

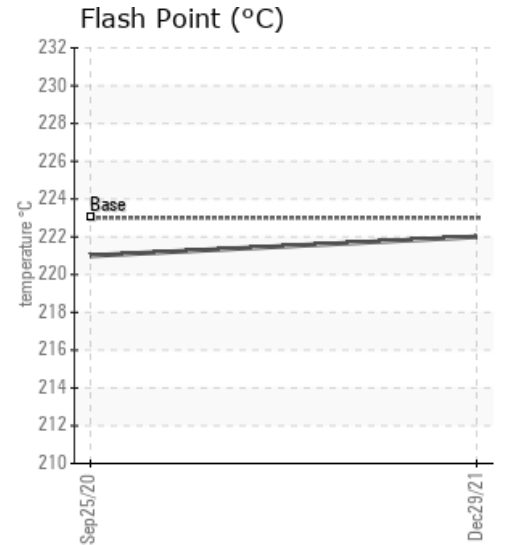
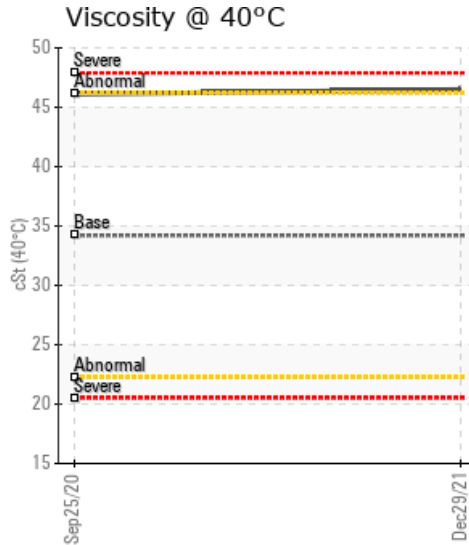
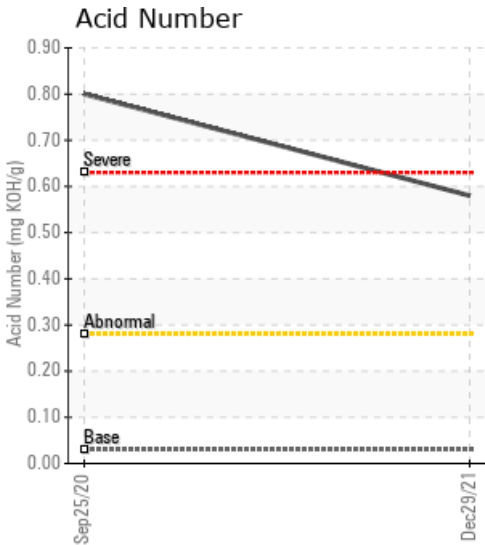
## West Fraser Quesnel - Energy Plant

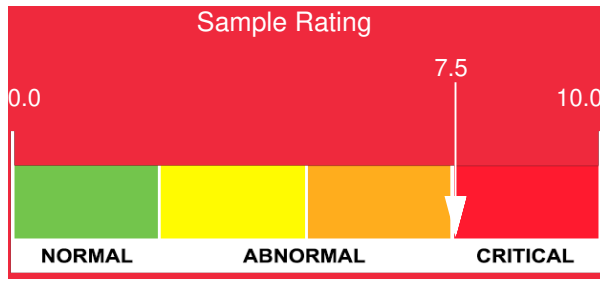
Customer: PTRHTF20242	System Information	Sample Information
WEST FRASER MILLS LTD 1250 BROWNMILLER RD QUESNEL, BC V2J 6P5 Canada Attn: Derek Peterson Tel: (250)991-5408 E-Mail: derek.peterson3@westfraser.com	System Volume: 125000 ltr Bulk Operating Temp: 518F / 270C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: CLASSEN	Lab No: 02466162 Analyst: Ray Rolston Sample Date: 12/29/21 Received Date: 01/13/22 Completed: 01/19/22 Ray Rolston Ray.Rolston@HFSinclair.com

Recommendation: The Acid Number (AN) is 0.58 mg KOH/g which is elevated, but below the condemning guideline of >1. Gas Chromatography Distillation (GCD) results indicate a reduction in the Initial Boiling Point (IBP) at 149.3 deg C along with an increase in the low boilers fraction at 2.39%. GCD results also show the presence of high boilers at the 90% and Final Boiling Point (FBP). Pentane Insolubles (solids) content at 0.754 wt% is above the condemning limit of 0.5 wt%. This fluid is reported to be 30 years old. Based on the age of the fluid and these results, a fluid change is recommended as soon as possible. A system clean and flush should also be completed to remove carbonaceous sludge and to restore heat transfer efficiency.

