

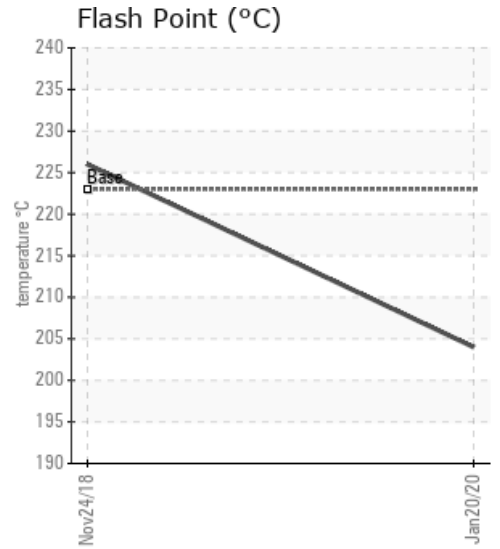
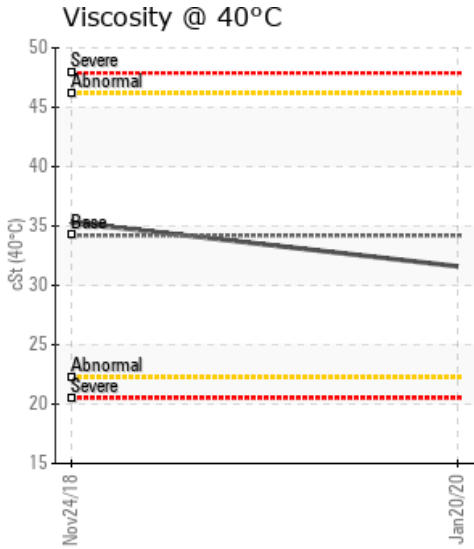
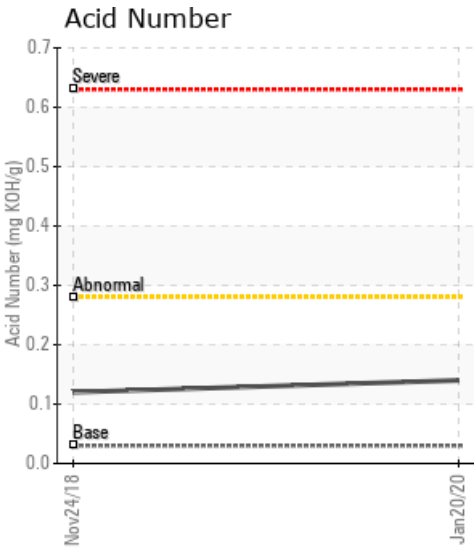
2-11-80-16W6M 5500-1

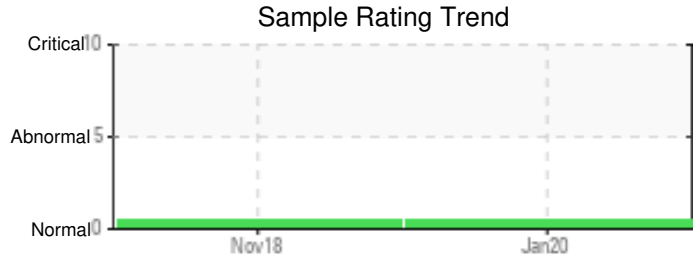
Customer: PTRHTF20156	System Information	Sample Information
TOURMALINE OIL 9920 98a Ave FORT ST. JOHN, BC V1J 1S2 Canada Attn: Brandon Braun Tel: (250)262-5420 E-Mail: Brandon.braun@tourmalineoil.com	System Volume: 15000 ltr Bulk Operating Temp: 345F / 174C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02353745 Analyst: Clinton Buhler Sample Date: 01/20/20 Received Date: 05/13/20 Completed: 05/20/20 Clinton Buhler Clinton.Buhler@PetroCanadaLSP.com

