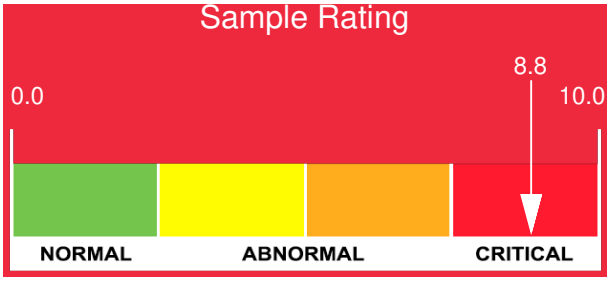
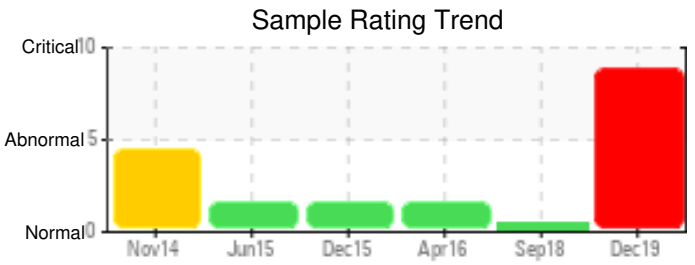




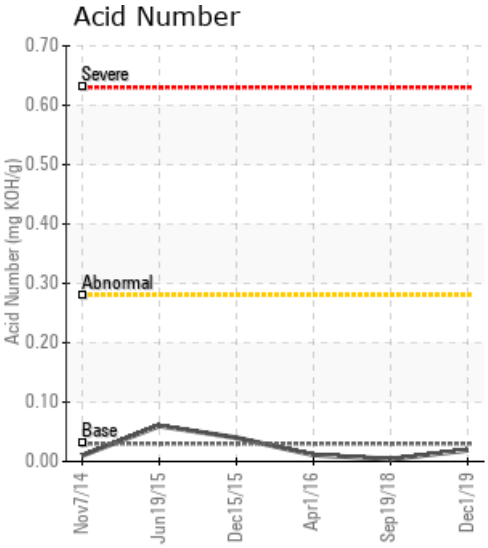
[PROCESS HEATER PLTS 1 & 2 / LSD: 3-22-78-12W6] CL#1604-0442-02 BIRCHCLIFF

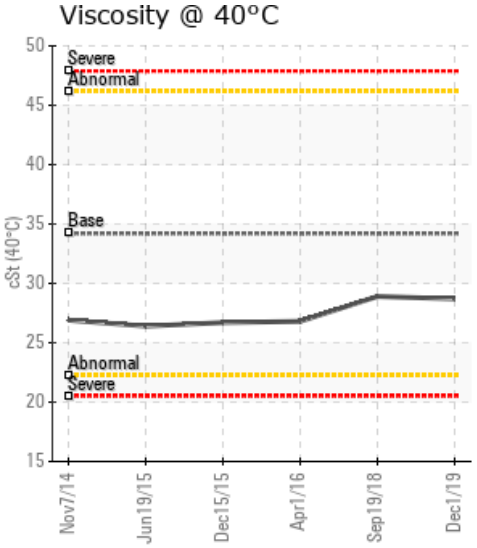
Customer: PTRHTF20039	System Information	Sample Information
BRENNTAG CANADA INC 3124-54TH AVENUE SE CALGARY, AB T2C 0A8 CA Attn: Matthew Kryska Tel: E-Mail: mkryska@brenntag.ca	System Volume: 19733 ltr Bulk Operating Temp: 356F / 180C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: Petro-Tech	Lab No: 02331379 Analyst: Clinton Buhler Sample Date: 12/01/19 Received Date: 01/13/20 Completed: 01/15/20 Clinton Buhler Clinton.Buhler@HFSinclair.com

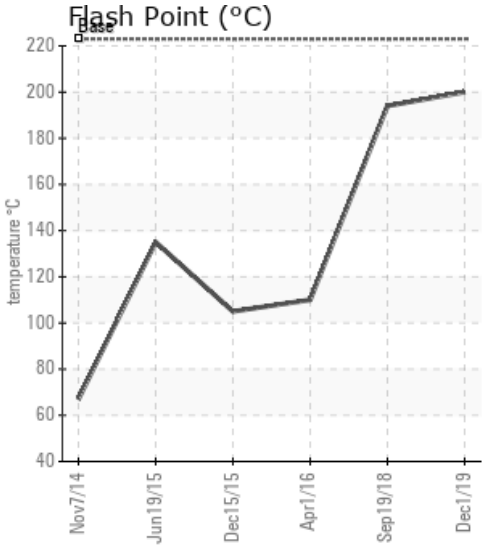
Recommendation: Sample results indicate that the fluid may be suitable for continued service. However, % boil-off of 16.52% and reduced 10% and 90% distillation temperatures is significant and may be an indication of thermal degradation, contaminants such as condensate or possibly a result of high blanket gas pressure. It is recommended to routinely vent off any low boiling vapors from the system on a regular basis. This may need to occur during an outage in the event the high blanket gas pressure is required for positive suction head pressure. Please re-sample fluid in 6 months after thorough venting has been performed.

