

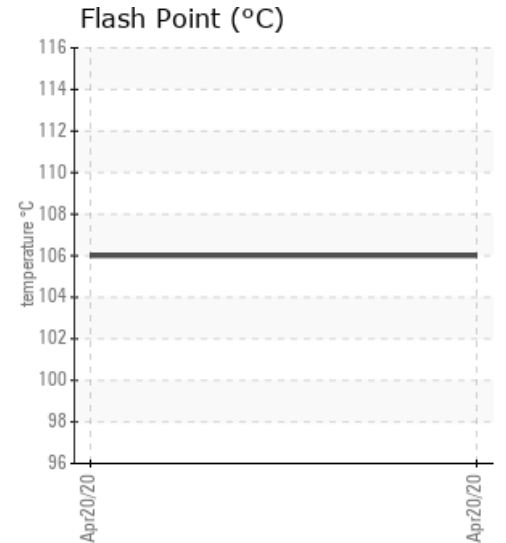
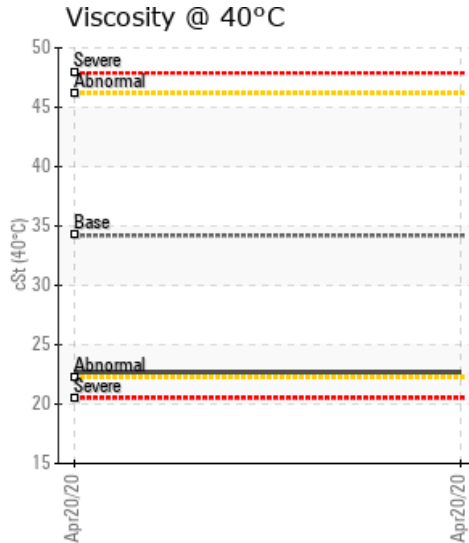
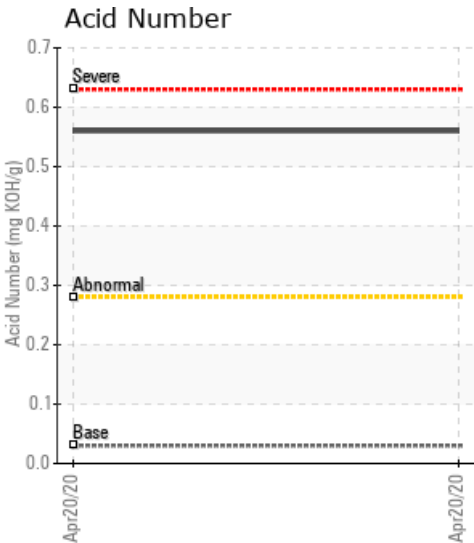
HEAT TRANSFER

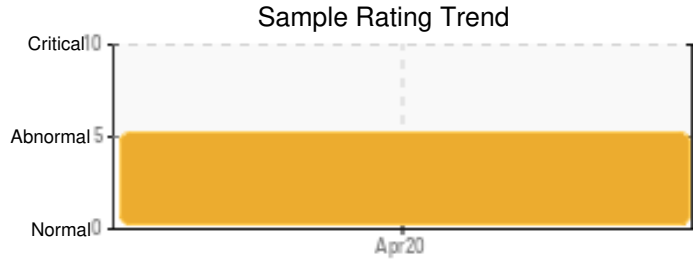
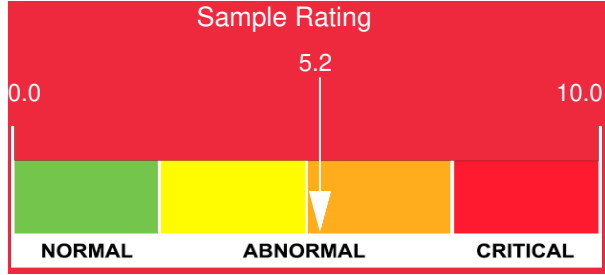
Customer: PTRHTF30153	System Information	Sample Information
DRAIN BROS EXCAVATION LIMITED 6830 HWY 7 HAVELOCK, ON K0L 1Z0 Canada Attn: Darnell Khan Tel: (705)772-3835 E-Mail: dkhan@drainbros.ca	System Volume: 1400 ltr Bulk Operating Temp: 550F / 288C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: GENCOR	Lab No: 02350019 Analyst: Behshad Sabah Sample Date: 04/20/20 Received Date: 04/22/20 Completed: 08/17/20 Behshad Sabah behshad.sabah@petrocanadalsp.com

