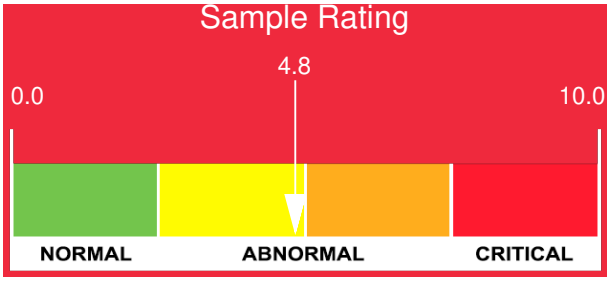
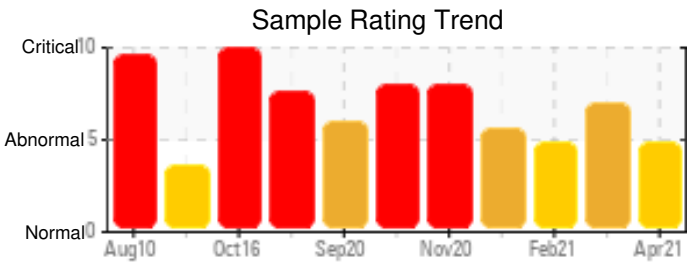




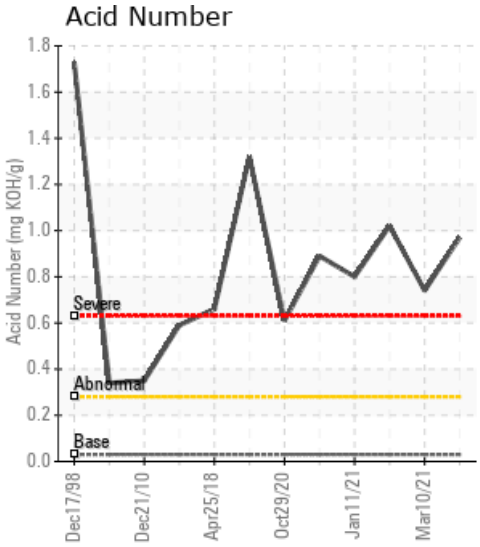
KONUS #1, 2 & 3

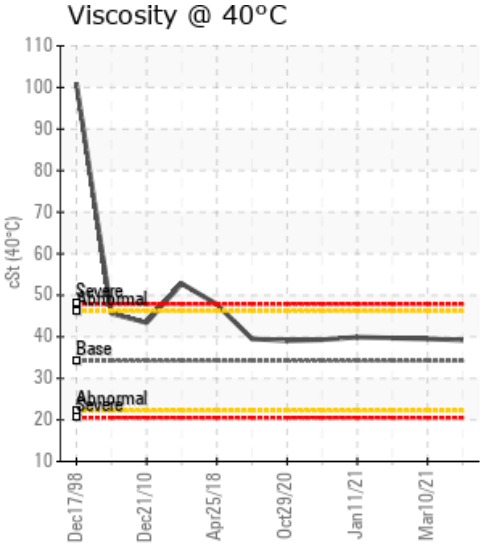
Customer: PTRHTF20179	System Information	Sample Information
Canfor - Polar 36654 Hart Highway General Delivery Bear Lake, BC V0J 3G0 Canada Attn: Chris Bertucci Tel: E-Mail: chris.bertucci@canfor.com	System Volume: 170000 ltr Bulk Operating Temp: 446F / 230C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: KONUS	Lab No: 02414690 Analyst: Ray Rolston Sample Date: 04/06/21 Received Date: 04/13/21 Completed: 04/14/21 Ray Rolston Ray.Rolston@hollyfrontier.com

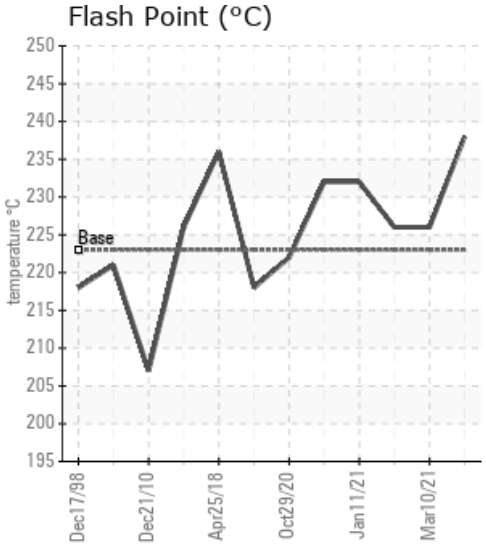
Recommendation: The Petro-Therm fluid's condition is essentially the same as the last few samples. The acid number has risen slightly to 0.97 mgKOH/g, and Pentane Insolubles (solids) are at 2.14 wt%. The HTF system is scheduled for cleaning, flushing and refill in one month, and should be sampled again 6 months from then (Nov 2021).

