

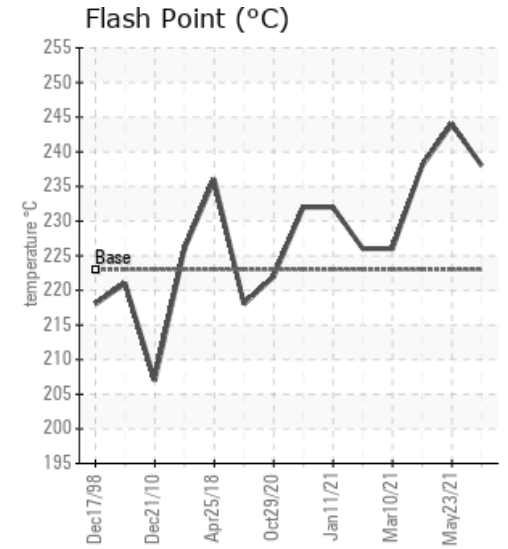
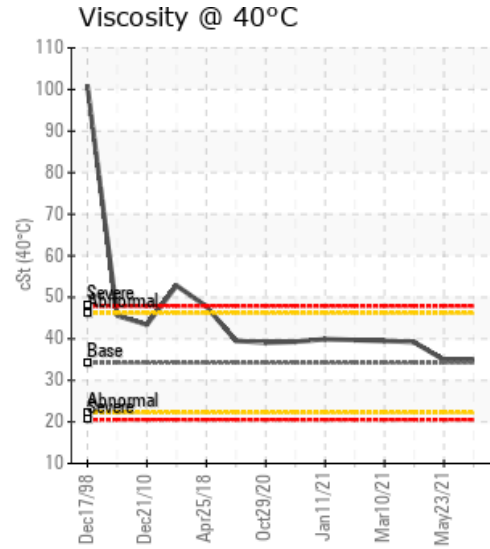
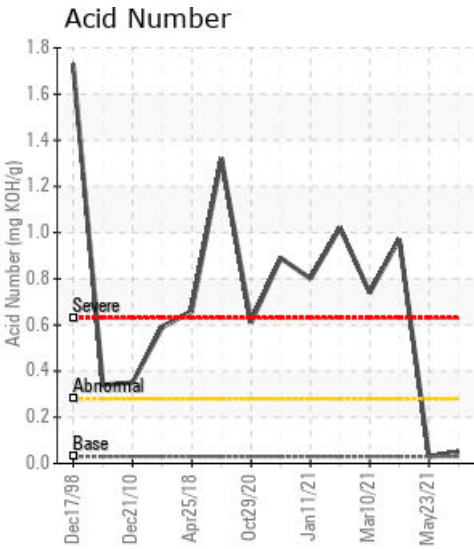
KONUS #1, 2 & 3

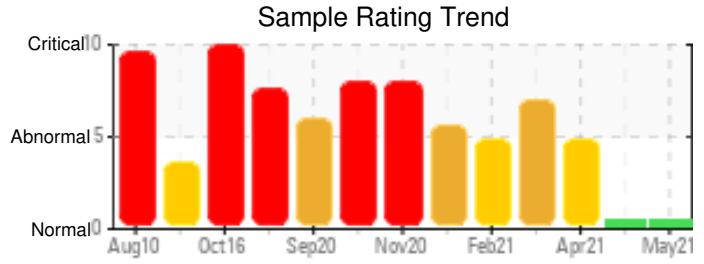
Customer: PTRHTF20179	System Information	Sample Information
Canfor - Polar 36654 Hart Highway General Delivery Bear Lake, BC V0J 3G0 Canada Attn: Chris Bertucci Tel: E-Mail: chris.bertucci@canfor.com	System Volume: 140000 ltr Bulk Operating Temp: 446F / 230C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: KONUS	Lab No: 02424208 Analyst: Ray Rolston Sample Date: 05/24/21 Received Date: 05/31/21 Completed: 06/02/21 Ray Rolston Ray.Rolston@hollyfrontier.com

Recommendation: 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.

Comments:

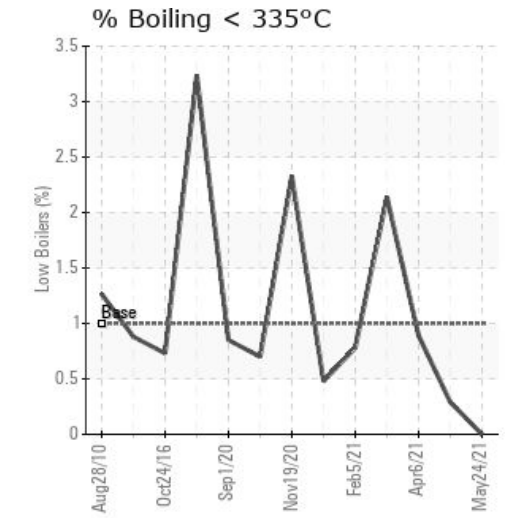
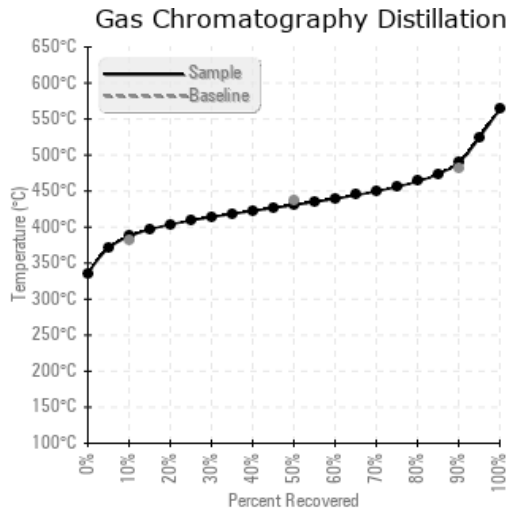
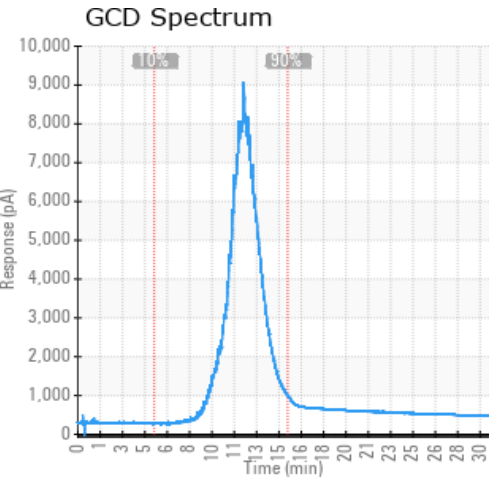
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
05/24/21	05/31/21	0.0y	Gauge 7	460 / 238	29.8	35.0	0.05	0.044	728 / 387	807 / 431	913 / 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
02/05/21	02/12/21	0.0y	Pump 7 drain	439 / 226	73.7	39.7	1.02	1.82	718 / 381	798 / 425	907 / 486	0.78
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
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
02/05/21	71	0	0	0	0	0	0	0	0	0	1	13	0	0	0	0	2	0	0	0	24	0	2	5
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	
05/23/21	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.
02/05/21	The Petro-Therm's Acid Number (AN) has increased from 0.80 to 1.02 since the last sample was taken on January 11, 2021 suggesting that the HTF's condition is continuing to deteriorate. Pentane Insolubles (solids) content remains very high at 1.82 wt%. Recommend submitting one additional sample 1 or 2 months prior to the planned system remediation in May, 2021. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high.

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