

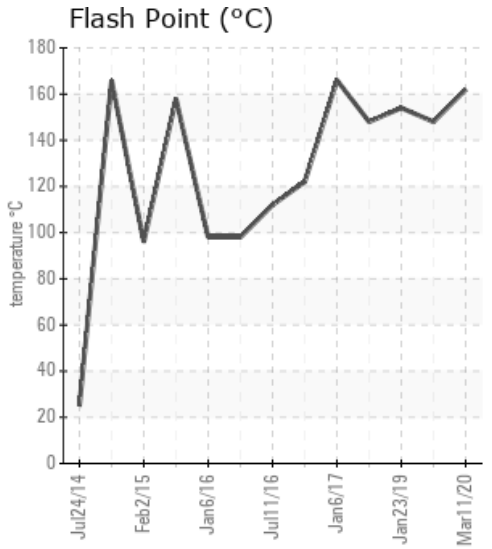
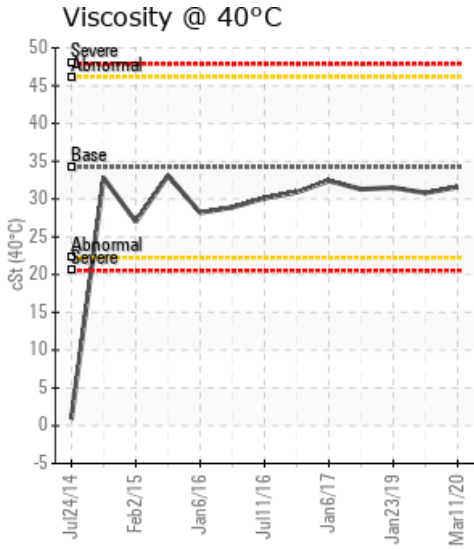
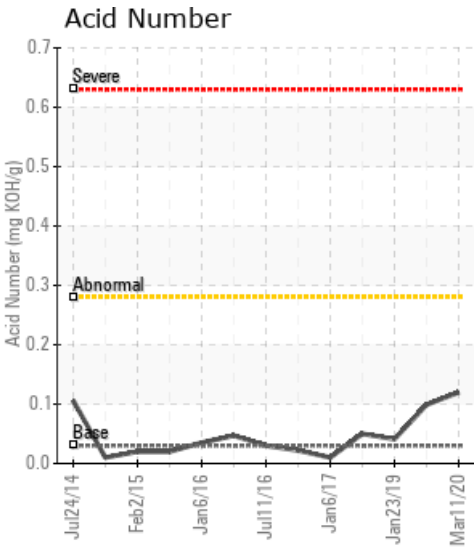
[CENOVUS / 5-1-51-15W5] H-401

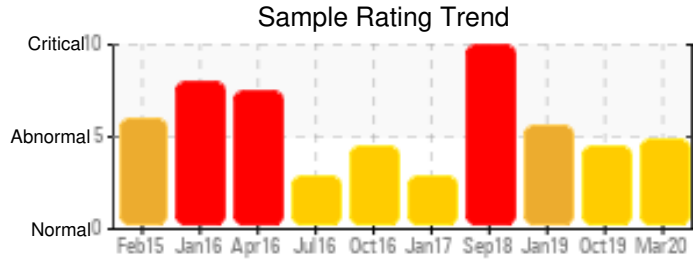
Customer: PTRHTF20039	System Information	Sample Information
BRENNTAG CANADA INC 3124-54TH AVENUE SE CALGARY, AB T2C 0A8 Canada Attn: Matthew Kryska Tel: E-Mail: mkryska@brenntag.ca	System Volume: 8000 ltr Bulk Operating Temp: 437F / 225C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: BORN HEATER	Lab No: 02348707 Analyst: Terry Veenstra Sample Date: 03/11/20 Received Date: 04/14/20 Completed: 04/24/20 Terry Veenstra terry.veenstra@petrocanadalsp.com

Recommendation: Water contamination is higher than normal. Flash Point is lower than normal. Regularly venting of system to vent off water vapour and low boilers is part of good heat transfer maintenance. Ensure gas blanket is in place when not venting. Resample in 6 months.

