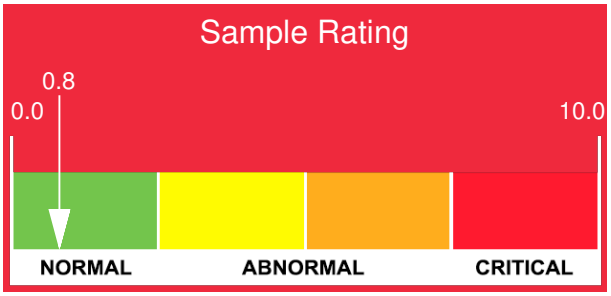
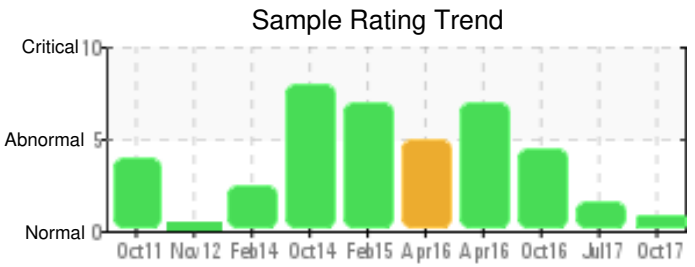




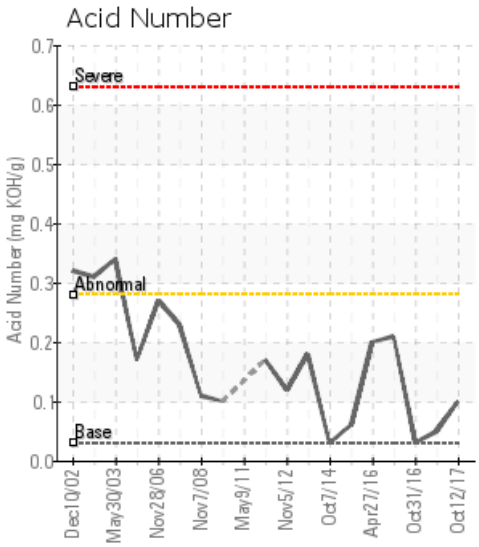
MAIN BOILER -STORAGE TANK LINE

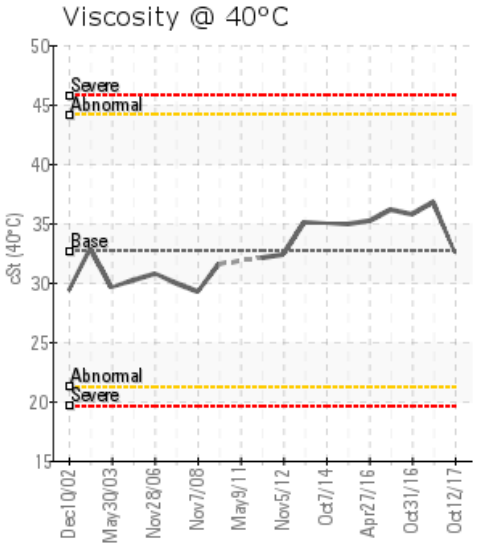
Customer: PTRHTF30025	System Information	Sample Information
MANCUSO CHEMICALS 5725 PROGRESS STREET NIAGARA FALLS, ON L2E 6X8 CANADA Attn: BOB PATEL Tel: (905)357-3626 E-Mail: bpatel@mancusochemicals.com	System Volume: 3280 ltr Bulk Operating Temp: 500F / 260C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: ARIZONA BOILER CO	Lab No: 02189824 Analyst: Adam Koscielak Sample Date: 10/12/17 Received Date: 12/22/17 Completed: 01/04/18 To discuss this report contact Adam Koscielak at 905-331-1323

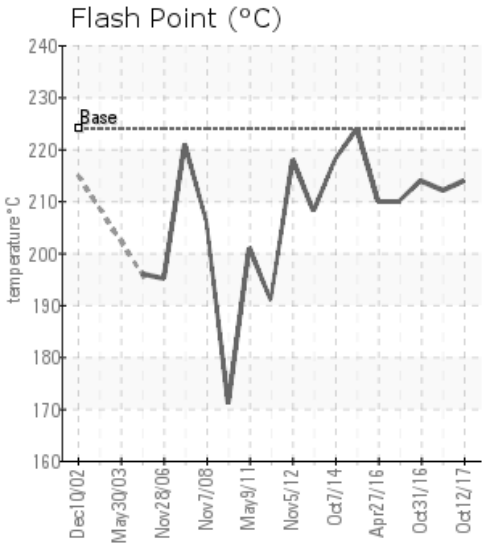
Recommendation: Sample was taken from the Storage Tank Oil line on Oct 12th, 2017. While this sample does indicate a slight increase in the 90% distillation point, other parameters in the GCD are consistent with Calflo AF. Some iron was detected at 8.1 ppm but this was significantly lower than the previous sample at 50 ppm. Pentane insoluble levels were fairly low at 0.051%.Fluid is suitable for continued use. Recommend another sample be taken in March 2018.

