

## HOT WAX AREA

**Customer: PTRHTF10102**  
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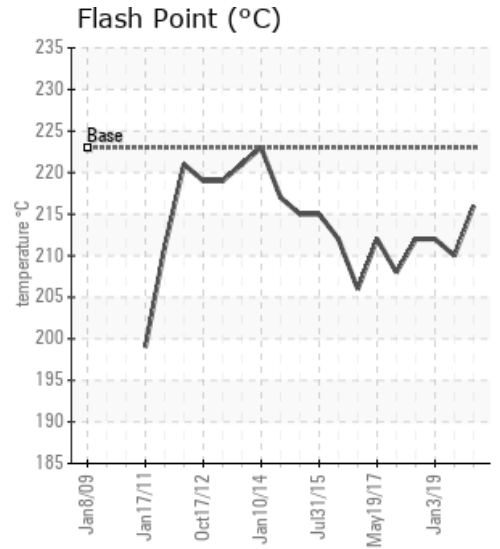
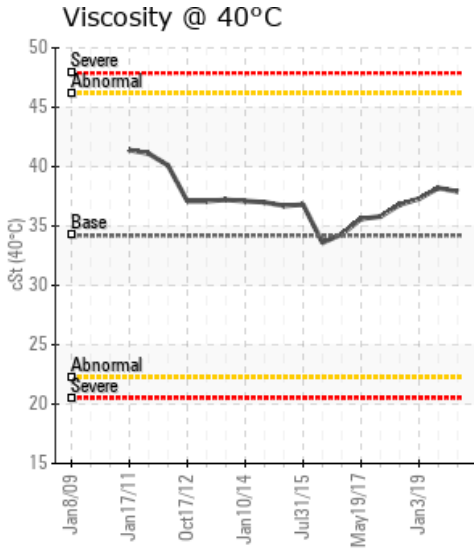
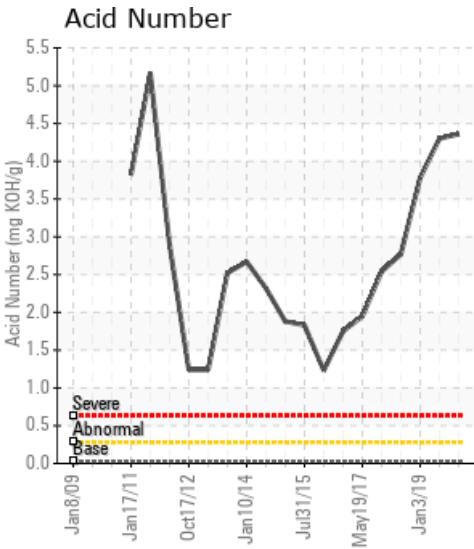
**System Information**  
 System Volume: 4000 gal  
 Bulk Operating Temp: 240F / 116C  
 Heating Source:  
 Blanket:  
 Fluid: PETRO CANADA PETRO-THERM  
 Make:

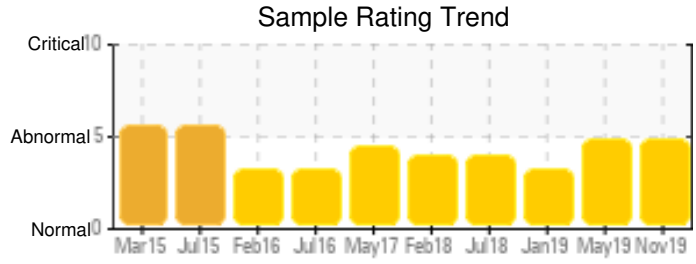
**Sample Information**  
 Lab No: 02323794  
 Analyst: Joe Goecke  
 Sample Date: 11/28/19  
 Received Date: 11/29/19  
 Completed: 12/17/19

Recommendation: Although acid numbers is very high this system tends to run high. However combining this with the increase in pentane insoluble material could indicate an increase in oil breakdown or contamination. The flash point, viscosity and low boilers are all good which does not indicate breakdown. I suggest resampling in 30 days and look for possible sources of contamination that could contribute to acid number.

Comments: Pentane Insolubles levels are severely high. Acid Number (AN) is severely high.