Comments: ppm Water contamination levels are marginally high. Water contamination levels are marginally high. COC Flash Point is severely low.

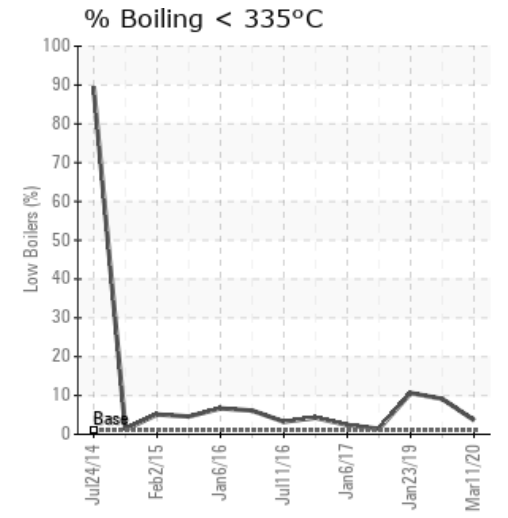
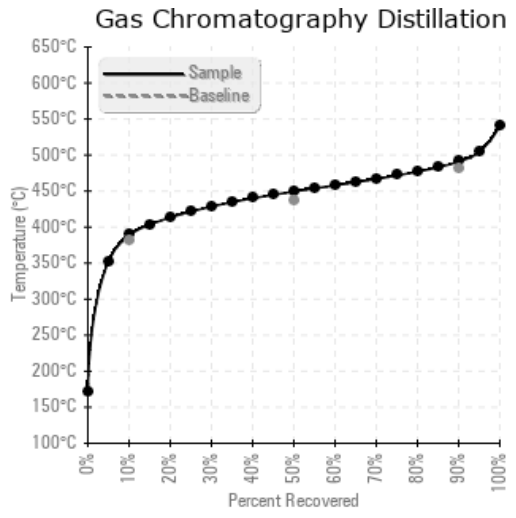
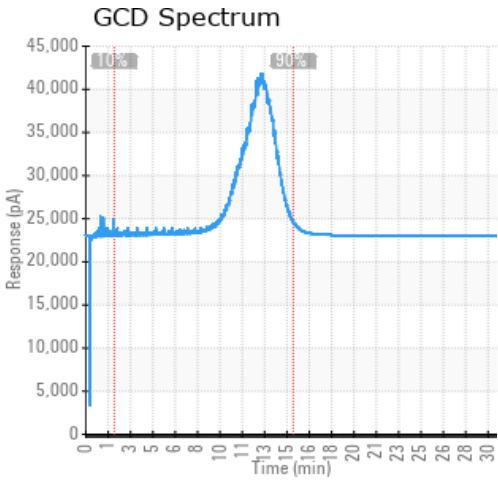
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/11/20	04/14/20	23y	PUMP DISCHARGE	324 / 162	494.6	31.6	0.12	0.160	732 / 389	841 / 449	916 / 491	3.65
10/01/19	11/01/19	16y		298 / 148	10.7	30.8	0.099	0.109	645 / 341	815 / 435	898 / 481	9.12
01/23/19	02/22/19	28y	NEW PROCESS REBOILER	309 / 154	7.8	31.5	0.041	0.248	601 / 316	817 / 436	905 / 485	10.64
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
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
03/11/20	18	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	0	0	1
10/01/19	15	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	4	0	0	0
01/23/19	22	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	4	0	3	1
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
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	
10/01/19	The flashpoint on this sample is low. System should be safely vented to eliminate low boilers from the system. This should be done as part of the regular system maintenance. Resample in 6 months COC Flash Point is severely low. (GCD) 10% Distillation Point is abnormally low. (GCD) % < 335°C is marginally high.
01/23/19	GDC 10% Distillation as well as the Flash Point are low indicating some lighter ends. Venting of the system is required. Vent lighter ends off system and resample in 6 months. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. (GCD) % < 335°C is marginally high.
09/12/18	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. 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.
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.

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