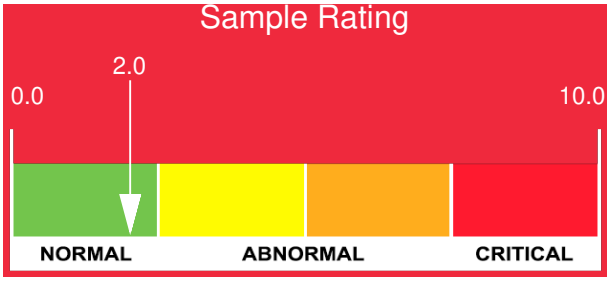
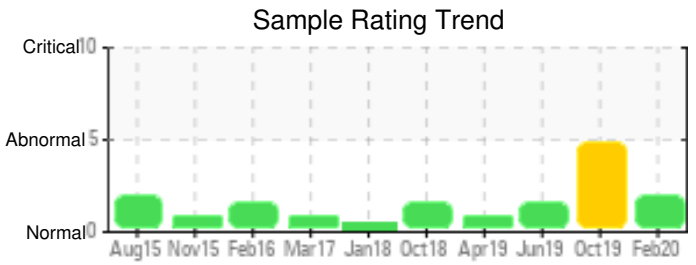




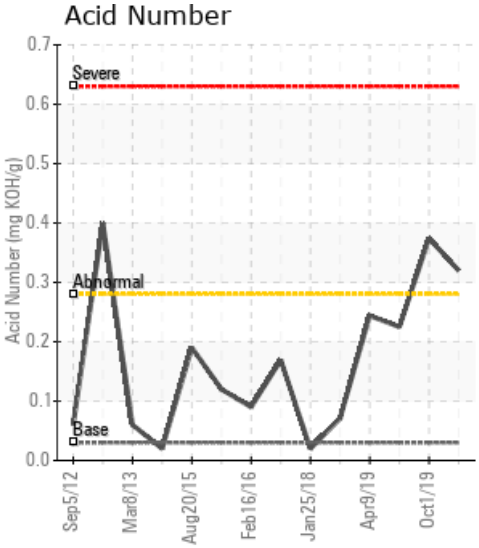
[DEASE DEVINE / LSD 12-27-81-18W6] CREW ENERGY SEPTIMUS PLANT SK-1500

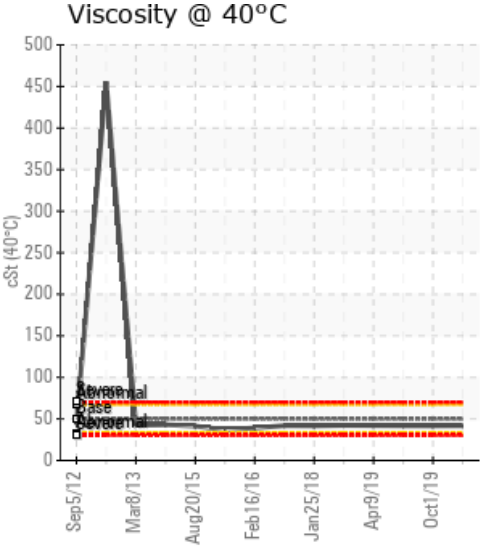
Customer: PTRHTF20109	System Information	Sample Information
Crew Energy Septimus Plant 12-27-81-18W6 8043-100TH AVENUE FORT ST.JOHN, BC V1J 1W2 Canada Attn: Dease Devine Tel: (250)262-1957 E-Mail: dease.devine@crewenergy.com	System Volume: 24000 ltr Bulk Operating Temp: 356F / 180C Heating Source: Blanket: Fluid: SUNOCO SUN HEAT TRANSFER 21 PD Make: NATCO	Lab No: 02343789 Analyst: Clinton Buhler Sample Date: 02/03/20 Received Date: 03/16/20 Completed: 03/23/20 Clinton Buhler Clinton.Buhler@PetroCanadaLSP.com

