

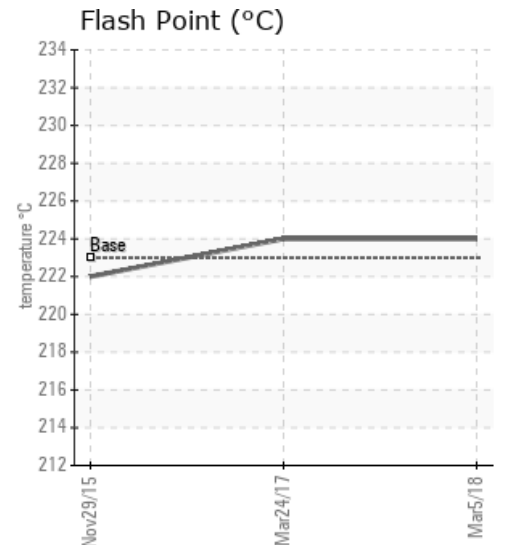
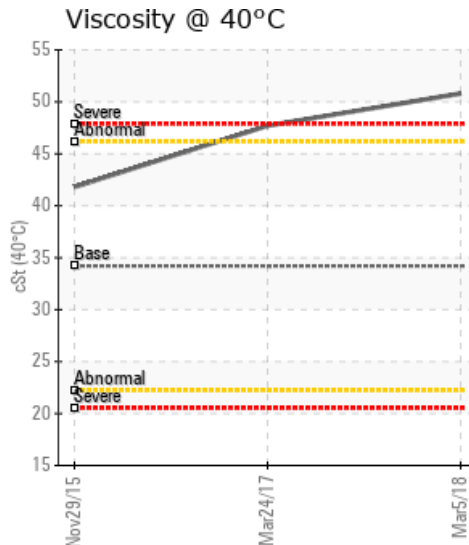
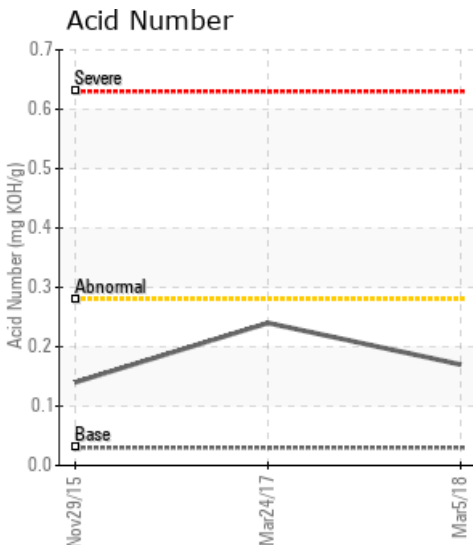
[1-34-51-18W5] TOURMALINE ANSEL UNIT #2

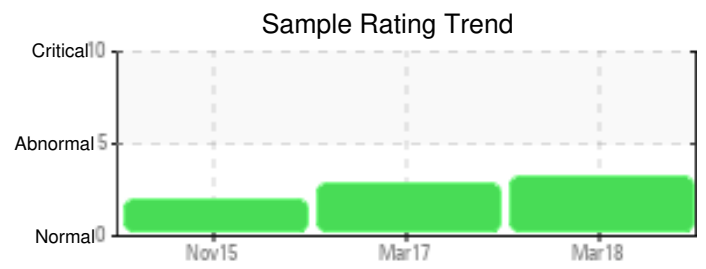
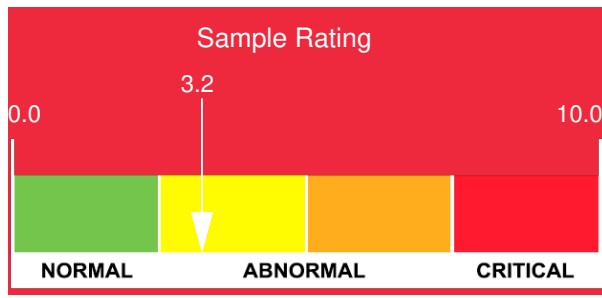
Customer: PTRHTF20046	System Information	Sample Information
QUADRA CHEMICALS 12925 146TH STREET EDMONTON, AB T5L 2H6 CANADA Attn: Ron Nordhagen Tel: (780)665-1291 E-Mail: ron_nordhagen@quadra.ca	System Volume: 10000 ltr Bulk Operating Temp: 419F / 215C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02202237 Analyst: Peter Harteveld Sample Date: 03/05/18 Received Date: 03/06/18 Completed: 03/09/18 To discuss this report contact Peter Harteveld at (780)967-4234

Recommendation: The fluid is in a reasonable condition and suitable for further use but the viscosity is high which will reduce the efficiency of heat transfer. The Pentane Insoluble (solids) content of the fluid is high and has increased. Filtration of the fluid is required. Please re-sample in 6 months.

