

[TOURMALINE OIL CORP / LSD 4-17-51-18W5] TOURMALINE EDSON PLANT UH-5000

Customer: PTRHTF20046
 QUADRA CHEMICALS
 12925 146TH STREET
 EDMONTON, AB T5L 2H6 CANADA
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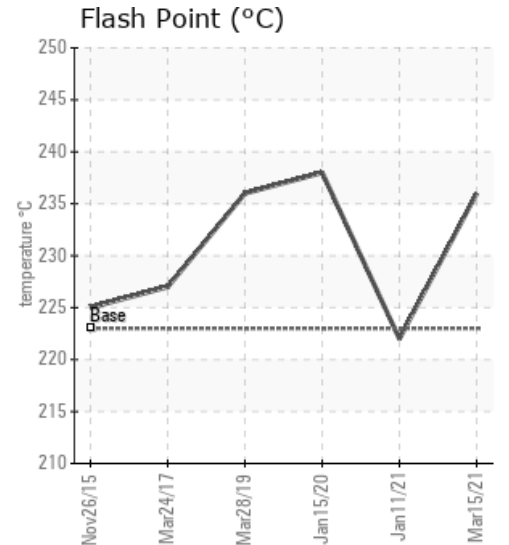
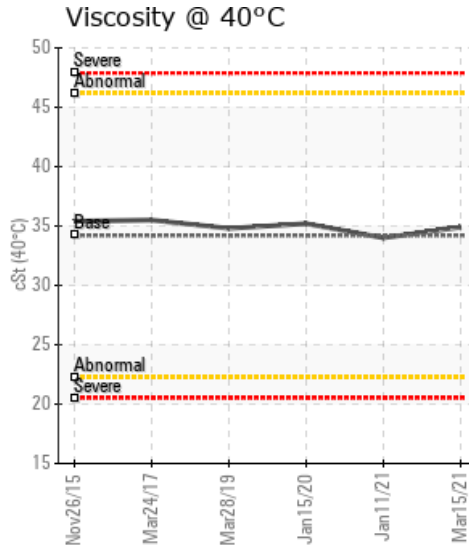
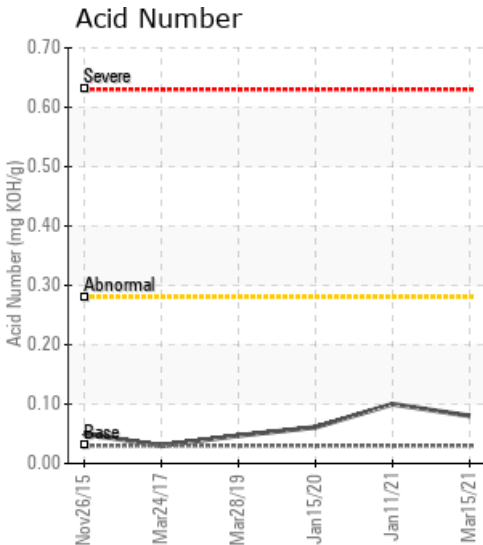
System Information
 System Volume: 19000 ltr
 Bulk Operating Temp: 437F / 225C
 Heating Source:
 Blanket:
 Fluid: PETRO CANADA PETRO-THERM
 Make:

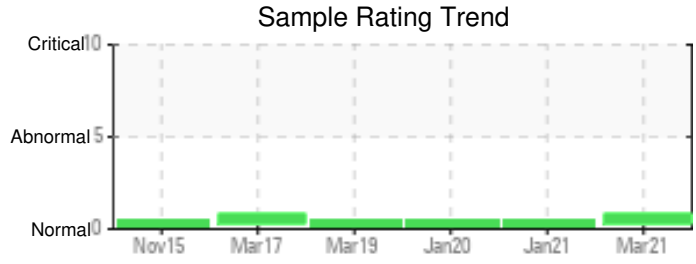
Sample Information
 Lab No: 02412290
 Analyst: Kevin McDermott
 Sample Date: 03/15/21
 Received Date: 03/30/21
 Completed: 04/01/21
 Kevin McDermott
 kevin.mcdermott@hollyfrontier.com

Recommendation: Fluid remains in excellent condition. No change since previous sample in January 2021.

