

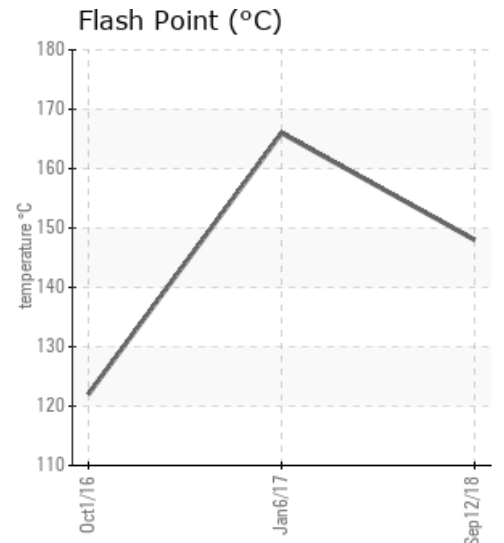
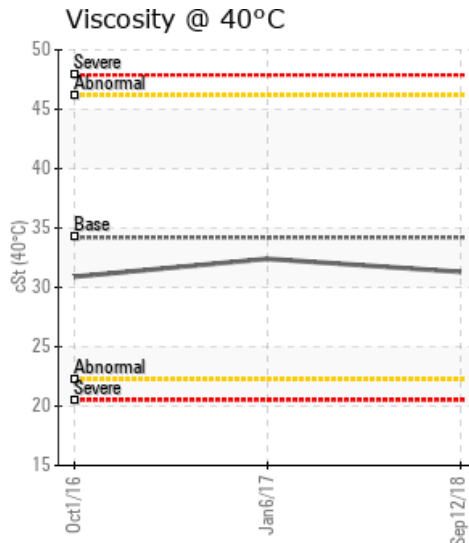
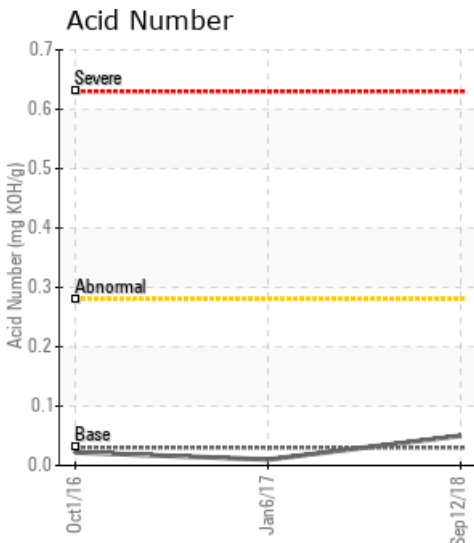
## [CONOCO PHILLIPS WOLF LAKE LSD / 5-1-51-15W5] CL #1809-0889-01 HOT OIL

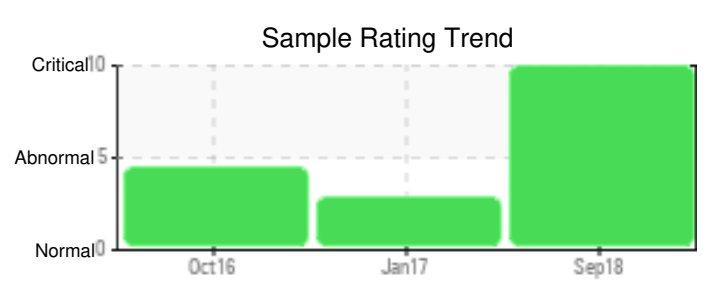
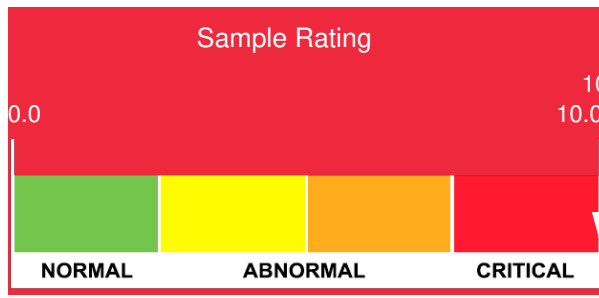
Customer: PTRHTF20039	System Information	Sample Information
BRENNTAG CANADA INC 3124-54TH AVENUE SE CALGARY, AB T2A 0A8 CANADA Attn: Matthew Kryska Tel: E-Mail: mkryska@brenntag.ca	System Volume: 30000 ltr Bulk Operating Temp: 500F / 260C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02240961 Analyst: Terry Veenstra Sample Date: 09/12/18 Received Date: 09/24/18 Completed: 10/09/18 To discuss this report contact Terry Veenstra at (780)591-5339

Recommendation: Fluid is showing low flash point and high Pentane Insolubles which indicates signs of Thermal Cracking. Consider venting off low boilers. Presence of sodium and water indicates contamination of fluid or contaminated sample. Venting of system should be done as regular system maintenance. Resample in 3 months after venting system.

