

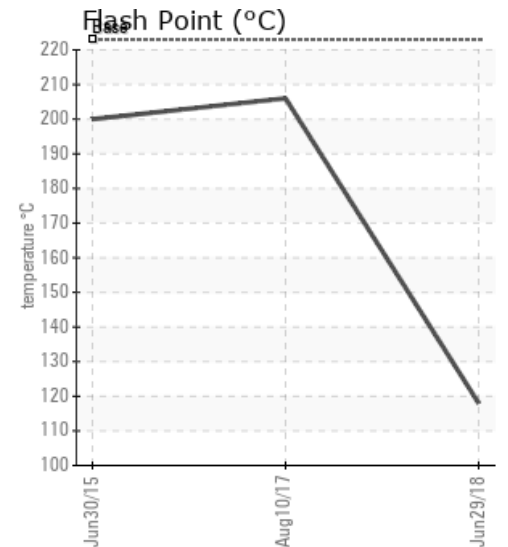
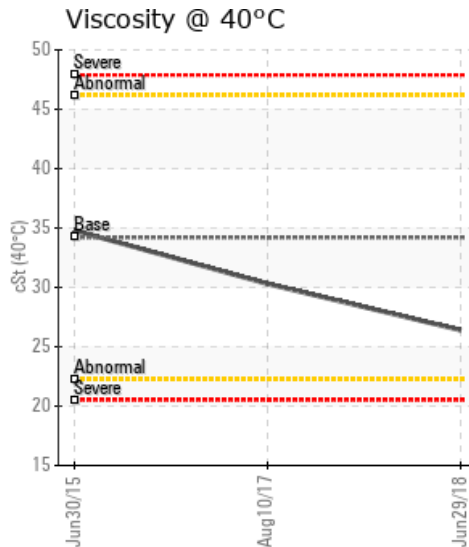
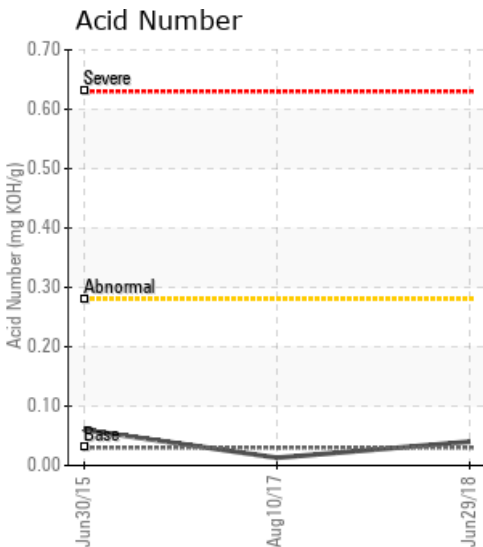
## [KEYERA BRAZEAU RIVER GAS PLANT / 3-12-46-14W5] PLANT 1

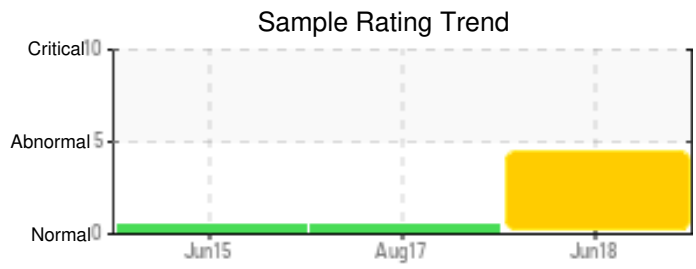
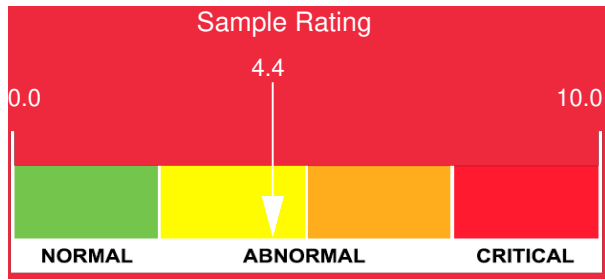
Customer: PTRHTF30084	System Information	Sample Information
Keyera Partnership Brazeau River Ga... Box 7318 Drayton Valley, AB T7A 1S5 Canada Attn: Ken Bouchard Tel: (780)894-3601 E-Mail: ken_bouchard@keyera.com	System Volume: 14000 ltr Bulk Operating Temp: 446F / 230C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: IAP HEATER	Lab No: 02227253 Analyst: Kevin McDermott Sample Date: 06/29/18 Received Date: 07/10/18 Completed: 07/12/18 Kevin McDermott kevin.mcdermott@hollyfrontier.com