Comments: Pentane Insolubles levels are severely high. Visc @ 40°C is severely high. (GCD) 90% Distillation Point is marginally low.

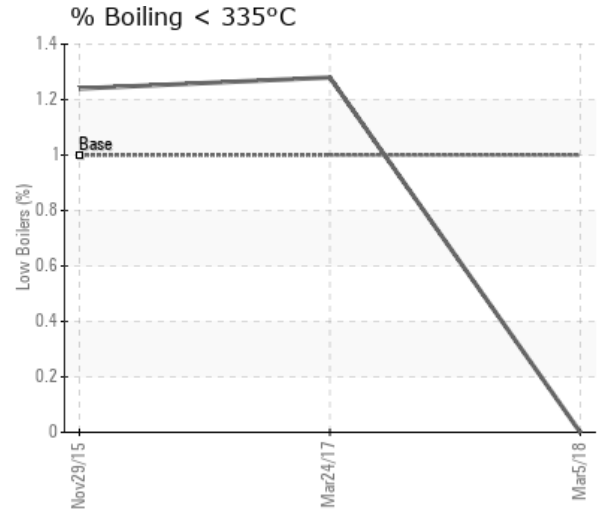
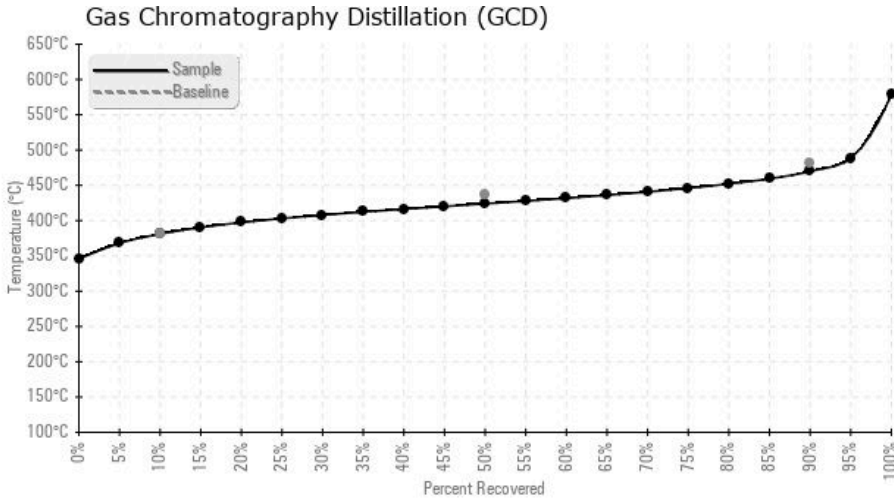
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/05/18	03/06/18	5m		435 / 224	18.6	50.8	0.17	1.17	718 / 381	795 / 424	878 / 470	0.00
03/24/17	03/30/17	0m		435 / 224	15.8	47.7	0.24	0.957	721 / 383	828 / 442	929 / 499	1.28
11/29/15	12/07/15	8m		432 / 222	20.0	41.8	0.14	0.478	713 / 378	822 / 439	927 / 497	1.24
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	
03/05/18	15	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
03/24/17	17	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
11/29/15	37	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	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	
03/24/17	An increase of viscosity, 90% GCD temperature and TAN indicates fluid degradation by oxidation. Please ensure the blanket gas system is working properly to limit contact between the hot fluid and outside air (oxygen). Pentane Insoluble (solids) content has exceeded the warning limit of 0.5%. The fluid is suitable for further use but it is recommended to start filtration of the fluid to bring the solids content down to a more acceptable level. Please resample after filtration. Pentane Insolubles levels are severely high. (GCD) 90% Distillation Point is abnormally high. Visc @ 40°C is abnormally high.
11/29/15	The viscosity of the fluid has increased. This in combination with an elevated 90% GCD temperature indicates degradation of the fluid by oxidation. The Pentane Insoluble (solids) content is high with 0.478%. It is getting close to the warning limit of 0.5%. Please verify proper operation of the blanket gas system. It is recommended to filter the fluid in order to bring the solids level down. The fluid is suitable for further use. Please re-sample after filtration of the fluid. Pentane Insolubles levels are abnormally high. Visc @ 40°C is abnormally high. (GCD) 90% Distillation Point is marginally high.

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