

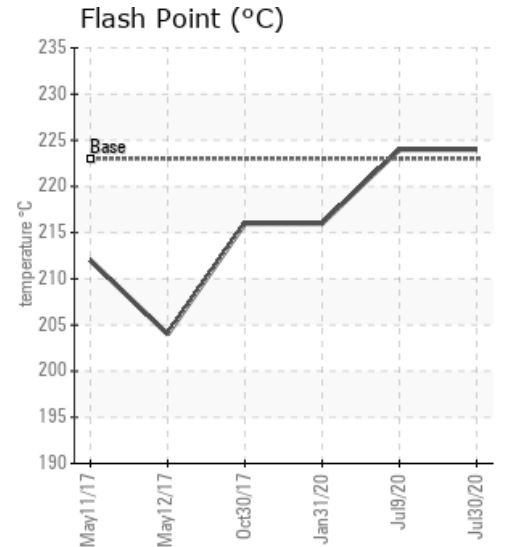
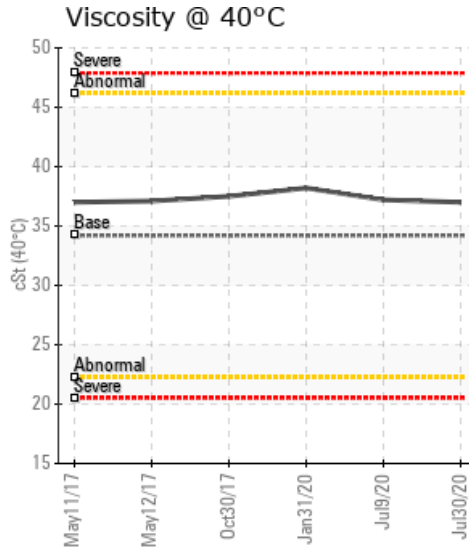
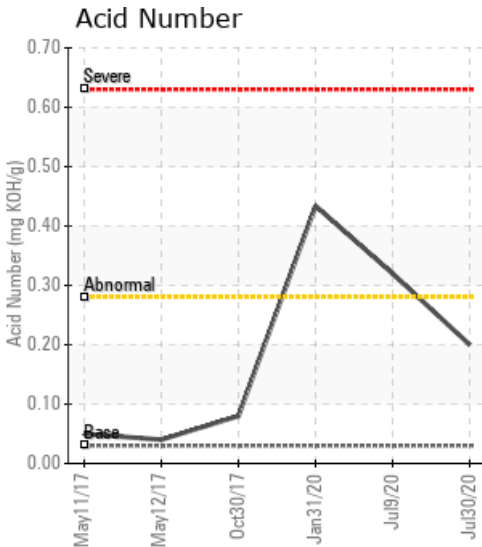
## HEAT TRANSFER

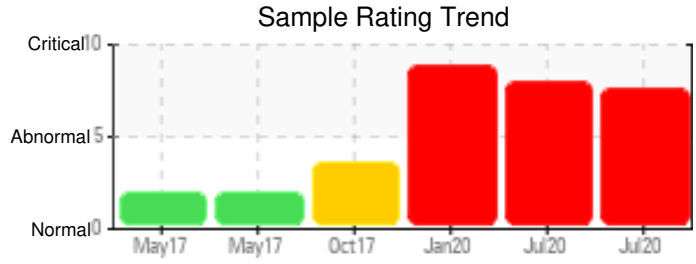
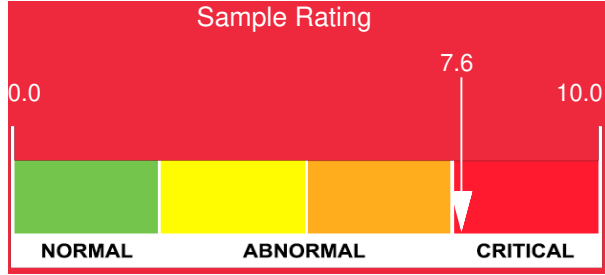
Customer: PTRHTF30101	System Information	Sample Information
Roseburg Pembroke MDF Inc. 777 Fibreboard Drive Pembroke, ON K8A 6W5 Canada Attn: Dan Havis Tel: (613)732-3939 E-Mail: danielh@rfpco.com	System Volume: 100000 ltr Bulk Operating Temp: 518F / 270C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02368793 Analyst: Pierre Castagne Sample Date: 07/30/20 Received Date: 08/06/20 Completed: 08/18/20 Pierre Castagne pierre.castagne@hollyfrontier.com

Recommendation: Potassium & Pentane Insolubles are very high, acid number is high, viscosity is higher than an ISO VG 32 should be. GCD @50% is high. Verify the source of the potassium (could be using same transfer equipment for other oils). Resample at your regular sample schedule

Comments: Potassium ppm levels are severely high. Pentane Insolubles levels are severely high. (GCD) 90% Distillation Point is marginally high.

