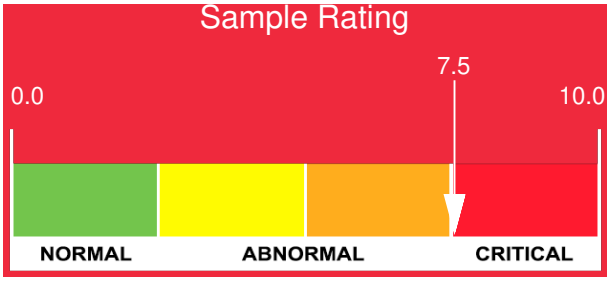
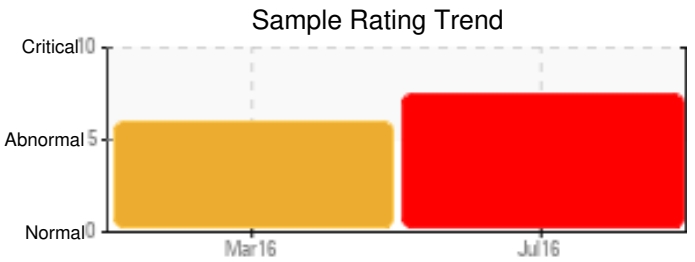




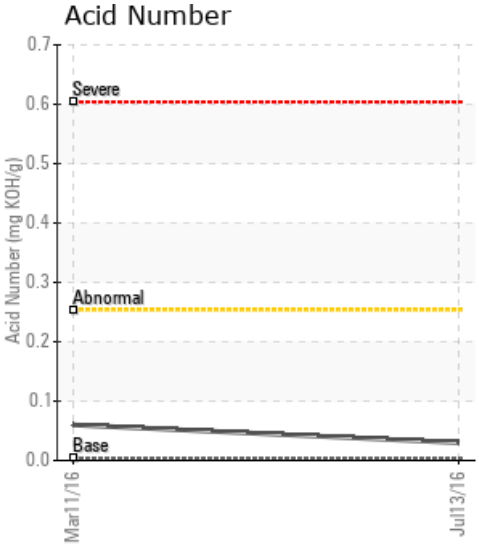
VEOLIA NORTH AMERICA CHICAGO BIOSOLIDS

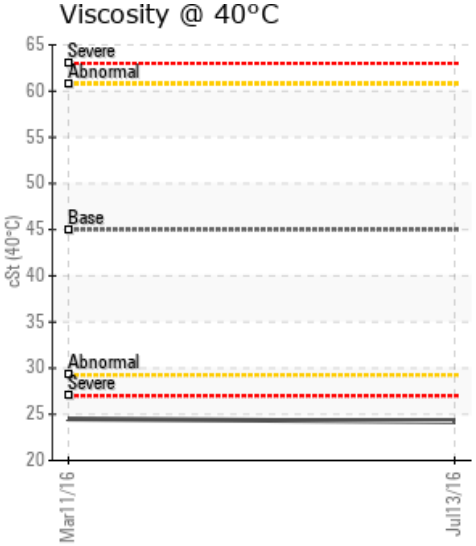
Customer: PTRHTF30090	System Information	Sample Information
VEOLIA NORTH AMERCIA 6001 W. PERSHING RD CICERO, IL 60804 USA Attn: Richard Jania Tel: (708)652-0575 E-Mail: richard.jania@veolia.com	System Volume: 38200 gal Bulk Operating Temp: 585F / 307C Heating Source: Blanket: Fluid: PARATHERM HE Make: GTS ENERGY INC	Lab No: 02085126 Analyst: Gaston Arseneault Sample Date: 07/13/16 Received Date: 07/14/16 Completed: 07/18/16 Gaston Arseneault gaston.arseneault@petrocanadalsp.com

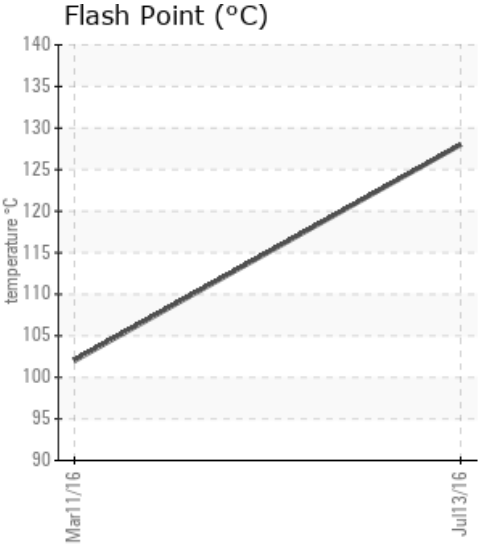
Recommendation: The fluid flash point and viscosity are very low. The fluid viscosity is half of what it should be. If the condensed vapors collected during venting are not used again and sent back into the system, this means this fluid has undergone severe thermal cracking. For a system that size a sweetening combined with active venting of the low boilers (which make up 13% of the sample by weight) out via the expansion tank would help.

