

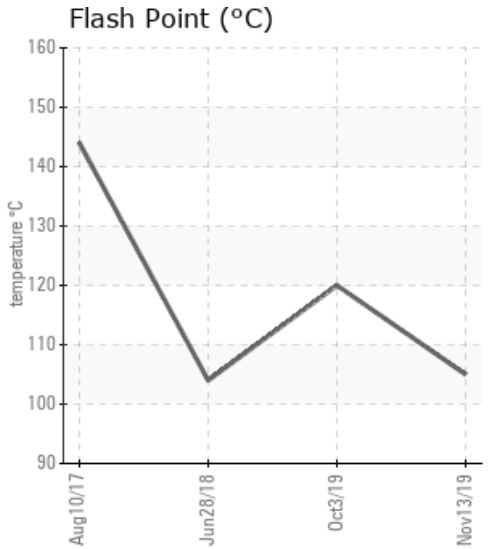
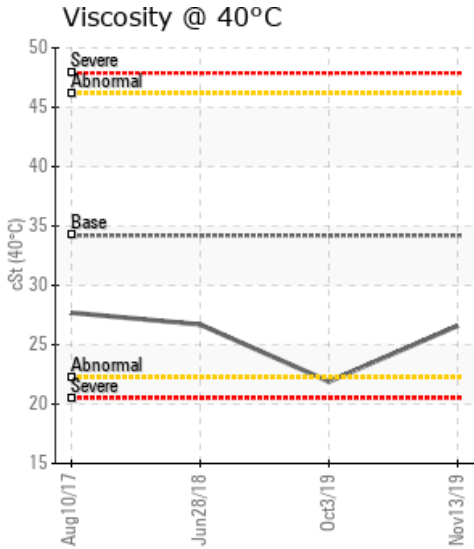
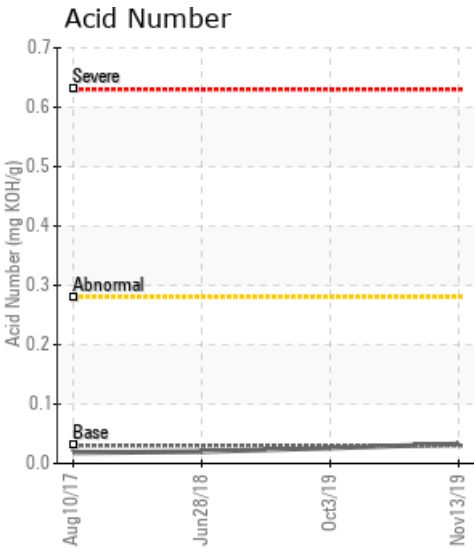
## [KEYERA PARTNERSHIP / 3-12-46-14W5M] PLT2

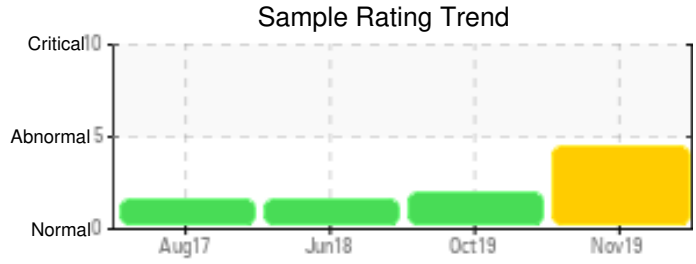
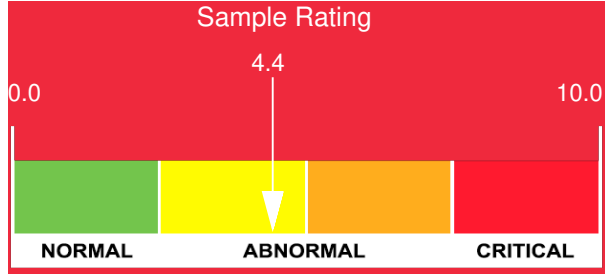
Customer: PTRHTF30084	System Information	Sample Information
Keyera Partnership Brazeau River Ga... Box 7318 3-12-46-14W5 Drayton Valley, AB T7A 1S5 Canada Attn: Ken Bouchard Tel: (780)894-3601 E-Mail: ken_bouchard@keyera.com	System Volume: 20000 ltr Bulk Operating Temp: 455F / 235C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: PETROTHERM ENG.	Lab No: 02321347 Analyst: Kevin McDermott Sample Date: 11/13/19 Received Date: 11/20/19 Completed: 11/25/19

Recommendation: The very low flash point combined with low viscosity are symptoms of thermal cracking, but given the history of this system likely from a prior exchanger leak. Fortunately these low values are not significantly worsening since previous sample. Suggest submitting annual samples or sooner if fluid becomes stressed or if exchanger leak is suspected.

