

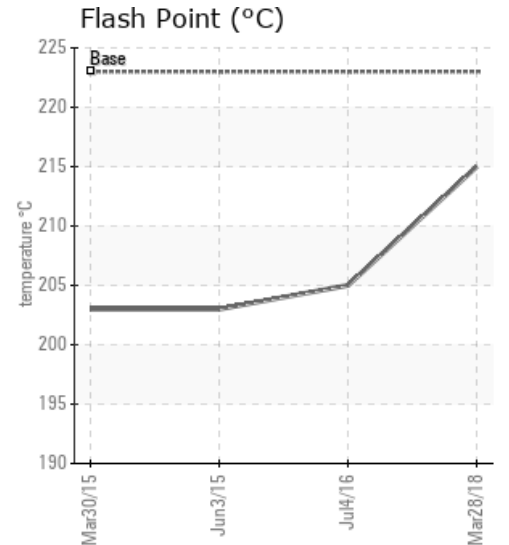
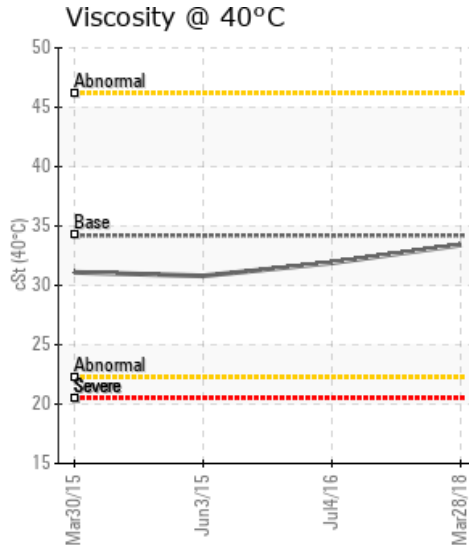
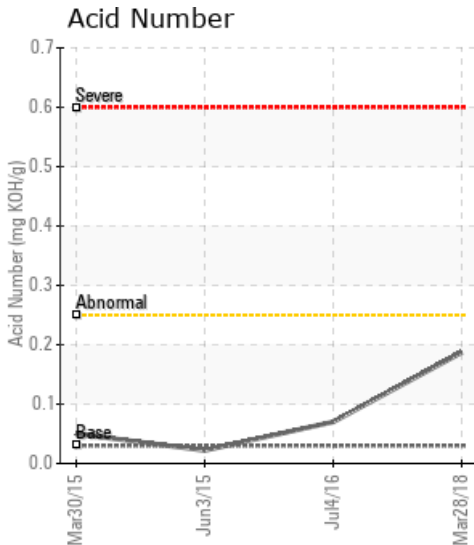
TRAIN #2 HEAT MEDIUM

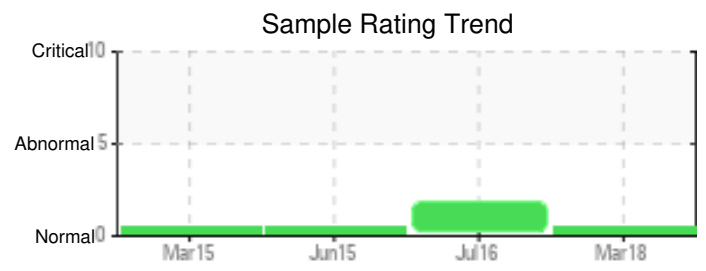
Customer: PTRHTF20156	System Information	Sample Information
TOURMALINE OIL 13-25-80-16W6 9920 98a Ave FORT ST. JOHN, BC V1J 1S2 Canada Attn: Russel Norrish Tel: (250)262-7229 E-Mail: russ.norrish@tourmalineoil.com	System Volume: 55000 ltr Bulk Operating Temp: 464F / 240C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: PROPAK	Lab No: 02208691 Analyst: Clinton Buhler Sample Date: 03/28/18 Received Date: 04/06/18 Completed: 04/20/18 To discuss this report contact Clinton Buhler at 780-516-9920

