

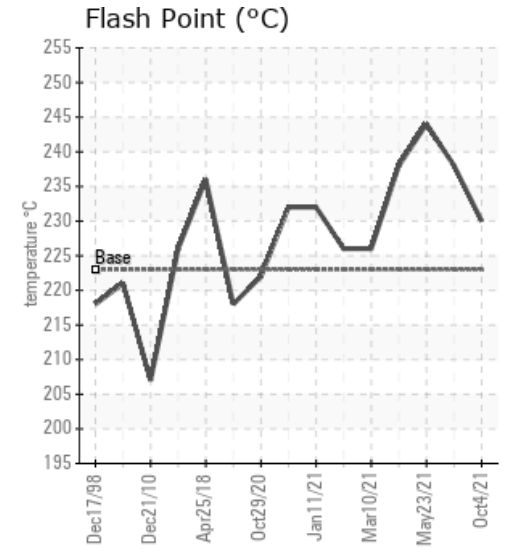
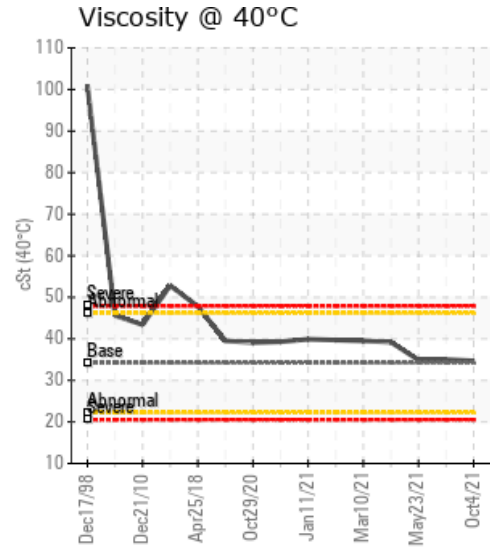
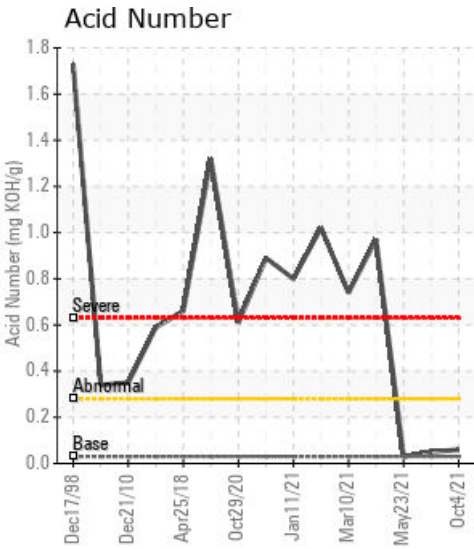
KONUS #1, 2 & 3

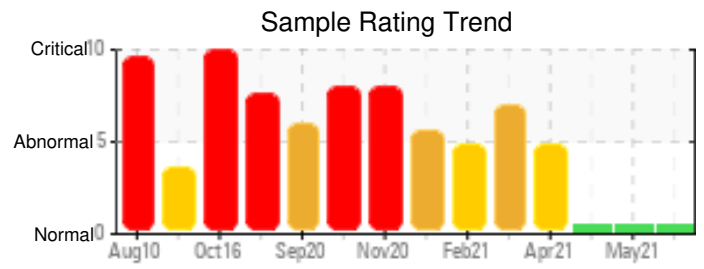
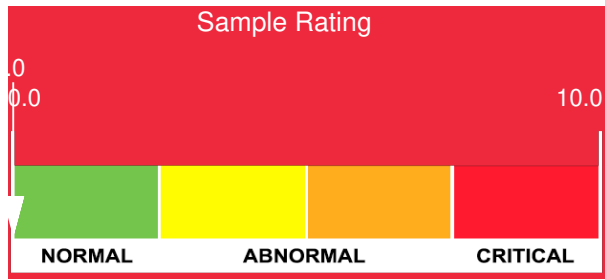
Customer: PTRHTF20179	System Information	Sample Information
Canfor - Polar 36654 Hart Highway General Delivery Bear Lake, BC V0J 3G0 Canada Attn: Chris Bertucci Tel: E-Mail: chris.bertucci@canfor.com	System Volume: 140000 ltr Bulk Operating Temp: 446F / 230C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: KONUS	Lab No: 02449858 Analyst: Ray Rolston Sample Date: 10/04/21 Received Date: 10/13/21 Completed: 10/19/21 Ray Rolston Ray.Rolston@hollyfrontier.com

Recommendation: The Acid Number (AN) of the oil after 6 months in service remains low at 0.06 mg KOH/g. The KV40 viscosity is stable at 34.7 cSt. Cleveland Open Cup (COC) Flash Point is also stable at 230 deg C. Gas Chromatograph Distillation (GCD) results are very good. The Pentane Insolubles (solids) content has increased marginally to 0.147 wt%. Re-sample in one year to monitor the fluid's condition.