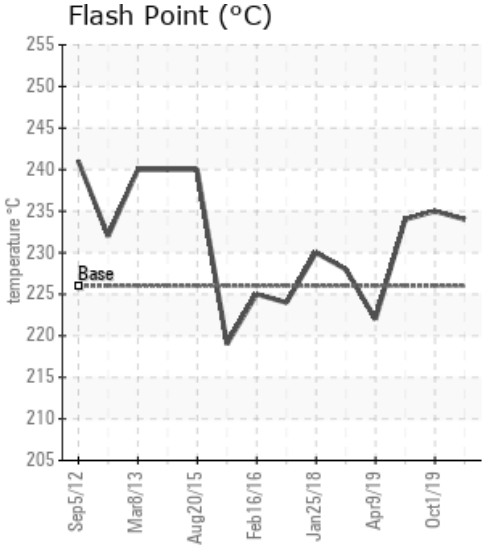
Recommendation: Sample results indicate an improvement over the previous analysis: Solids content showing as 0.34%, down from 0.607%. This may also indicate that the previous sample may not have been completely representative (maybe sample line and valve wasn't purged, etc...). Flash point and 90% distillation values (> new values) are indicative of oxidation as is the overall rising trend in Acid Number (AN down slightly this sample but this can also be related to the test accuracy). Ensure blanket gas remains operational.Periodic sweetening of the system can be beneficial in reducing the fluids overall acidity as it approaches 0.4 AN. Please re-sample in 6 months.

Comments:

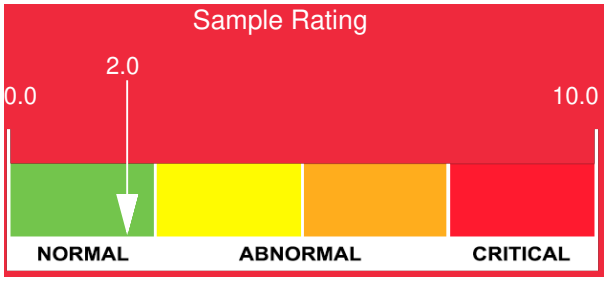
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
02/03/20	03/16/20	106m	PUMP DISCHARGE	453 / 234	5.2	41.8	0.320	0.340	781 / 416	850 / 454	935 / 502	0.00
10/01/19	10/07/19	8m		455 / 235	2.7	41.7	0.374	0.607	760 / 404	856 / 458	947 / 508	0.00
06/27/19	07/08/19	8m	12-27-81-18	453 / 234	27.3	41.8	0.225	0.306	722 / 383	824 / 440	920 / 494	1.26
04/09/19	06/05/19	8m	PUMP DISCHARGE	432 / 222	23.3	42.0	0.244	0.312	735 / 391	832 / 445	925 / 496	0.00
10/17/18	11/07/18	7m		442 / 228	12.9	42.2	0.071	0.404	737 / 391	834 / 445	923 / 495	0.00
Baseline Data				439 / 226		50.0	0.03		777 / 414		900 / 482	0.25

