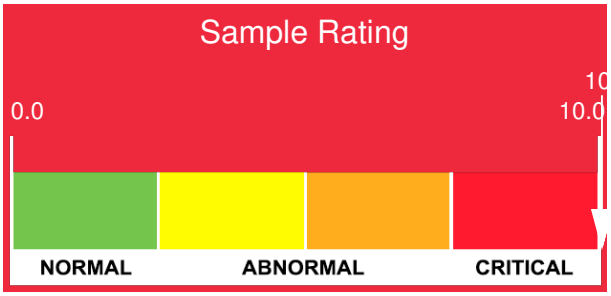
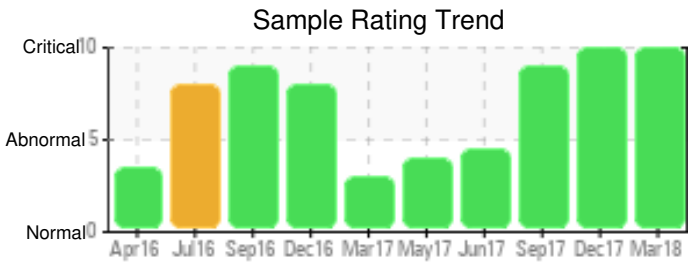




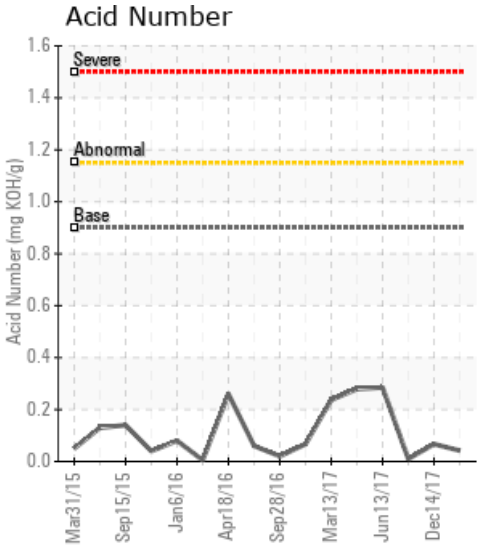
VTA HOT OIL PUMP

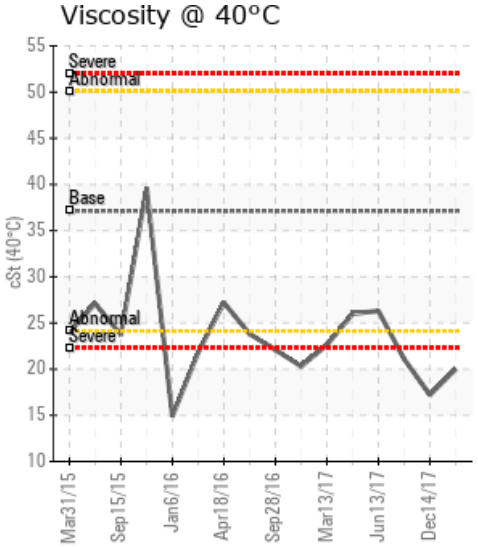
Customer: PTRHTF10004	System Information	Sample Information
ADM VITAMIN E PLANT 3700 EAST DIVISION STREET DECATUR, IL 62526 USA Attn: Rick Cluck Tel: (217)451-7770 E-Mail: ricky.cluck@adm.com	System Volume: 1800 gal Bulk Operating Temp: 650F / 343C Heating Source: Blanket: Fluid: PETRO CANADA PURITY FG HEAT TRANSFER FLUID Make: AMERICAN HEATING	Lab No: 02205301 Analyst: Joe Goecke Sample Date: 03/13/18 Received Date: 03/21/18 Completed: 03/23/18 To discuss this report contact Joe Goecke at (859)543-0092

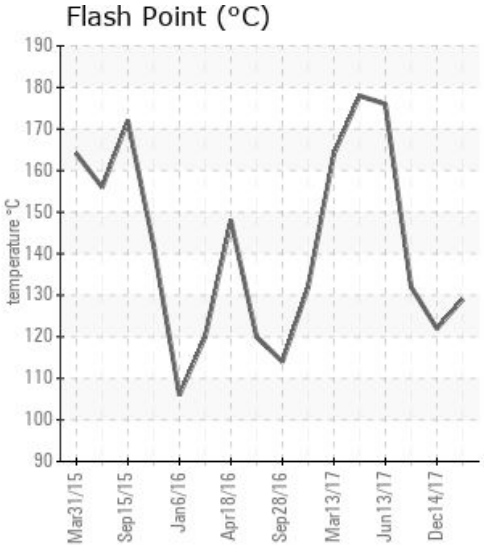
Recommendation: System continues to be dangerously low on flash point and getting higher with low boilers or light ends creating a concern. System should be changed ASAP. Viscosity also critically low.

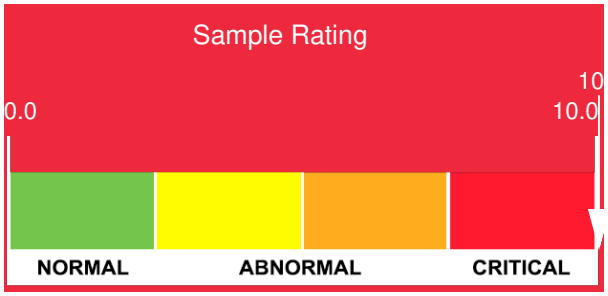
Comments: (GCD) % < 335°C is severely high. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low. Visc @ 40°C is severely low.