Comments:

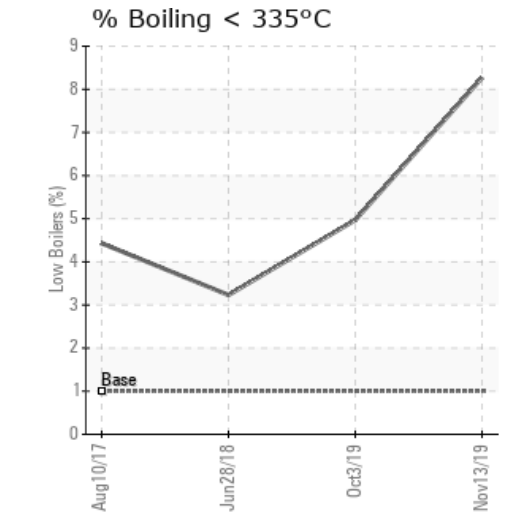
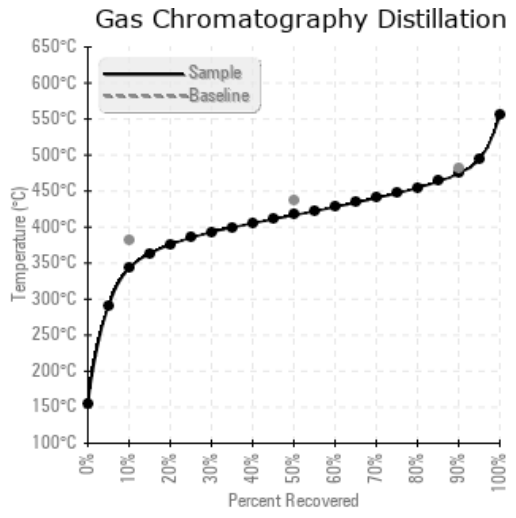
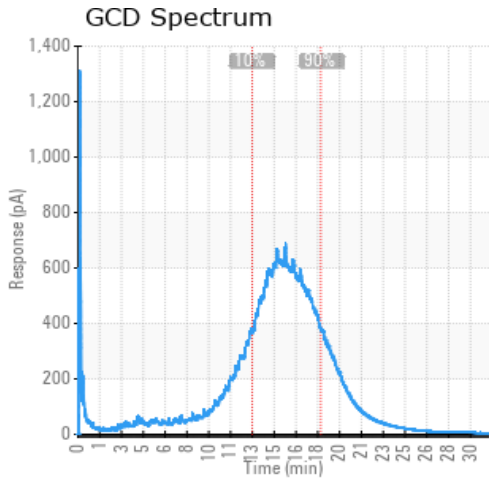
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/13/19	11/20/19	0y	PUMP DISCHARGE	221 / 105	67.0	26.6	0.033	0.085	649 / 343	782 / 417	886 / 474	8.27
10/03/19	10/30/19	9y	TANK	248 / 120	70.2	21.9	0.026	0.052	681 / 361	797 / 425	897 / 481	4.97
06/28/18	07/10/18	0y	MAIN PUMP	219 / 104	37.9	26.7	0.02	0.016	700 / 371	806 / 430	904 / 484	3.23
08/10/17	08/22/17	2y	AT THE PUMP	291 / 144	16.9	27.7	0.018	0.027	689 / 365	801 / 427	903 / 484	4.43
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
11/13/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/03/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06/28/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/10/17	0	0	0	0	0	0	0	0	0	0	0	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

10/03/19	The reduced viscosity and severely reduced flash point suggest an exchanger leak since the previous sample June 2018. Suggest taking another sample to see if FP / visc are continuing to drop. COC Flash Point is severely low. Visc @ 40°C is abnormally low.
06/28/18	Flash point is very low, viscosity slightly lower, both caused by dilution from blanket gas, or early signs of thermal cracking. Suggest venting off light ends from fluid. COC Flash Point is severely low.
08/10/17	Reduced flash point and viscosity indicate that some thermal cracking of the fluid has taken place, which is caused by excessive skin film temperature at the heat source. However, fluid remains in good condition. Suggest annual sample submissions. COC Flash Point is severely low. Viscosity slightly low.

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