

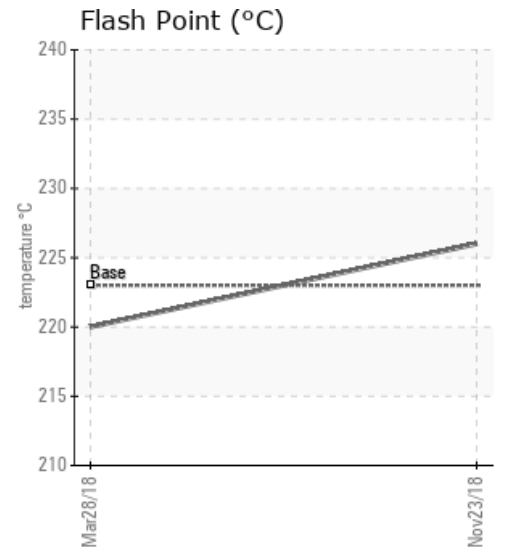
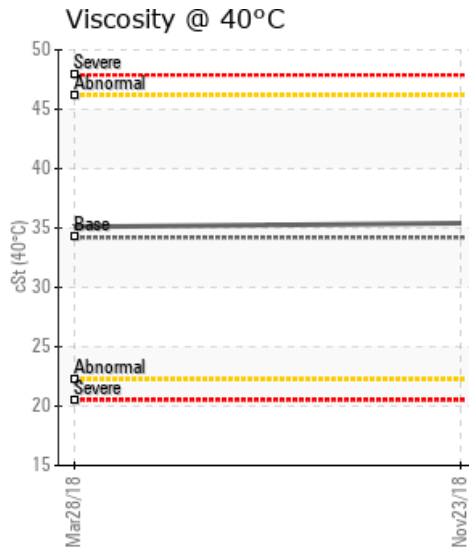
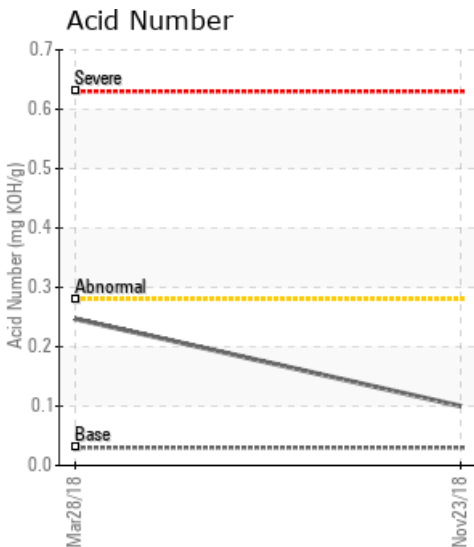
[3-18-80-17W6M] HEAT MEDIUM #1

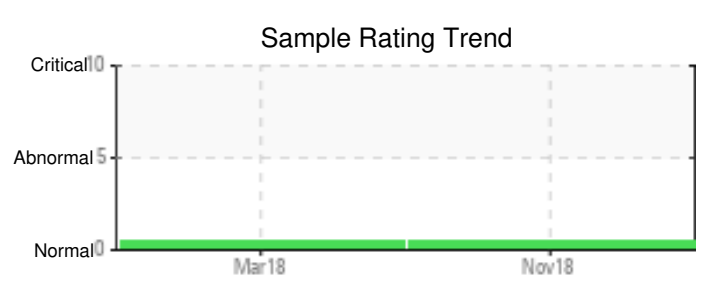
Customer: PTRHTF20156	System Information	Sample Information
TOURMALINE OIL 13-25-80-16W6 9920 98a Ave FORT ST. JOHN, BC V1J 1S2 Canada Attn: Brandon Braun Tel: (250)262-5420 E-Mail:	System Volume: 15000 ltr Bulk Operating Temp: 392F / 200C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02258126 Analyst: Peter Harteveld Sample Date: 11/23/18 Received Date: 12/18/18 Completed: 12/21/18

Recommendation: The fluid is in good condition and suitable for further use. Fe and solids (PI) content have increased slightly. These have to be monitored via future samples. Please re-sample in 6 months. (list oil service life on analysis request form)

Comments:

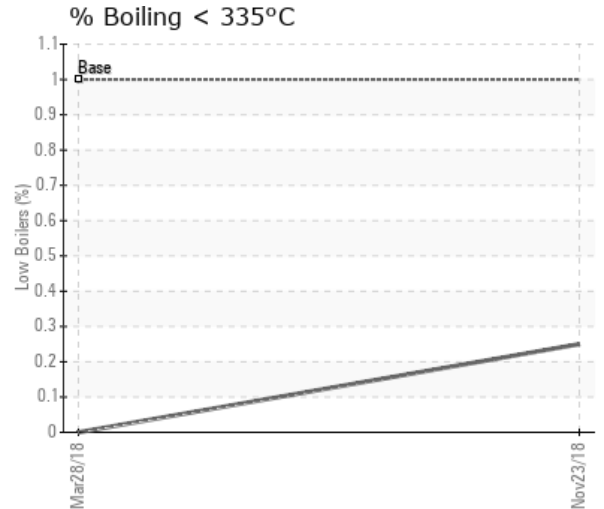
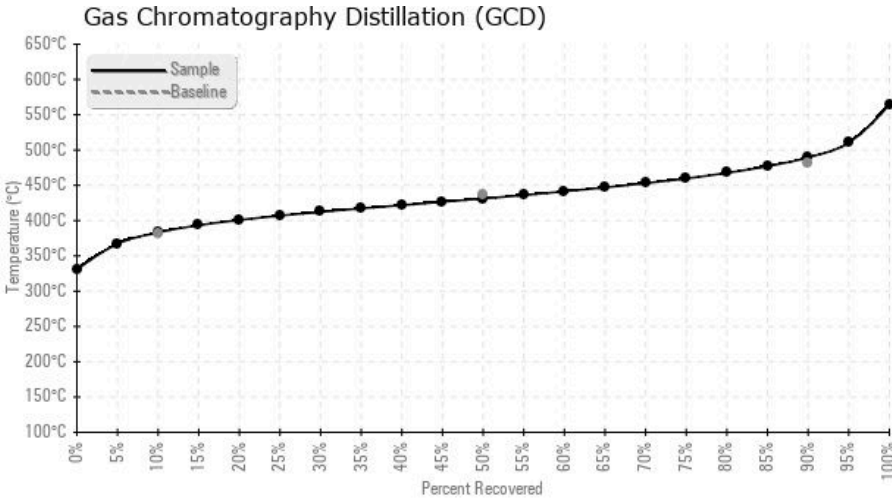
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/23/18	12/18/18	0m		439 / 226	131.0	35.4	0.10	0.197	722 / 383	808 / 431	913 / 490	0.25
03/28/18	04/06/18	18m		428 / 220	67.9	35.1	0.247	0.045	723 / 384	798 / 425	894 / 479	0.00
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
11/23/18	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03/28/18	10	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

03/28/18	Sample results indicate that the thermal fluid is suitable for continued service. Please note that Acid Number of 0.247 and Iron content (possibly from corrosion) can be an early indication of oxidation. Please ensure that blanket gas is properly applied to the expansion tank. Re-sample in 6 months and please ensure sample is drawn off of pump discharge and that a thorough purge precedes the drawing of the sample.

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