

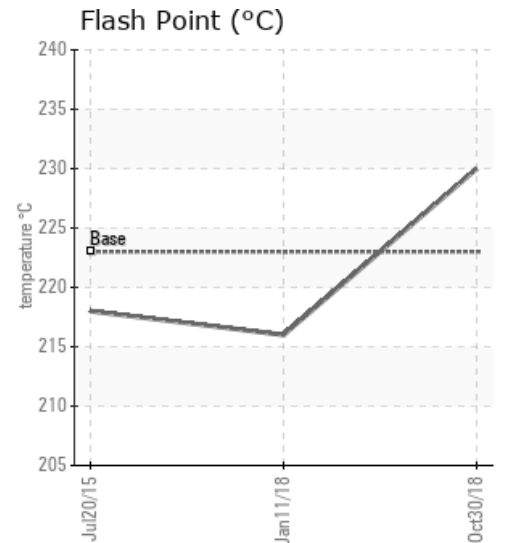
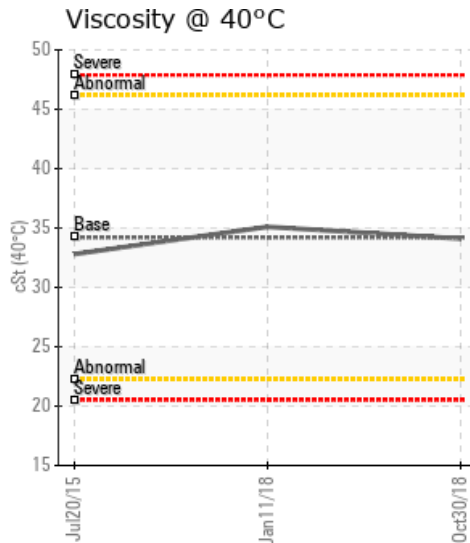
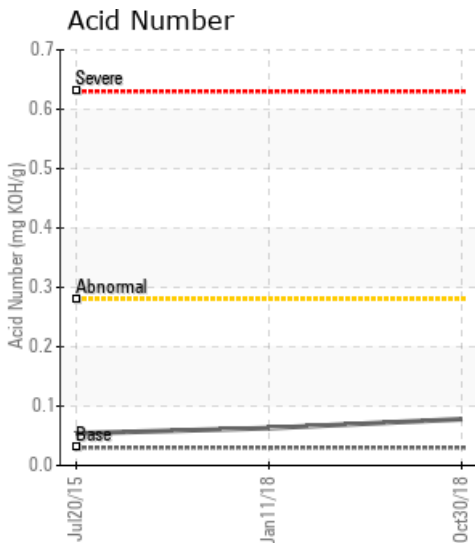
TOURMALINE WILD RIVER TRAIN 3 HEAT MEDIUM

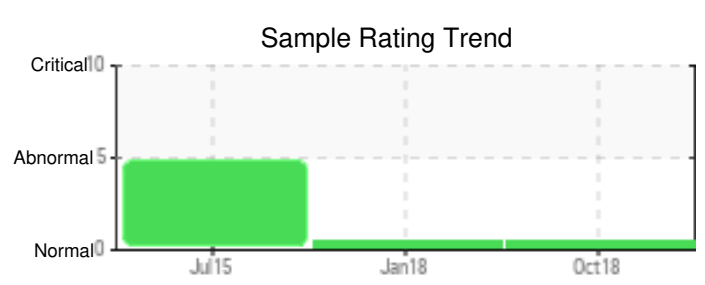
Customer: PTRHTF20046	System Information	Sample Information
QUADRA CHEMICALS 12925 146TH STREET EDMONTON, AB T5L 2H6 CANADA Attn: Quadra Samples Tel: E-Mail: quadra_samples@quadra.ca	System Volume: 29000 ltr Bulk Operating Temp: 446F / 230C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02249318 Analyst: Peter Harteveld Sample Date: 10/30/18 Received Date: 11/05/18 Completed: 11/11/18

Recommendation: The fluid is in good condition and suitable for further use. Please re-sample in 12 months.

