Please wait at least 12 months before re-sampling again and ensure venting is happening regularly.
04/20/22	Sample results again indicate a small improvement in Flash Point. Continue regular venting of expansion tank to further reduce low boiling vapor content and to help increase flash point. Please wait at least 6 months before re-sampling again and ensure venting is happening regularly.
09/29/21	Sample results indicate small improvement in Flash Point. Low boiling vapor content remains fairly flat. Continue regular venting of expansion tank to further reduce low boiling vapor content and to help increase flash point. Please wait at least 6 months before re-sampling again