

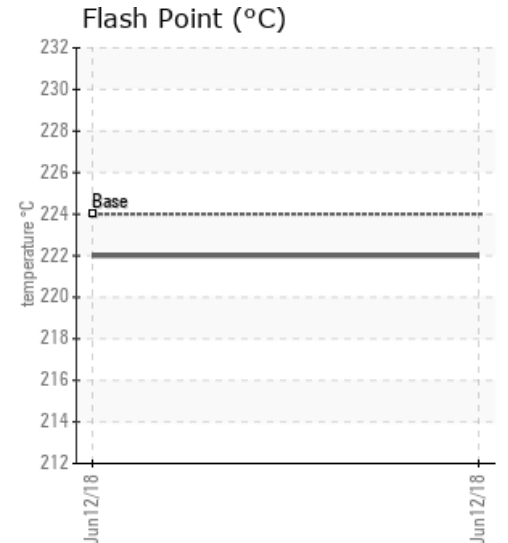
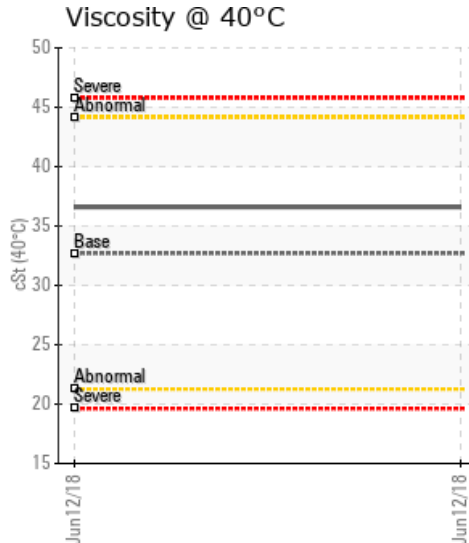
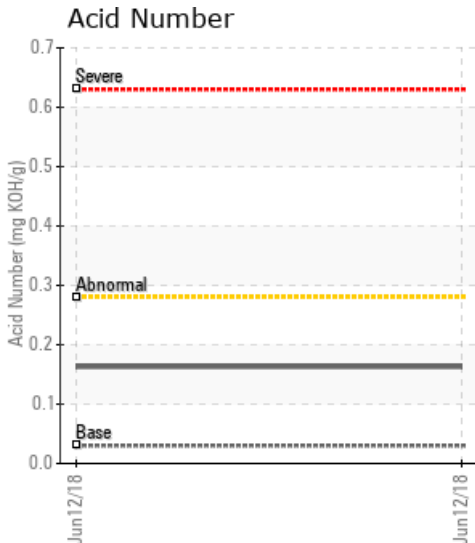
## STORAGE TANK

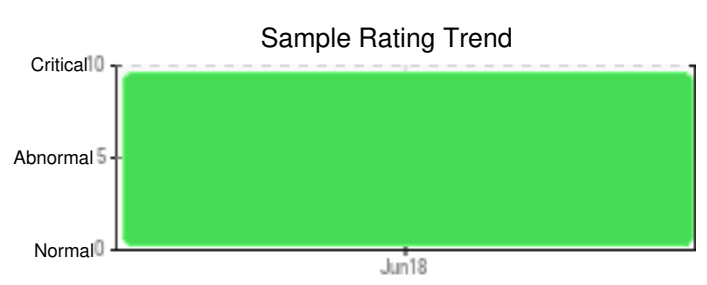
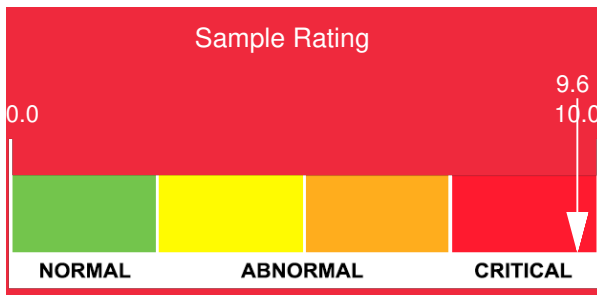
Customer: PTRHTF30025	System Information	Sample Information
<b>MANCUSO CHEMICALS</b> 5725 PROGRESS STREET NIAGARA FALLS, ON L2E 6X8 CANADA Attn: Dave Senior Tel: (905)357-3626 E-Mail: dsenior@mancusochemicals.com	System Volume: 0 gal Bulk Operating Temp: Not Specified Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make:	Lab No: 02222638 Analyst: Adam Koscielak Sample Date: 06/12/18 Received Date: 06/18/18 Completed: 07/03/18 To discuss this report contact Adam Koscielak at 905-331-1323