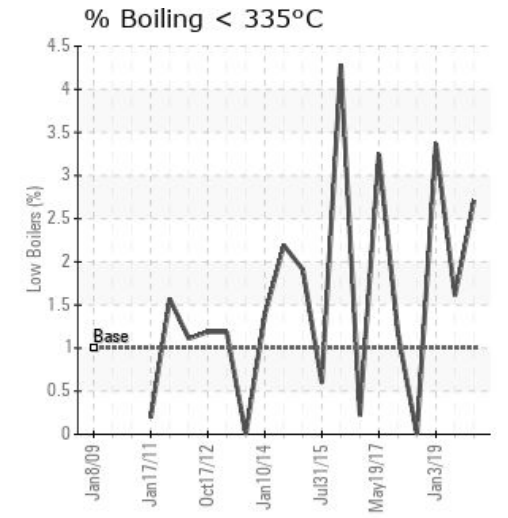
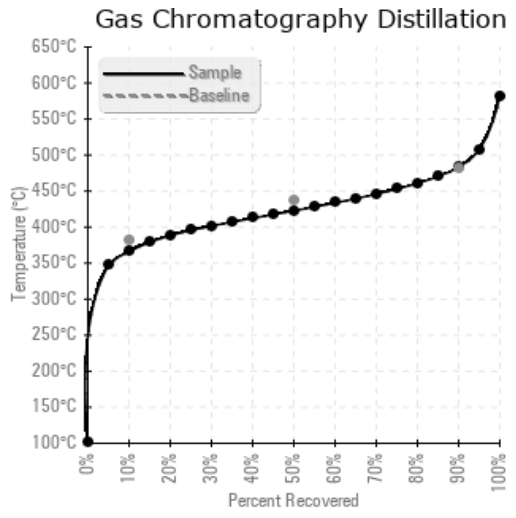
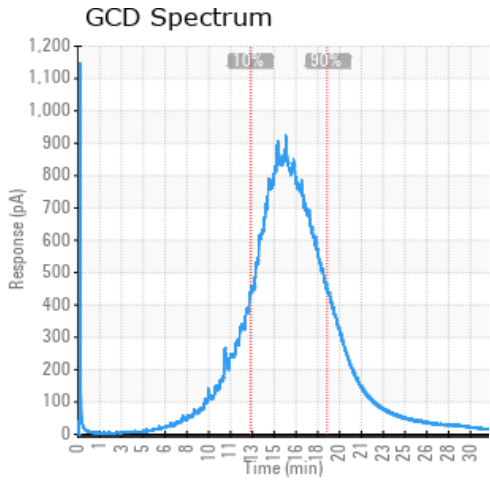
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/28/19	11/29/19	0y		421 / 216	42.4	37.9	4.36	1.10	691 / 366	793 / 423	902 / 483	2.71
05/21/19	05/22/19	0y		410 / 210	44.8	38.2	4.30	0.580	698 / 370	798 / 426	910 / 488	1.61
01/03/19	01/10/19	4y		414 / 212	20.6	37.3	3.78	0.205	681 / 360	784 / 418	893 / 479	3.37
07/31/18	08/01/18	0y		414 / 212	39.8	36.8	2.77	0.236	703 / 373	786 / 419	867 / 464	0.00
02/07/18	02/08/18	0y		406 / 208	19.4	35.8	2.54	0.435	694 / 368	788 / 420	884 / 474	1.18
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00





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	
11/28/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
05/21/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/03/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
07/31/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02/07/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Baseline Data</b>			0	0						0			0	0					0				0		

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



Historical Comments	
05/21/19	Acid number increased again but not as much as last jump. Oil does not show signs of degradation. Flash point, low boilers, and viscosity are all in very good range. Continue to use and resample at next scheduled interval. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high.
01/03/19	Aside from the acid number being extremely high the sample is in excellent condition. The acid number has continued to increase over the past 6 samples. Although this is high wear metals do not show any negative effects from the high acid. Continue to use and look for any possible contaminants that could increase acid number. Acid Number (AN) is severely high.
07/31/18	This sample is very clean and looks to be in very good condition with the only exception being the high acid number which is difficult to explain unless some acidic material was added and is always high. The remaining properties of this look like new oil. Very little water, great flash point and viscosity and no light ends forming. No action needed a time. Acid Number (AN) is severely high. (GCD) 90% Distillation Point is abnormally low.
02/07/18	Acid number is very high at 2.54, not sure what is causing this but appears to be a constant issue and may be from an environmental contaminant similar to the pentane insoluble being high. Major characteristics of Flash Point, viscosity and low boilers are in very good condition as is metal wear and water. Continue to use product and resample at next regular interval. Pentane Insolubles levels are abnormally high. Acid Number (AN) is severely high.

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