

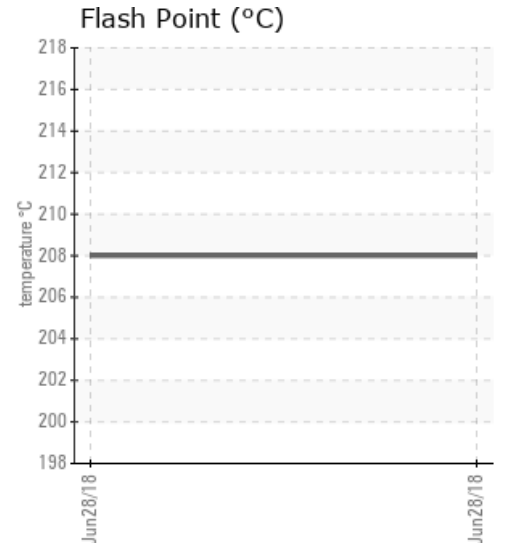
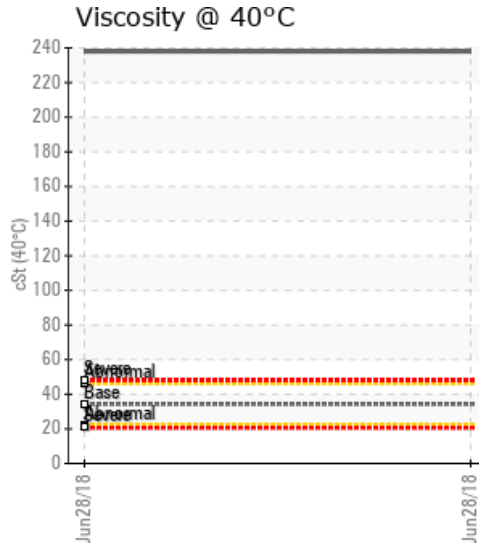
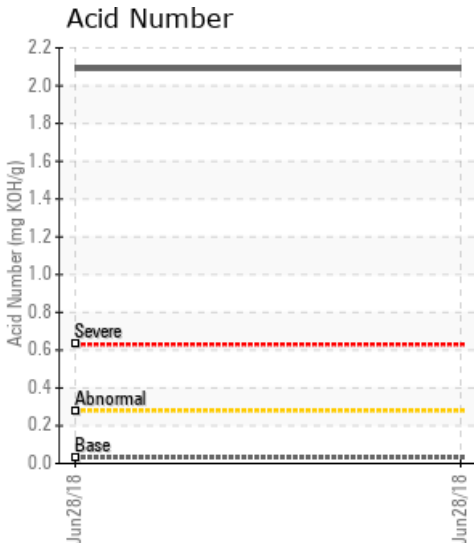
[TANGLE CREEK ENERGY 02-26-52-12W5M] HEAT TRANSFER

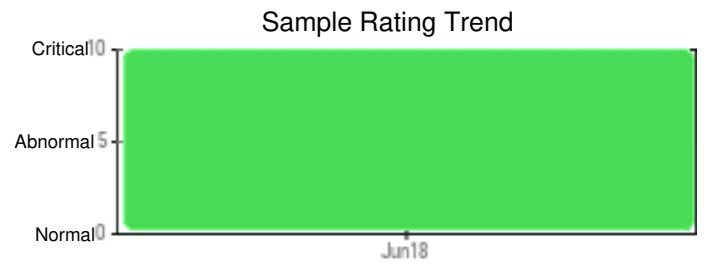
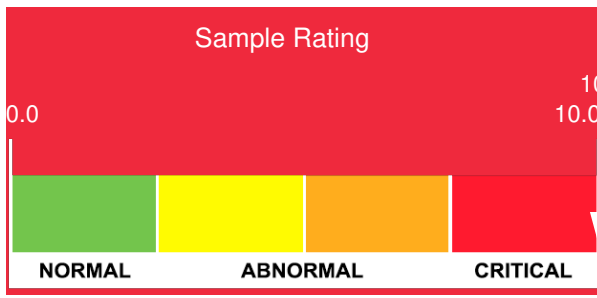
Customer: PTRHTF20201	System Information	Sample Information
TANGLE CREEK ENERGY 2-26-52-12W5M WHITECOURT, AB T7S 0A2 Canada Attn: Jason Kerr Tel: (780)706-1778 E-Mail: jkerr@tanglecreekenergy.com	System Volume: 1200 gal Bulk Operating Temp: 374F / 190C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02228658 Analyst: Peter Hartevelde Sample Date: 06/28/18 Received Date: 07/17/18 Completed: 08/14/18 To discuss this report contact Peter Hartevelde at (780)967-4234