Recommendation: Analysis of the sample provided from the STORAGE TANK indicates the following issues; 1 - iron level is approx. 36 ppm, may be an indication of rust or pump wear. 2 - Calcium level is higher than expected, check for possible addition of another fluid or contamination entering the system. 3 - Water level is high @ 2288 ppm or 0.2%, this can lead to bumping in the system due to steam being formed from the water. If possible, vent expansion tank to reduce water content. Investigate possible ingress points for the water. 4 - CGD % <335°C was measured at 12.5% indicating a high level of low boilers. If possible, vent expansion tank to reduce content. 5 - GCD% at 10%, 50%, and 90% indicate a significant drop in the temperature profile. Was there another fluid added to the heat transfer system other than Calflo AF? 6 - Pentane insolubles were measured at 0.604%. Level is high and should be reduced.

Comments: Water contamination levels are severely high. ppm Water contamination levels are severely high. Pentane Insolubles levels are severely high. Calcium ppm levels are severely high. (GCD) 10% Distillation Point is abnormally low. (GCD) 90% Distillation Point is abnormally low. (GCD) % < 335°C is marginally high.

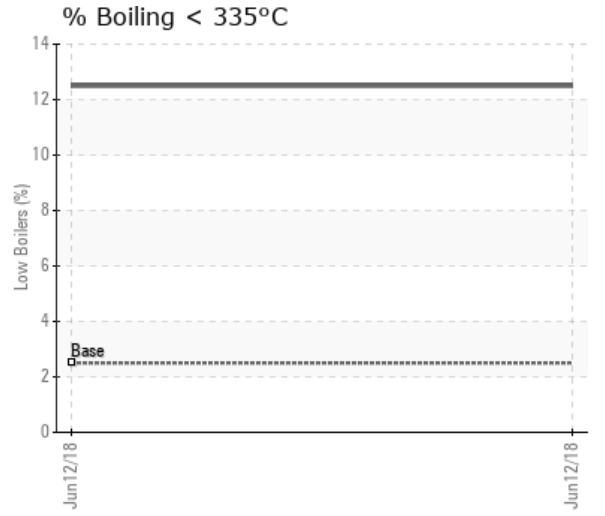
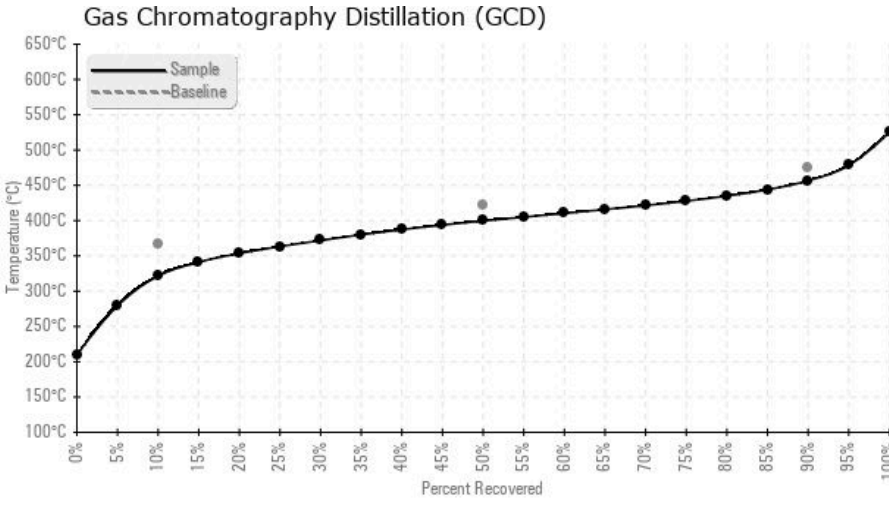
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
06/12/18	06/18/18	0h		432 / 222	2288.4	36.6	0.163	0.604	611 / 322	751 / 400	854 / 457	12.50
Baseline Data				435 / 224		32.7	0.03		693 / 367	790 / 421	887 / 475	2.5





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
06/12/18	36	0	0	0	0	0	0	44	0	0	1	5	1	0	0	0	1	0	1	1	44	0	94	1
Baseline Data			0	0						0			0	0					0				270	

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



### Historical Comments


Petro-Canada makes no representation or warranty of any kind, either express or implied, as to the accuracy or completeness of the analysis and assumes no responsibility and shall have no liability whatsoever with respect to such analysis, or a party's use of it. Petro-Canada is a division of HollyFrontier Corporation.