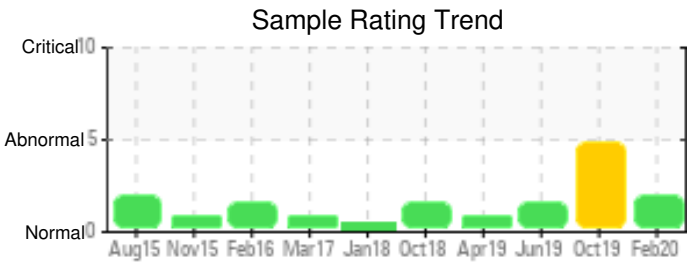






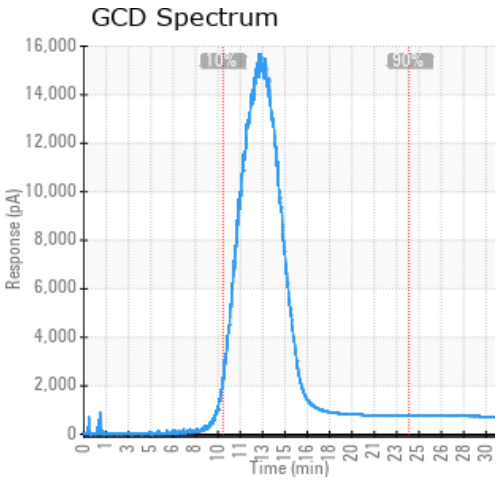
PETRO-CANADA LUBRICANTS

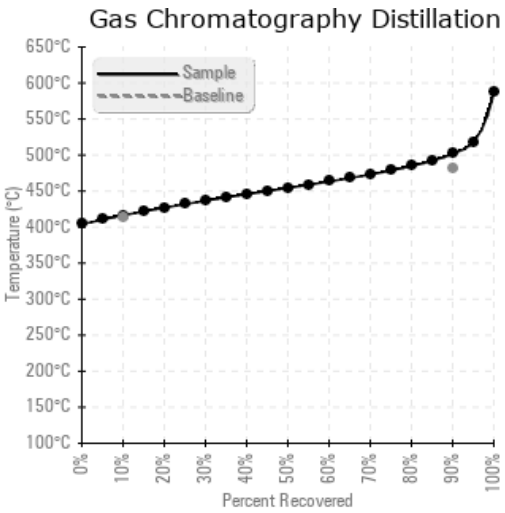


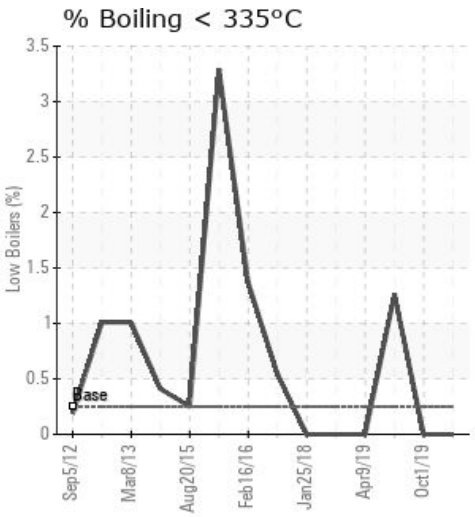


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
02/03/20	29	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	1	0	0	0
10/01/19	31	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	2	0	0	0
06/27/19	30	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	2	0	0	0
04/09/19	30	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	1	0	0	0
10/17/18	30	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	1	0	0	0
Baseline Data			0	0						0			0	0					0				0	

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







Historical Comments

10/01/19	Sample results indicate that the fluid is experiencing increased oxidation degradation as evidenced by the increased Acid Number- up to 0.374 from 0.225 3.5 months ago. The fluids increased flash point as well as the increased 10% and 90% GCD temperatures also support evidence of oxidation. The greatly increased Solids content (Pentane Insolubles) may also indicate insoluble oxidative by-products. Solids is also a concern as they can plate out and deposit across heat exchanging surfaces and cause an insulating effect, reducing efficiency.Sweetening of the system can be considered to keep the fluids acidity in check, but this is only a near term solution. Sweetening is generally recommended at an Acid Number of 0.4 in large systems such as this.The evidence of fluid degradation and solids content of 0.607% suggests that planning should begin to clean the system of solids through a cleaning and flush followed by a new thermal fluid fill.Please ensure that blanket gas is operational to ensure oxygen cannot enter the system.Once this is confirmed, please re-sample in 3 months to confirm fluid condition.
06/27/19	Sample results indicate that the heat transfer fluid is suitable for continued service. Percent boil-off has increased slightly since last analysis (1.26%). As a good practice, periodic venting of any low boiling vapors from the expansion tank is recommended.Please re-sample in 12 months (GCD) 90% Distillation Point is marginally high. (GCD) 10% Distillation Point is marginally low.
04/09/19	The fluid is in good condition and suitable for further use. The 90% GCD temperature is elevated but this does not affect performance of the fluid. Please re-sample in 12 months. (GCD) 90% Distillation Point is marginally high.
10/17/18	Sample results indicate the fluid is suitable for continued service. Please note solids content of 0.404%. This is nearing the warning limit of 0.5%. Consider filtration of fluid to reduce solids. Reduced viscosity may be related to their being some Teresso 32 mixed in the system.Re-sample in 12 months Pentane Insolubles levels are abnormally high. (GCD) 90% Distillation Point is marginally high.