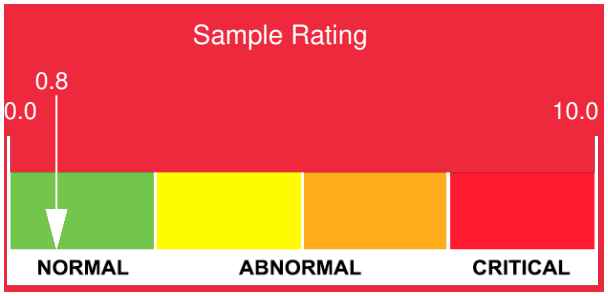
Comments: (GCD) 90% Distillation Point is marginally high.

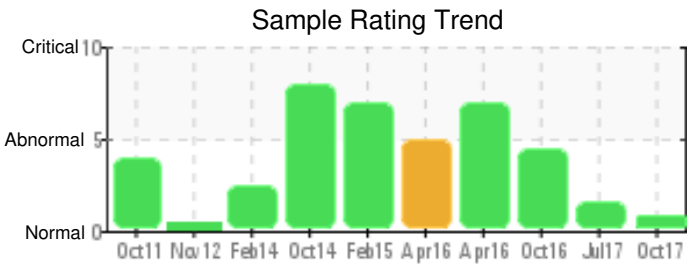
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
10/12/17	12/22/17	0y	AK171221-03	417 / 214	9.1	32.5	0.10	0.051	704 / 373	807 / 430	909 / 487	1.48
07/11/17	07/12/17	0y	BOILER ROOM	414 / 212	147.4	36.8	0.05	1.55	695 / 368	794 / 424	901 / 483	1.79
10/31/16	11/11/16	0y	BOILER ROOM	417 / 214	80.4	35.7	0.03	0.679	697 / 370	801 / 427	905 / 485	1.59
04/28/16	06/09/16	0y	AFTER 1M FILTRATION	410 / 210	36.5	36.1	0.21	1.10	698 / 370	790 / 421	892 / 478	0.07
04/27/16	06/09/16	0y	BOILER SAMPLE	410 / 210	37.1	35.2	0.20	0.879	696 / 369	776 / 414	867 / 464	0.00
02/17/15	02/18/15	0y	BOILER RM RETURN	435 / 224	37.5	34.9	0.06	1.44	693 / 367	777 / 414	900 / 482	0.00
Baseline Data				435 / 224		32.7	0.03		693 / 367	790 / 421	887 / 475	2.5