Recommendation: Sample results indicate that the thermal fluid is suitable for continued service. Acid Number has increased since the last sample, which can be an indication of oxidation. Ensure blanket gas is properly being applied to the expansion tank. Re-sample in 12 months

Comments:

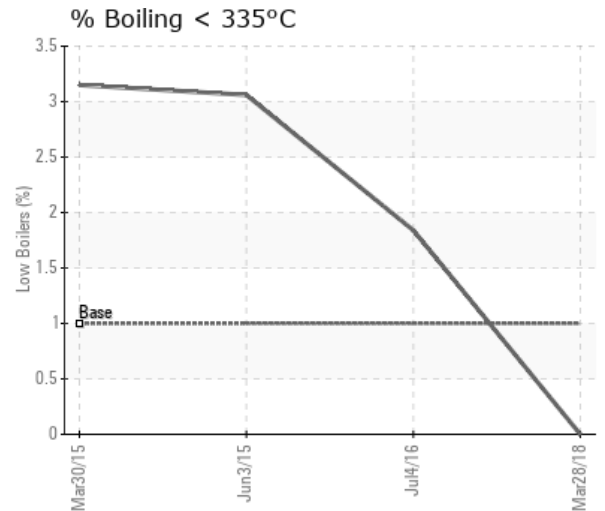
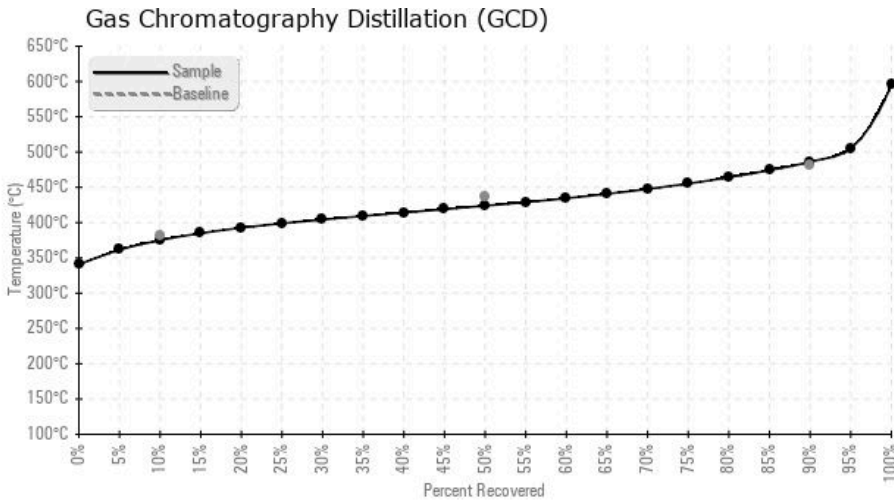
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/28/18	04/06/18	48m		419 / 215	7.8	33.4	0.187	0.046	707 / 375	795 / 424	907 / 486	0.00
07/04/16	07/15/16	24m	PUMP SUCTION	401 / 205	0.00	31.9	0.07	0.103	699 / 371	799 / 426	904 / 485	1.84
06/03/15	06/09/15	0m		397 / 203	17.8	30.8	0.022	0.038	700 / 371	812 / 434	921 / 494	3.06
03/30/15	04/17/15	0m	PUMP SUCTION	397 / 203	15.6	31.1	0.050	0.025	698 / 370	810 / 432	918 / 492	3.15
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	
03/28/18	4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	
07/04/16	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	12	0
06/03/15	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	13	0
03/30/15	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	13	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

07/04/16	The fluid is in good condition but shows indications of thermal degradation in an early stage. This is not a problem at this moment. It is recommended to vent off low boiler vapors to atmosphere on a regular basis. Please re-sample in 6 months.
06/03/15	Sample indicates that fluid is suitable for continued use. Resample in 6 months. (GCD) 90% Distillation Point is marginally high.
03/30/15	Note the flash point is below the system operating temperature. Ensure that this is a closed system and that there is a N2 blanket in the headspace. Also note the dark colour of the product and the reduced initial boiling point of the GCD distillation indicating that the oil may be beginning to thermally crack. Resample at the next interval and continue to monitor. (GCD) 90% Distillation Point is marginally high.