Comments: Pentane Insolubles levels are severely high. Acid Number (AN) is severely 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	%
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
01/11/21	01/19/21	0.0y		450 / 232	83.3	39.9	0.80	2.46	728 / 387	815 / 435	919 / 493	0.48
11/19/20	11/26/20	0.0y	Drain	450 / 232	238.0	39.3	0.89	1.85	708 / 375	793 / 423	911 / 489	2.33
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00







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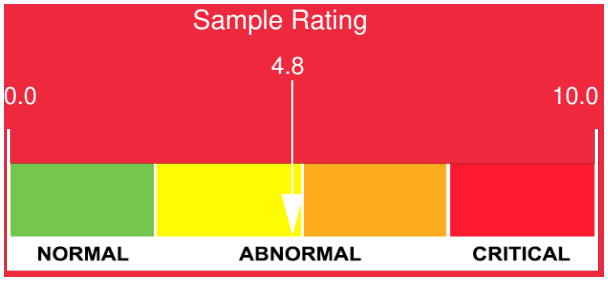
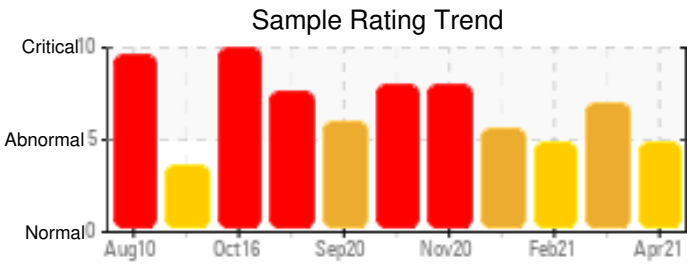
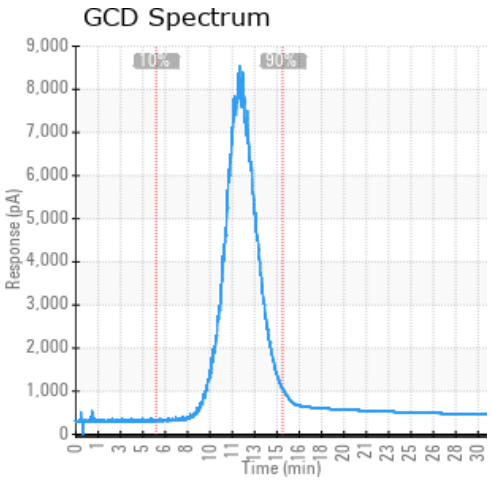
PETRO-CANADA LUBRICANTS

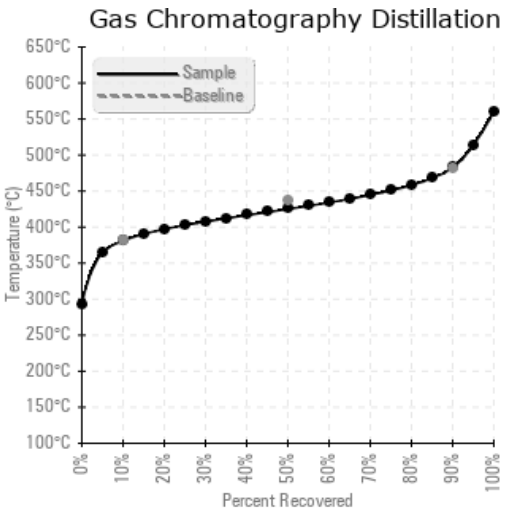


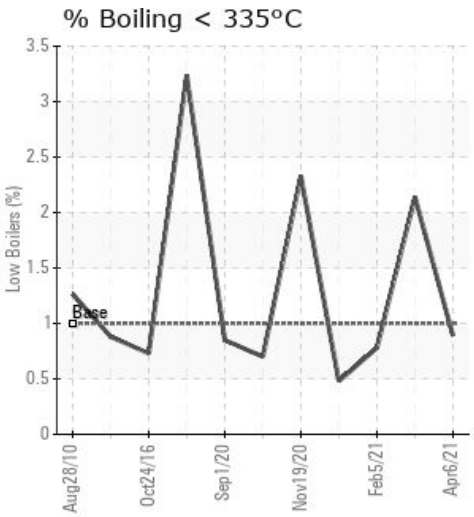


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
04/06/21	75	0	0	0	0	0	0	0	0	0	1	12	0	0	0	0	2	0	0	0	24	0	3	7
03/10/21	73	0	0	0	0	0	0	0	0	0	1	13	0	0	0	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
01/11/21	69	0	0	0	0	0	0	0	0	0	2	13	0	0	0	0	2	0	0	0	24	0	3	6
11/19/20	63	0	0	0	0	0	0	0	0	0	1	12	0	0	0	0	1	0	0	0	22	0	2	3
Baseline Data			0	0						0			0	0					0				0	

Elemental anaysis results (above) in parts per million (ppm). [10,000 ppm = 1.0%]







Historical Comments

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 t0 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.
01/11/21	This January 11, 2021 sample appears to be similar to the last sample dated November 19, 2020. The Acid Number (AN) is 0.80 mg KOH/g which is essentially unchanged since the last sample which was 0.89 mg KOH/g. The Pentane Insolubles (solids) content has increased from 1.85% on the previous sample to 2.46%. Both test results are beyond condemning guidelines. All other test results are normal and typical for the age of this fluid. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. (GCD) 90% Distillation Point is marginally high.
11/19/20	This Nov 19, 2020 sample looks very similar to one submitted on Oct 29, 2020. The Acid Number (AN) test was run in triplicate to verify consistency; the results were 0.88, 0.89 and 0.90 mg KOH/g. This is a 45% increase since the previous sample of 0.61 mg KOH/g which indicates that the fluid`s condition is continuing to deteriorate. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high.

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