Comments:

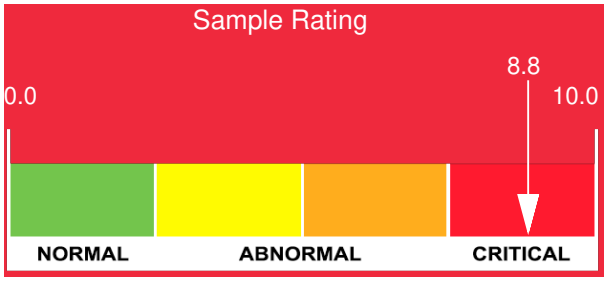
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
12/01/19	01/13/20	0.0y	PUMP SUCTION	392 / 200	9.9	28.7	0.019	0.056	504 / 262	754 / 401	859 / 459	16.52
09/19/18	09/27/18	8.0y		381 / 194	11.9	28.9	0.004	0.027	707 / 375	811 / 433	909 / 487	2.03
04/01/16	04/11/16	0.0y	AMINE BLDG	230 / 110	7.1	26.8	0.011	0.034	681 / 361	797 / 425	899 / 482	5.23
12/15/15	12/23/15	0.0y	AMINE BLOG	221 / 105	10.5	26.7	0.04	0.042	677 / 358	797 / 425	898 / 481	5.75
06/19/15	06/29/15	4.5y	AMINE BLDG OVER HEAT	275 / 135	10.9	26.4	0.06	0.032	697 / 369	806 / 430	906 / 486	2.93
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

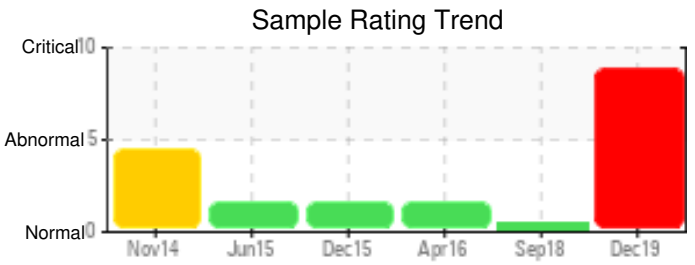






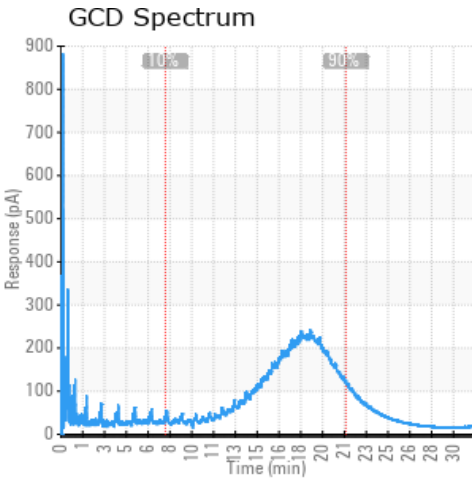
PETRO-CANADA LUBRICANTS

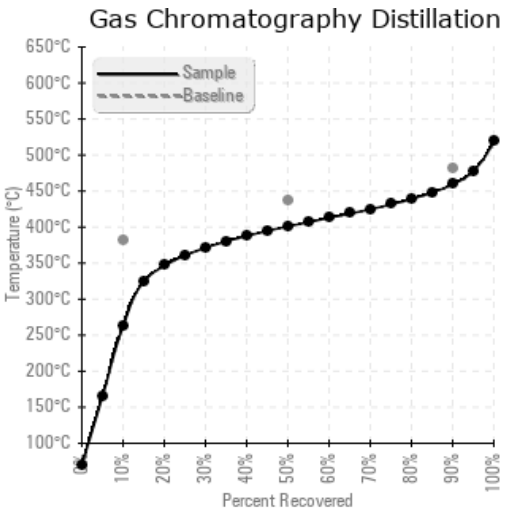


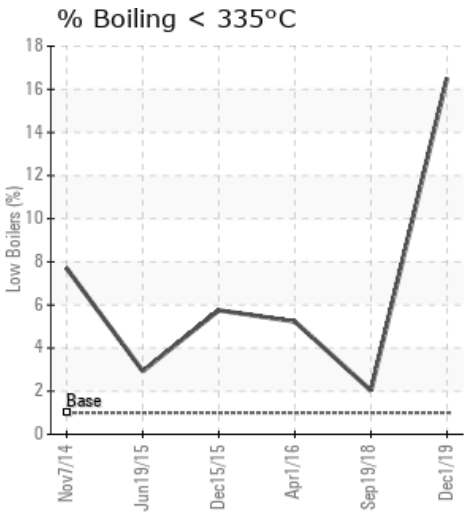


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
12/01/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/19/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/01/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/15/15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06/19/15	0	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 anaysis results (above) in parts per million (ppm). [10,000 ppm = 1.0%]







Historical Comments

09/19/18	Sample results indicate that the fluid is suitable for continued service. % boil-off of 2.03% and slightly reduced flashpoint may be an indication of thermal degradation or possibly a mixture of fluids. As a good preventative maintenance practice, it is ideal to vent off any low boiling vapors from the system on a regular basis.Re-sample fluid in 6 months to establish a trend
04/01/16	The flash point on this sample is extremely low as is the Viscosity. Check for leakage of condensate into heat transfer system. COC Flash Point is severely low.
12/15/15	Flash point of samples is extremely low. Possibly contaminated with condensate. This would also be the reason the viscosity is so low versus new oil. COC Flash Point is severely low.
06/19/15	Flash point is still severly low although not as low as previous sample. GCD's have also improved. Resample again in 6 months. COC Flash Point is severely low.