Recommendation: The very low flash point, decrease in viscosity and increasing GCD<335 indicate that thermal cracking is occurring. Suggest venting off light ends from fluid. Also make sure there is adequate circulation to prevent further thermal degradation.

Comments: COC Flash Point is severely low. (GCD) % < 335°C is marginally high. (GCD) 10% 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	%
06/29/18	07/10/18	0.0m	MAIN PUMP	244 / 118	55.2	26.4	0.04	0.026	649 / 343	784 / 418	889 / 476	8.50
08/10/17	08/22/17	2.0m	AT THE PUMP	403 / 206	4.2	30.3	0.013	0.021	687 / 364	801 / 427	904 / 485	4.56
06/30/15	07/07/15	4.0m	AFT SLIPSTREAM FILTR	392 / 200	50.6	34.8	0.06	0.029	698 / 370	812 / 433	903 / 484	3.48
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

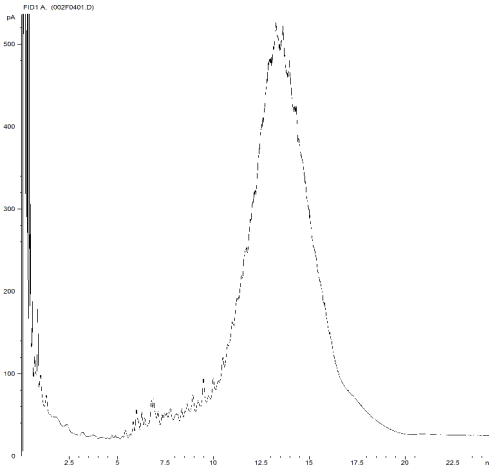




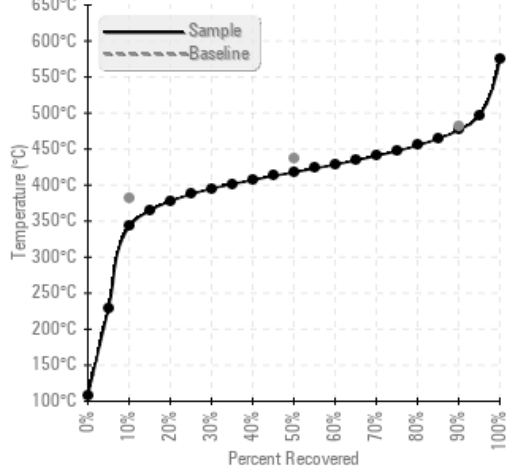
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
06/29/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08/10/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06/30/15	2	0	0	0	0	0	0	0	0	0	0	4	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%]

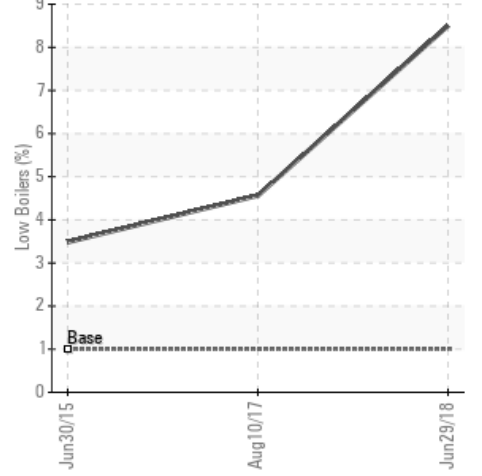
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



Historical Comments	
08/10/17	Fluid remains in very good condition. Very little change from the June 2015 sample. Suggest annual sample submission to proactively monitor fluid condition.
06/30/15	Fluid is in excellent condition. Resample in 6 months to begin developing a fluid condition trend. Be sure to use Customer Number PTRHTF30084 on the sample submission form to ensure future samples can be linked up to previous sample history.

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