Comments:

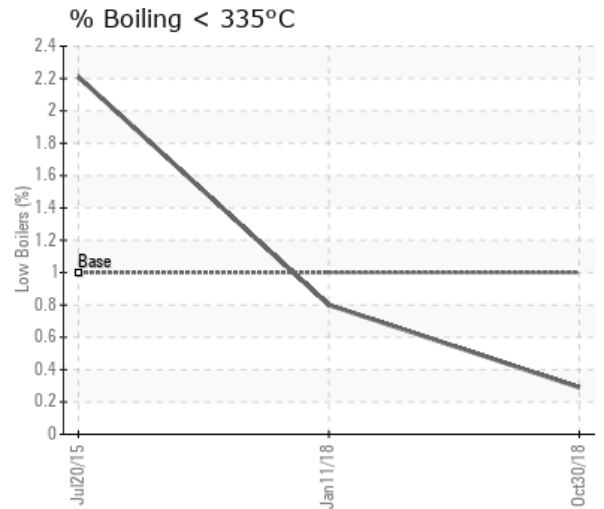
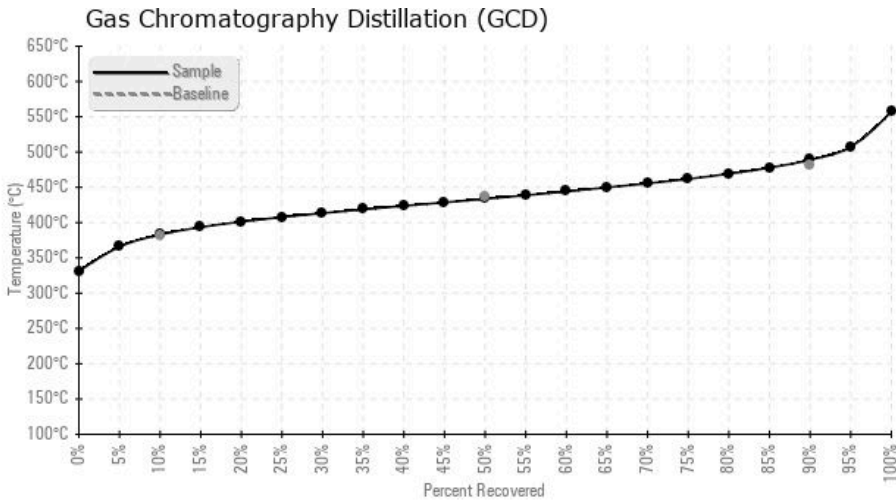
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
10/30/18	11/05/18	0y		446 / 230	68.6	34.1	0.078	0.054	721 / 383	812 / 434	912 / 489	0.29
01/11/18	01/18/18	0y		421 / 216	6.7	35.1	0.063	0.068	697 / 370	784 / 418	890 / 476	0.80
07/20/15	07/29/15	4y		424 / 218	1934.3	32.8	0.054	0.057	709 / 376	811 / 433	912 / 489	2.21
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
10/30/18	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
01/11/18	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
07/20/15	15	0	0	0	0	2	0	0	0	0	4	1	0	0	0	0	0	0	0	0	2	0	0	2
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	
01/11/18	It is important for getting value out of the analysis to list system volume and fluid service life. The diagnosis of analysis results takes these parameters into consideration. This has been requested several times in the past. Perhaps we should do a training to familiarize the operating personnel with the basics. The fluid is in excellent condition and suitable for further use. Please re-sample in 6 months.
07/20/15	The water content of the fluid is high. It is recommended to boil-off the water by means of venting. Please re-sample in 6 months. When filling in the sample label please list the system volume. The fluid is in good condition and suitable for further use. Water contamination levels are severely high. Water contamination levels are severely high.. ppm Water contamination levels are severely high.

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