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

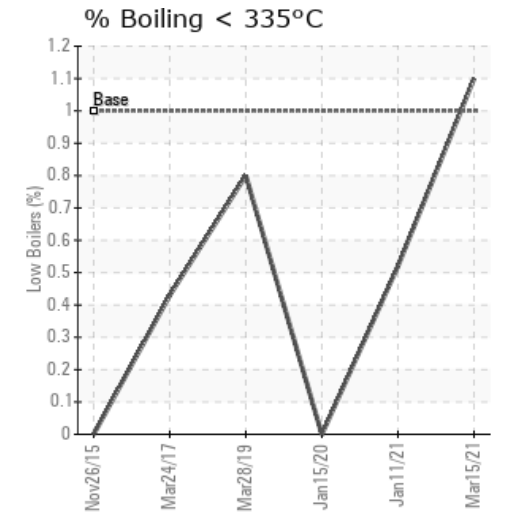
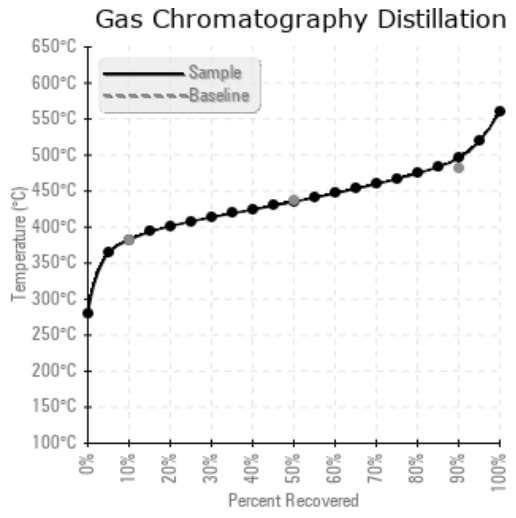
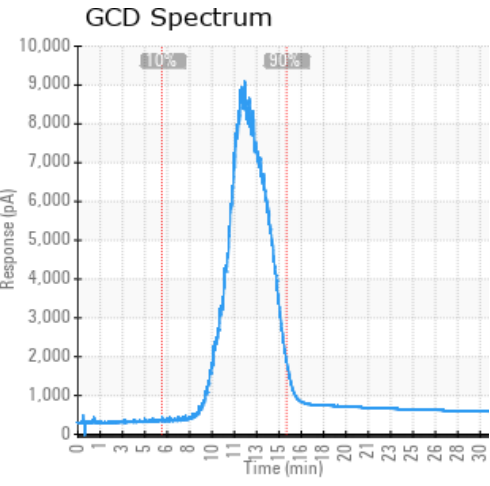
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/15/21	03/30/21	5.0y	Pump suction	457 / 236	7.2	34.9	0.08	0.051	720 / 382	815 / 435	924 / 496	1.10
01/11/21	01/22/21	6.0y	SITE GLASS	432 / 222	11.1	34.0	0.10	0.080	726 / 386	815 / 435	913 / 490	0.52
01/15/20	02/03/20	5.0y		460 / 238	7.2	35.2	0.061	0.078	723 / 384	806 / 430	903 / 484	0.00
03/28/19	04/08/19	3.0y		457 / 236	0.00	34.8	0.047	0.059	721 / 383	813 / 434	915 / 491	0.80
03/24/17	03/30/17	2.0y		441 / 227	6.3	35.5	0.03	0.031	724 / 385	817 / 436	920 / 494	0.43
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
03/15/21	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
01/11/21	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/15/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03/28/19	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	1	0
03/24/17	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Baseline Data			0	0						0			0	0					0				0	

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



Historical Comments

01/11/21	This fluid appears to be in good condition. Maintain good system maintenance practices and resample in 6 months.
01/15/20	The fluid is in good condition and suitable for further use. Please re-sample in 12 months.
03/28/19	The fluid is in good condition and suitable for further use. Please re-sample in 6 months.
03/24/17	Aside from an increase in 90% GCD temperature which indicates fluid degradation by oxidation, the fluid is in good condition and suitable for further use. Make sure the blanket gas system works properly to prevent contact between the hot fluid and outside air (oxygen) Please resample in 12 months. (GCD) 90% Distillation Point is marginally high.

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