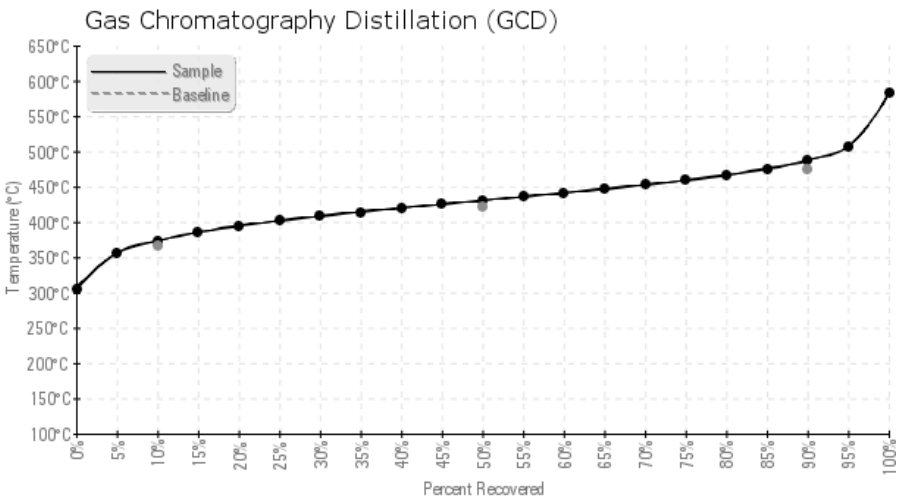


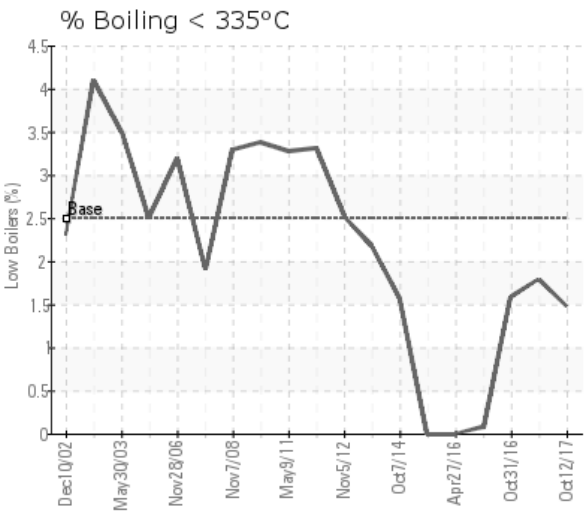




Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
10/12/17	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	124	0
07/11/17	50	0	0	0	1	1	1	0	0	0	1	13	0	0	0	0	1	0	0	0	0	0	150	1
10/31/16	29	0	0	0	0	0	1	9	0	0	1	4	0	0	0	0	0	0	0	0	9	0	141	1
04/28/16	34	0	0	0	0	0	0	0	0	0	1	7	0	0	0	0	1	0	1	0	0	0	148	0
04/27/16	25	0	0	0	0	0	0	0	0	0	1	5	0	0	0	0	1	0	1	0	0	0	148	0
02/17/15	56	0	0	0	1	1	0	1	0	0	1	6	0	0	0	0	2	0	1	0	1	0	142	1
Baseline Data			0	0						0			0	0					0				270	

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





Historical Comments

07/11/17	Fluid condition (viscosity, distillation profile, additives) indicate fluid is suitable for continued use. However Pentane insolubles are extremely high at 1.55%. Pentane insolubles may also be responsible for an increase in the Iron increase in the oil. The iron increase may be due to wear caused by the abrasive affects of the pentane insolubles which are typically carbonaceous in composition.Recommendation is to remove / reduce pentane insolubles. A system cleaning is recommended for this level of insolubles. A system cleaning will remove the deposits and also help improve the heat transfer capabilities of the system as the insolubles also act as barrier to the thermal conductivity of the fluid. This can also be seen in an increase in the bulk fluid temperature to achieve the same desired operation temperature. Pentane Insolubles levels are severely high.
10/31/16	Filtration has reduced the amount of particles at >14, and >21 um levels from previous sample measurement, however overall particle count at >4 and >6 um has not been reduced significantly.Pentane insoluble level has decreased but Pentane Insolubles levels are still high, above the acceptable limit of 0.5%, at 0.679%, but have been reduced compared to previous sample. Viscosity is typical for in service Calflo AF.Acid number has been reduced, 0.03 compared to the previous sample at 0.21.Initial boiling point has dropped from previous sample, but overall distillation profile is still consistent with other samples.Flash point is consistent with other samples and does not indicate a high presence of low boilers.Fluid is suitable for continued service. Resample at 6 months.Wear rates are typical, no increase in iron wear. Pentane Insolubles levels are high, above the acceptable limit of 0.5%, at 0.679%. Viscosity is typical for in service Calflo AF.Acid number has been reduced, 0.03 compared to the previous sample at 0.21.Initial boiling point has dropped from previous sample, but overall distillation profile is still consistent with other samples.Flash point is consistent with other samples and does not indicate a high presence of low boilers.Fluid is suitable for continued use.
04/28/16	Sample off unit. Previous sample 02077411 was filtered in the lab at Mancuso. Pentane insoluble have been reduced slightly from 1.44 to 1.10% compared to sample taken in 2015, but still considered high. Filtration is removing some insolubles very slowly. Viscosity, GCD are within normal ranges. No indication of cracking. Wear metals are within normal range.Recommend another sample be taken in 4 months to track the insoluble levels. Pentane Insolubles levels are severely high.
04/27/16	Analysis indicates Pentane insoluble has come down. Continued filtration is removing insoluble, but may require a long period of time to achieve target of 0.5% or less.Recommend another sample be taken in 4 months to track any further reduction in insoluble. Pentane Insolubles levels are severely high. (GCD) 90% Distillation Point is marginally low.
02/17/15	Pentane insolubels are high, but slightly reduced from the last sample. Viscosity, TAN, Flash, GCD results are well within normal parameters. Initial BoilPoint has gone up to 343.7°C. Fluid Suitable for continued use. Pentane Insolubles levels are severely high.