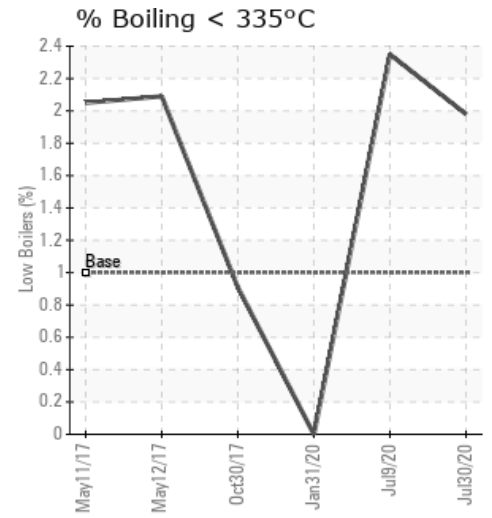
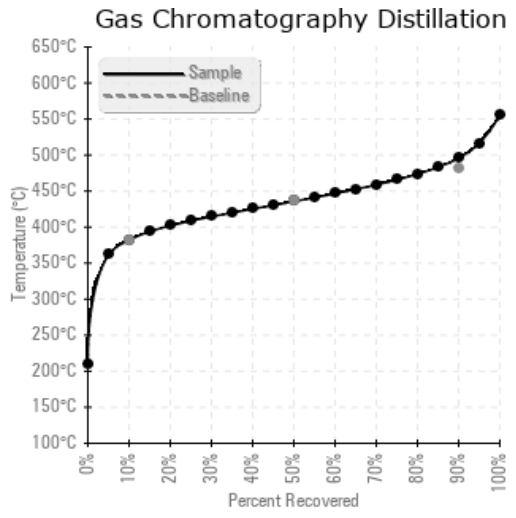
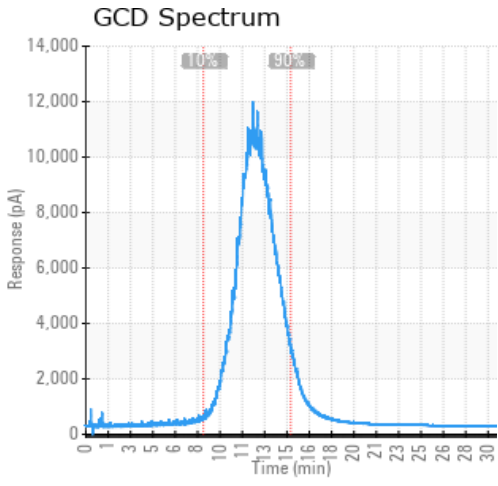
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
07/30/20	08/06/20	0.0y	HEAT PLANT	435 / 224	298.0	37.0	0.20	0.784	720 / 382	816 / 436	924 / 496	1.98
07/09/20	07/16/20	10.0y	hp line at main pump	435 / 224	268.6	37.2	0.32	0.348	718 / 381	815 / 435	922 / 495	2.35
01/31/20	02/05/20	0.0y	H.P. PUMPS	421 / 216	298.7	38.2	0.434	0.924	699 / 370	785 / 418	887 / 475	0.00
10/30/17	11/02/17	0.0y		421 / 216	41.0	37.5	0.08	0.227	714 / 379	812 / 434	924 / 496	0.91
05/12/17	05/15/17	0.0y		399 / 204	40.9	37.1	0.04	0.111	714 / 379	821 / 439	944 / 507	2.09
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
07/30/20	66	0	0	0	0	0	0	0	0	0	0	0	263	0	0	0	1	0	0	0	1	0	3	1
07/09/20	70	0	0	0	0	0	0	0	0	0	0	0	250	0	0	0	1	0	1	0	1	0	3	1
01/31/20	113	0	0	0	0	0	0	0	0	0	0	0	302	0	0	0	2	0	0	0	1	0	4	2
10/30/17	152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
05/12/17	27	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	
07/09/20	The Potassium level are severely high, Acid Number (AN) is high, GCD @ 90% is high, GCD % <335C is high, Pentane Insolubles is high. With the high level of Potassium, we suspect product contamination, please verify the possible source of contamination. There is some thermal degradation of the oil. Re-sample the oil at regular sample date. Potassium ppm levels are severely high. Acid Number (AN) is abnormally high. (GCD) 90% Distillation Point is marginally high.
01/31/20	Potassium PPM levels are severely high. Pentane Insoluble are severely high. Acid number (AN) is abnormal high. Resample to confirm finding. Potassium ppm levels are severely high. Pentane Insolubles levels are severely high. Acid Number (AN) is abnormally high.
10/30/17	Apart for high Iron, the sample looks good. PQ levels are abnormal. Iron ppm levels are abnormal. (GCD) 90% Distillation Point is marginally high.
05/12/17	GCD @ 90% are very high, this impacts the viscosity and carbone deposit (GCD) 90% Distillation Point is severely high.

Petro-Canada makes no representation or warranty of any kind, either express or implied, as to the accuracy or completeness of the analysis and assumes no responsibility and shall have no liability whatsoever with respect to such analysis, or a party's use of it. Petro-Canada is a division of HollyFrontier Corporation.