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

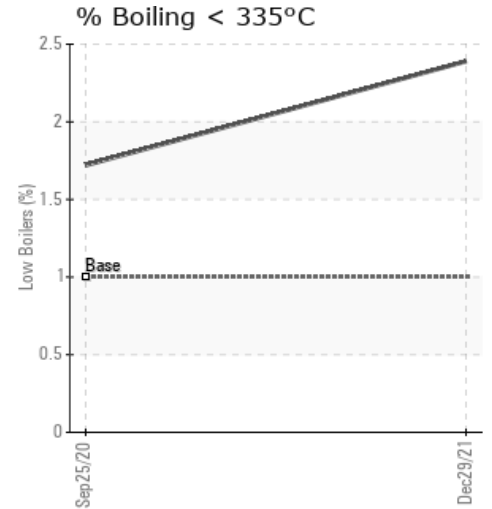
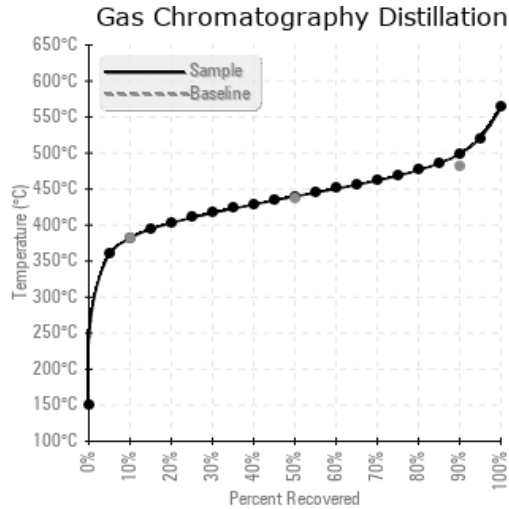
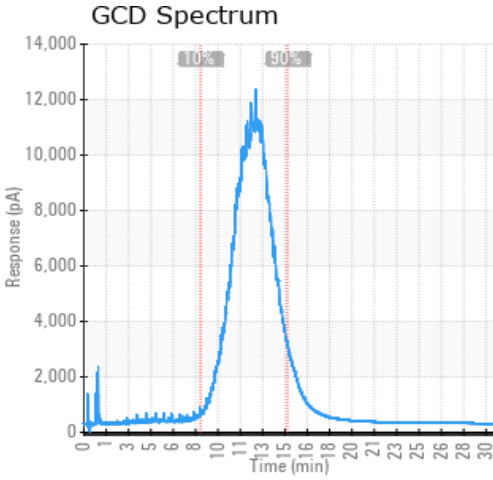
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
12/29/21	01/13/22	30.0y	samp station	432 / 222	34.3	46.5	0.58	0.754	719 / 382	823 / 440	930 / 499	2.39
09/25/20	10/06/20	20.0y	Sample Station	430 / 221	62.9	46.1	0.80	0.838	723 / 384	824 / 440	929 / 499	1.72
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
12/29/21	33	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	0	2	0	0	0
09/25/20	36	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	2	0	0	0	2	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

09/25/20	The Acid Number (AN) value of 0.80mg KOH/g is approaching the condemning guideline of 1.0. Also, the Initial Boiling Point (IBP) value of 217 deg C is well below the fresh oil value of 316 deg C suggesting that some thermal cracking is occurring. The Gas Chromatography Distillation (GCD) curve front end 'noise' supports this observation. Most importantly, the Pentane Insolubles (solids) content of 0.838 wt% exceeds the condemning limit of 0.5 wt%. It is believed that the fluid in the system is over 20 years old. Petro-Canada Lubricants recommends that the heat transfer system be drained, cleaned, flushed and re-filled to remove carbonaceous material and sludge and restore the heat transfer efficiency. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. (GCD) 90% Distillation Point is abnormally high.
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