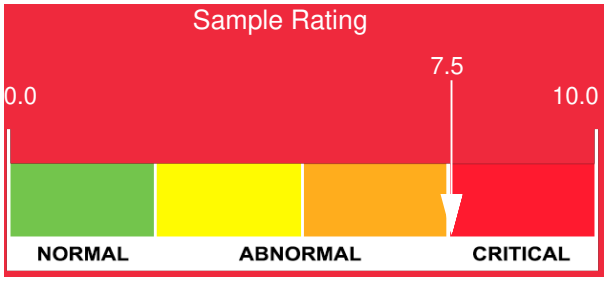
Comments: (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. Visc @ 40°C is severely low. (GCD) % < 335°C is abnormally high.

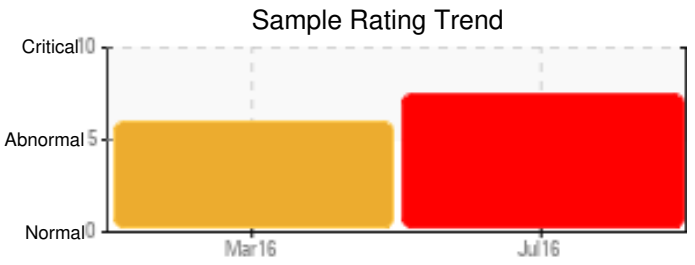
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
07/13/16	07/14/16	0y		262 / 128	0.00	24.2	0.03	0.175	572 / 300	799 / 426	946 / 508	13.47
03/11/16	03/21/16	9y	#1 SECONDARY LOOP	216 / 102	0.1	24.5	0.06	0.044	811 / 433	887 / 475	980 / 527	2.67
Baseline Data				410 / 210		45	0.004		725 / 385		945 / 507	0.74







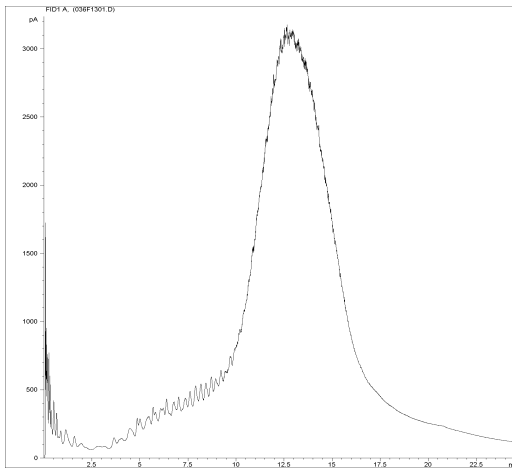


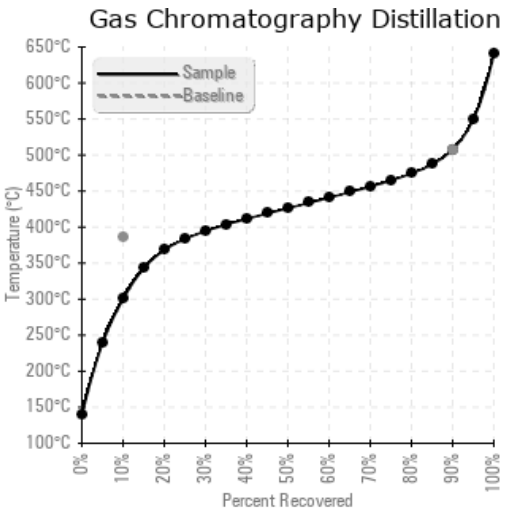


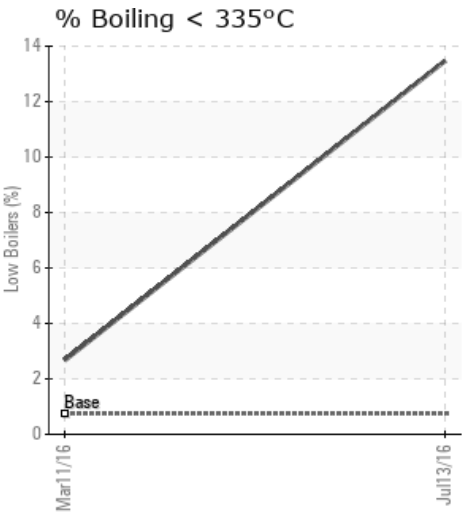
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
07/13/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03/11/16	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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%]

GCD Spectrum







Historical Comments

03/11/16	The fluid contains a fair amount of low boilers, which contribute to the reduced viscosity (about 50% down from fresh oil) and lower flash point (also about 50% of fresh oil). Although 2.67% low boilers doesn't sound alarming, multiplied by 38,000 gallons that means ~1000 gallons of low flash point hydrocarbons in the fluid. We suggest to perform venting to remove those low boilers and replace the loss by adding fresh oil. (GCD) 10% Distillation Point is severely high. COC Flash Point is severely low. Visc @ 40°C is severely low. (GCD) 90% Distillation Point is abnormally high.