Comments:

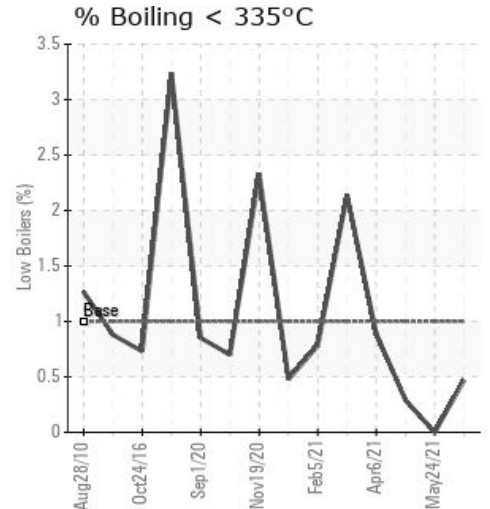
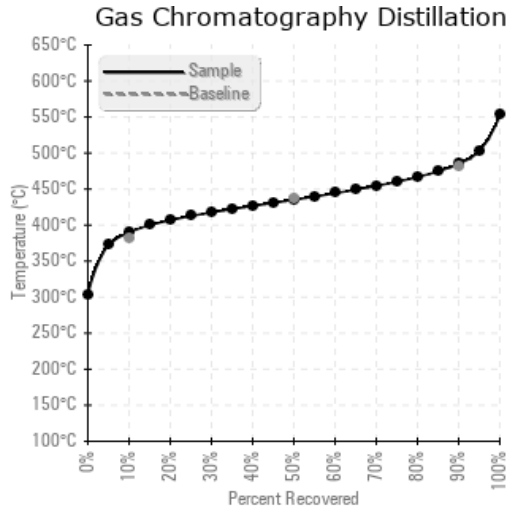
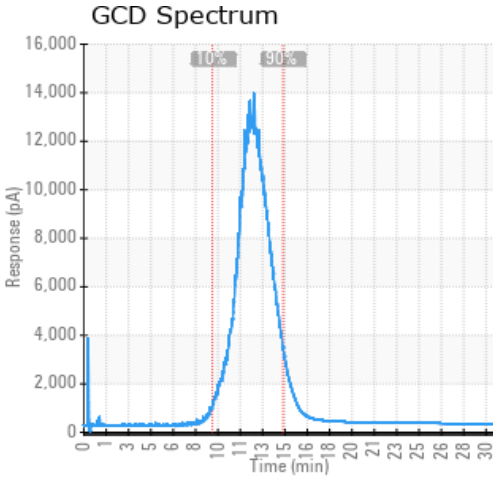
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
10/04/21	10/13/21	0.5y	#7 pump gauge	446 / 230	45.3	34.7	0.06	0.147	734 / 390	815 / 435	905 / 485	0.47
05/24/21	05/31/21	0.0y	Gauge 7	460 / 238	29.8	35.0	0.05	0.044	728 / 387	807 / 431	913 / 489	0.00
05/23/21	05/31/21	0.0y	Pump 7 gauge	471 / 244	19.2	34.9	0.03	0.052	728 / 387	807 / 431	906 / 486	0.29
04/06/21	04/13/21	0.0y	7 pump gauge drain	460 / 238	68.4	39.2	0.97	2.14	718 / 381	797 / 425	900 / 482	0.89
03/10/21	03/18/21	0.0y	7 pump gauge drain	439 / 226	67.4	39.5	0.74	2.01	711 / 377	805 / 429	922 / 495	2.14
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
10/04/21	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	2	0	0	1
05/24/21	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1
05/23/21	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
04/06/21	75	0	0	0	0	0	0	0	0	0	1	12	0	0	0	0	2	0	0	0	24	0	3	7
03/10/21	73	0	0	0	0	0	0	0	0	0	1	13	0	0	0	0	2	0	0	0	24	0	2	6
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

05/24/21	Sample was submitted May 24, 2021 labelled KONUS #1, 2 & 3 Gauge 7. All test results on the fluid are as new. Water is 29.8 ppm; Acid Number is 0.05 mg KOH/g; Pentane Insolubles (solids) is 0.044 wt%. Recommend re-sampling in 6 months to monitor the fluid's condition.
05/23/21	Sample was labelled KONUS #1, 2 & 3 Pump 7 gauge. All fluid properties are like new. Water content is 19.2 ppm; Acid Number 0.03 (previously 0.97 mg KOH/g); Pentane Insolubles 0.052 wt% (previously 2.14 wt%). Recommend sampling in 6 months to monitor the fluid's condition.
04/06/21	The Petro-Therm fluid's condition is essentially the same as the last few samples. The acid number has risen slightly to 0.97 mgKOH/g, and Pentane Insolubles (solids) are at 2.14 wt%. The HTF system is scheduled for cleaning, flushing and refill in one month, and should be sampled again 6 months from then (Nov 2021). Pentane Insolubles levels are severely high. Acid Number (AN) is severely high.
03/10/21	Petro-Therm heat transfer fluid's condition is largely unchanged since last month's sample. The Acid Number (AN) value of 0.74 continues to exceed the condemning guideline of 0.6 mg KOH/g. Pentane Insolubles (solids) content has increased slightly to 2.01 wt% compared with 1.82 wt% on the previous sample. Recommend re-sampling one last time prior to the system cleaning, flush & refill planned for mid-May. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. (GCD) 90% Distillation Point is marginally high.

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