Recommendation: The fluid is severely degraded and has to be replaced. The viscosity is very high. AN has exceeded the limit. The oil has become corrosive and therefore the Fe content is high. GCD 90% temperature is slightly low. The symptoms indicate degradation by oxidation. The Pentane Insoluble (solids) content has exceeded the reportable limit of 0.5%. Since oxidation is usually caused by hot oil contacting atmospheric air, it is advised to check proper operation of the blanket gas system. Before filling with fresh fluid an internal inspection of the heater is recommended. This because the solids content is at 0.749%. If necessary the system needs to be cleaned/flushed prior adding a fresh fill. Please take a sample of the fresh fill in circulation while cold and another sample of hot fluid after 24 hours of service. The results will be used as baseline references. For further questions please contact your Petro-Canada Tech Service Advisor.

Comments: Iron ppm levels are severe. PQ levels are severe. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Visc @ 40°C is severely high. (GCD) 90% Distillation Point is marginally low.

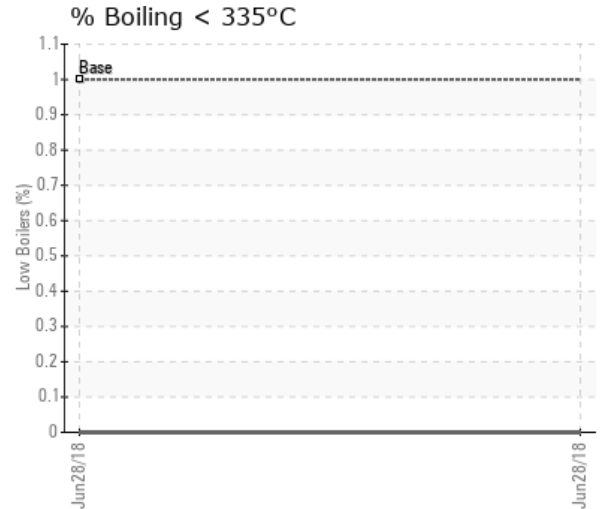
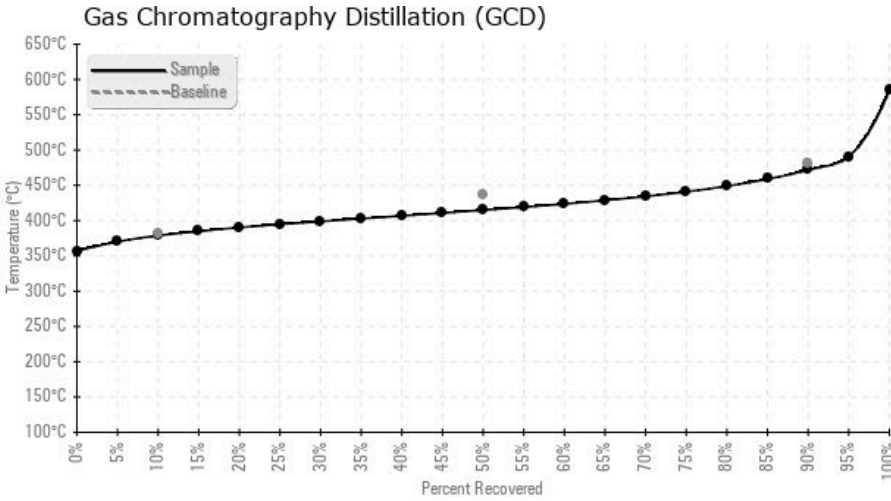
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
06/28/18	07/17/18	0h	BOTTOM OF THE PUMP	406 / 208	263.9	238	2.09	0.749	714 / 379	779 / 415	881 / 472	0.00
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
06/28/18	1429	1	0	7	0	0	0	0	0	0	10	12	0	0	0	0	17	0	0	2	4	0	1	1
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

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