Comments: PQ levels are abnormal. Iron ppm levels are abnormal. Pentane Insolubles levels are severely high. Sodium ppm levels are severely high. COC Flash Point is severely low.

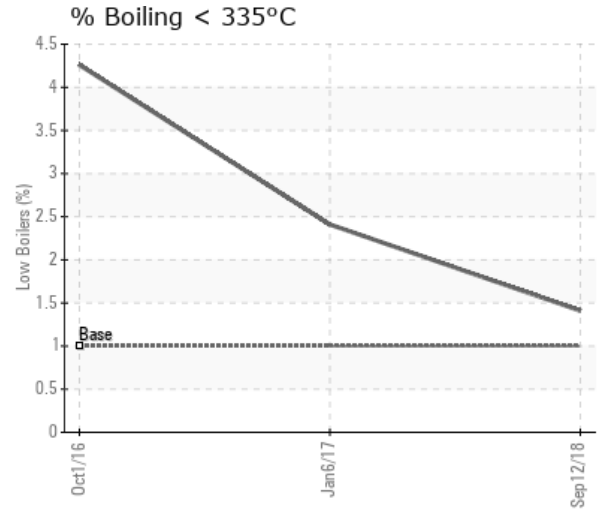
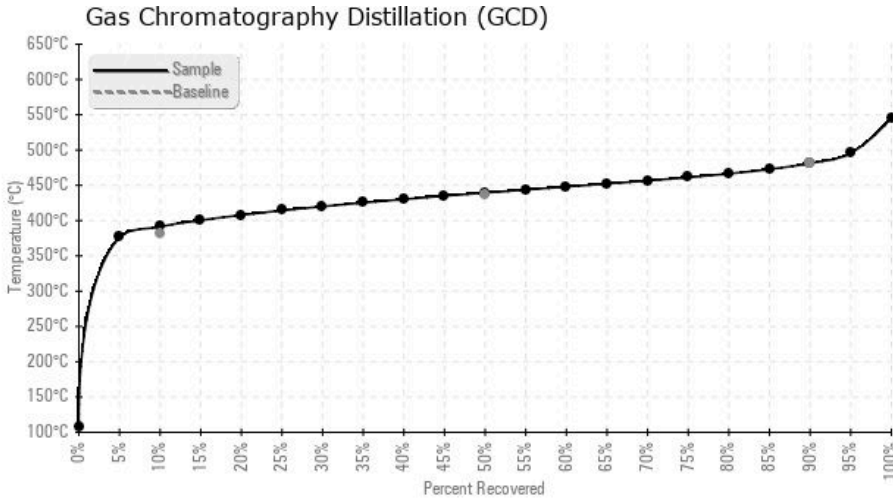
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
09/12/18	09/24/18	16y		298 / 148	122.3	31.3	0.05	0.688	736 / 391	823 / 439	898 / 481	1.41
01/06/17	01/16/17	14y	DISCHARGE LINE	331 / 166	5.7	32.4	0.01	0.022	734 / 390	847 / 453	929 / 499	2.41
10/01/16	10/31/16	14y	DISCHARGE LINE	252 / 122	5.9	30.9	0.022	0.095	721 / 383	842 / 450	927 / 497	4.26
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
09/12/18	182	0	0	0	0	0	0	0	0	0	2	76	1	0	0	0	2	0	1	3	22	5	8	6
01/06/17	19	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	5	0	1	1
10/01/16	3	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0
<b>Baseline Data</b>			0	0						0			0	0					0				0	

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



Historical Comments	
01/06/17	The fluid is in good condition and suitable for further use. A significant decrease in viscosity in combination with low Flash Point and low 10% GCD temperature indicates thermal degradation of the fluid. Venting of low boiler vapors to atmosphere on a regular basis is recommended to restore fluid properties. COC Flash Point is severely low. (GCD) 90% Distillation Point is abnormally high. Visc @ 40°C is abnormally low.
10/01/16	The fluid shows signs of thermal degradation. These are: Low viscosity, very low Flash Point, low 10% GCD temperature and the presence of low boiler vapor as indicated by high boil-off below 335 degrees C. It is recommended to remove the low boiler vapors by venting to atmosphere. This to restore the Flash Point to a more acceptable level. Operating the system at 260 degrees C with a fluid Flash Point of 122 degrees C is potentially unsafe. COC Flash Point is severely low. (GCD) 90% Distillation Point is abnormally high. Visc @ 40°C is abnormally low. (GCD) 10% Distillation Point is marginally low.

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