Recommendation: Sample missing 'total time on fluid'. Please include when registering samples. Sample results indicate that the fluid is suitable for continued service. % of low boiling vapors <335C has increased to 3.05 from 0.38 last sample, viscosity has slightly reduced to 31.6 from 35.3 and flash point has gone from 226C to 204C. This can be related to possible thermal degradation, contamination with a process fluid or can be the result of high blanket gas pressure in the expansion tank. As part of good maintenance practices, it is recommended to regularly vent off any low boiling vapors from the system to help bring these parameters back inline. Venting needs to happen only when blanket gas is turned off; ensure blanket gas is turned back on after venting. If possible, adjust blanket gas pressure to be between 2-3 psi (if circulation pump NPSH requirements allow). Please re-sample in 12 months after venting has been carefully executed.

Comments:

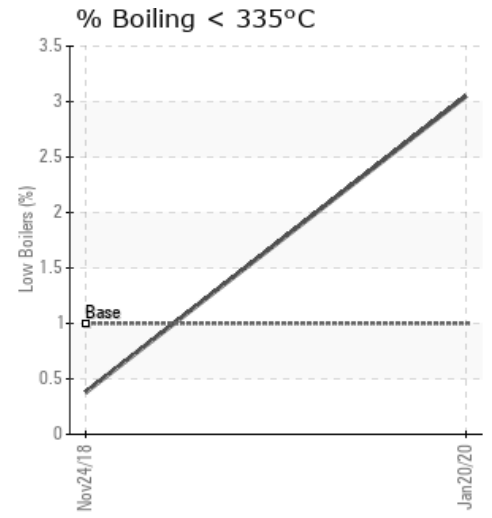
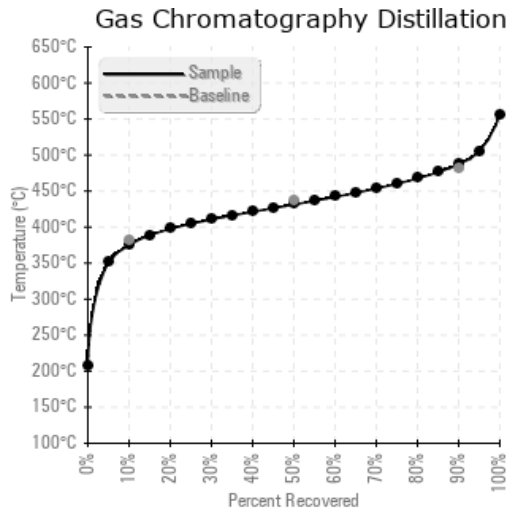
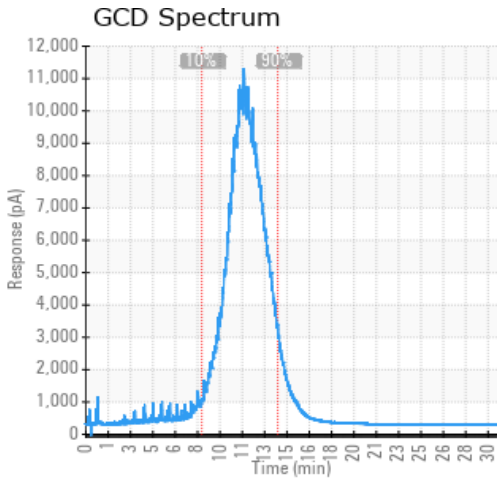
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
01/20/20	05/13/20	0m	DISCHARGE	399 / 204	28.7	31.6	0.14	0.170	707 / 375	808 / 431	909 / 487	3.05
11/24/18	12/18/18	18m		439 / 226	152.0	35.3	0.12	0.045	721 / 383	810 / 432	917 / 492	0.38
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
01/20/20	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
11/24/18	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 analysis results (above) in parts per million (ppm). [10,000 ppm = 1.0%]



Historical Comments

11/24/18	The fluid is in excellent condition and suitable for further use. Please re-sample in 6 months.

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