Recommendation: The flash point is significantly low, thus indicative of thermal degradation and/or contamination. This low flash point is also a safety concern. With this safety concern, you should look at the possibility of a total fluid change. The sample shows a high level of acids as shown with the acid number of 0.56. Oxidation causes the oil to form acids. Oil degrading by reacting with oxygen from air in the expansion tank without nitrogen blanketing (not sure whether you have nitrogen blanketing). Depending on the volume of the system, as the acid number continues to increase, a partial oil replacement (sweeten) is a possibility to reduce acid number, and postpone fouling and costly shutdown. The GCD profile shows a few low boilers, which indicates thermal degradation and can lead to pump cavitation. The viscosity is very low (22.7 cSt at 40C) compared to new fluid (~35 cSt at 40C), suggesting low boilers as well. There is also significant amount of water present (386 ppm) as well as some emulsified water. This water will contribute to fluid oxidation and the formation of acids, thus increase in iron (corrosion). There is also a significant amount of titanium which could be from contamination, depending on your operation. have you topped up with a different oil recently?

Comments: Titanium ppm levels are abnormal. Water contamination levels are marginally high. COC Flash Point is severely low. Acid Number (AN) is abnormally high.

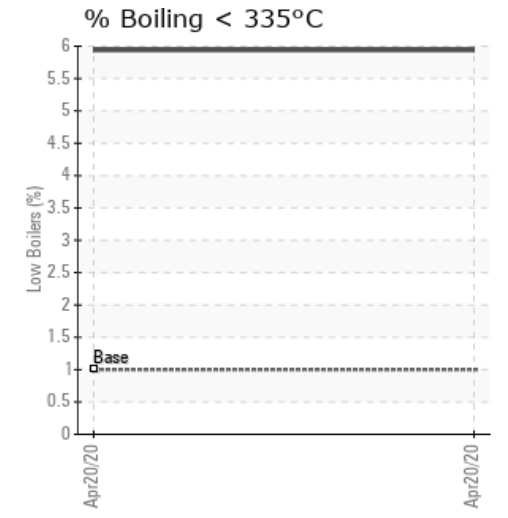
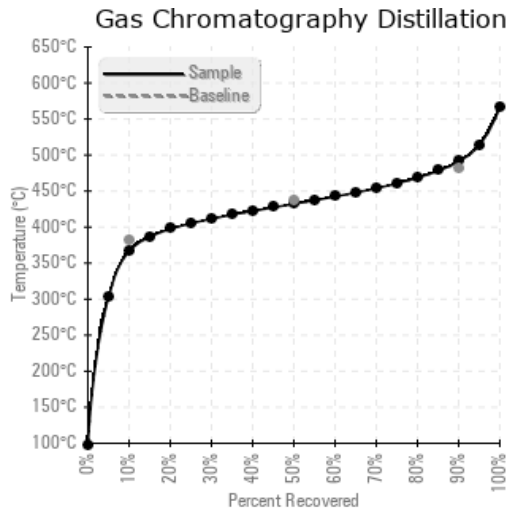
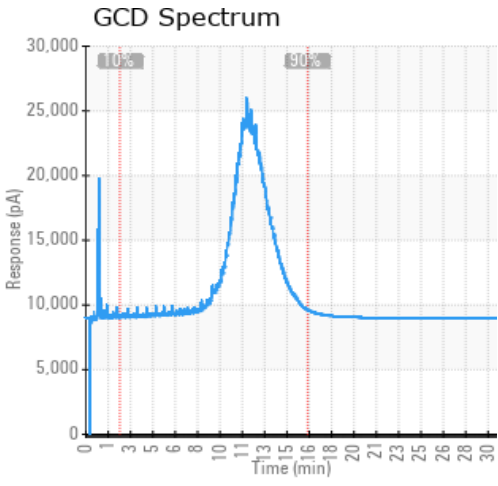
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
04/20/20	04/22/20	2y	SIDE STREAM FILTER	223 / 106	385.6	22.7	0.56	0.090	692 / 367	810 / 432	916 / 491	5.94
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
04/20/20	51	0	0	0	0	0	0	0	0	0	0	0	0	39	0	0	0	0	2	0	0	0	0	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

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