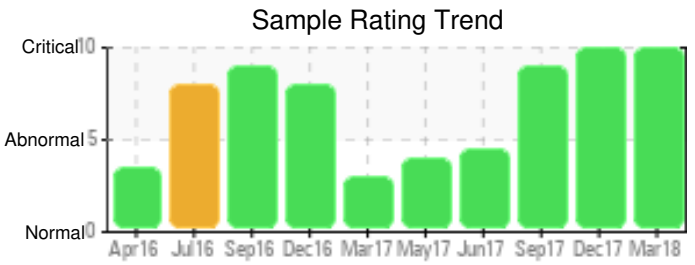
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/13/18	03/21/18	0m		264 / 129	6.2	20.0	0.042	0.049	535 / 280	761 / 405	880 / 471	19.53
12/14/17	12/21/17	0m		252 / 122	0.00	17.2	0.067	0.024	539 / 282	782 / 417	893 / 478	16.12
09/14/17	09/21/17	0m	B4 HOT OIL PUMP	270 / 132	4.7	21.1	0.01	0.030	547 / 286	781 / 416	890 / 477	15.19
06/13/17	06/19/17	18m	VTA EAST HOT OIL PMP	349 / 176	5.4	26.3	0.285	0.015	657 / 347	797 / 425	899 / 482	7.88
05/22/17	05/26/17	0m	VTA EAST PUMP	352 / 178	0.00	26.0	0.279	0.032	656 / 347	800 / 427	900 / 482	7.90
03/13/17	03/16/17	0m	B4 HOT OIL PUMP	327 / 164	9.8	22.6	0.237	0.029	699 / 370	802 / 428	900 / 482	3.24
Baseline Data				459 / 237		37.12	0.90		721 / 383	807 / 431	892 / 478	1.5





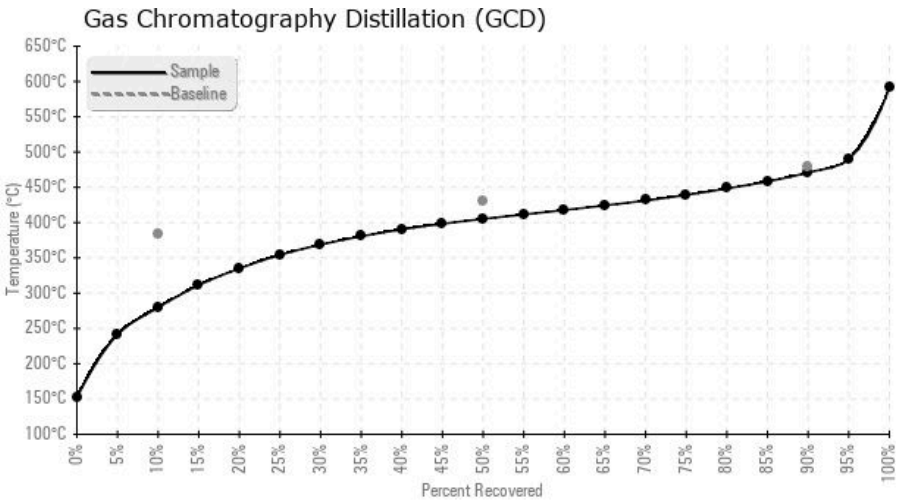


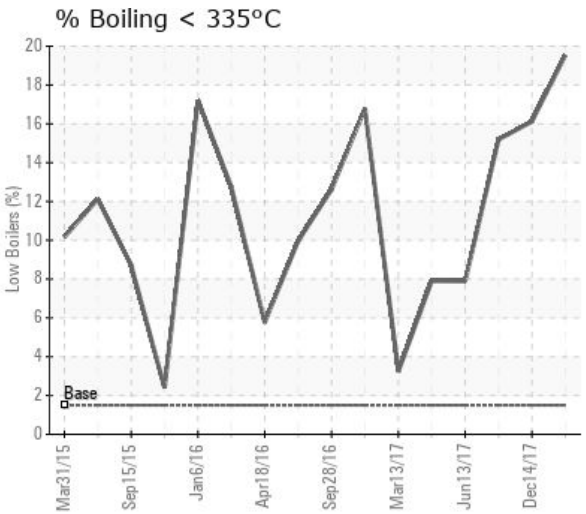




Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
03/13/18	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	63	0
12/14/17	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	56	0
09/14/17	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	52	1
06/13/17	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	54	0
05/22/17	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	51	0
03/13/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	0
Baseline Data			0	0						0			0	0					0				230	

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





Historical Comments

12/14/17	This system should be changed as soon as possible. Low boilers are high flash point and viscosity are very low . The sample rating should be a 10 but cannot be changed by my system. (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.
09/14/17	System needs to be scheduled to be changed. Viscosity @ 40 C is below 22, Flash point dropped 40 degrees C from 3 months ago and Low boilers have increased to 15%. Since these cannot be vented the system need to be changed to improve heat transfer and safe operating properties. (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.
06/13/17	Sample results very similar to last sample. Flash point marginally lower. Light ends unchanged. Viscosity slightly higher Suggest resample in about 45-60 days COC Flash Point is severely low. (GCD) % < 335°C is marginally high. (GCD) 10% Distillation Point is marginally low.
05/22/17	Viscosity is low but higher than last sample, COC flash is also slightly higher than last sample, Acid number increased slightly, low boilers have doubled and passed the 7% threshold, and the GCD 10% distillation is dropping. We recommend resampling in 3 months and prepare for change later this year based on low boiler rise. COC Flash Point is abnormally low. (GCD) % < 335°C is marginally high. (GCD) 10% Distillation Point is marginally low.
03/13/17	Viscosity at 40 is low, but low boilers is also low at 3.24% and flash point although low is higher than the past 5 samples. Everything else looks normal. Resample at next quarter or 60 days due to the low viscosity. COC Flash Point is severely low. Visc @ 40°C is abnormally low.