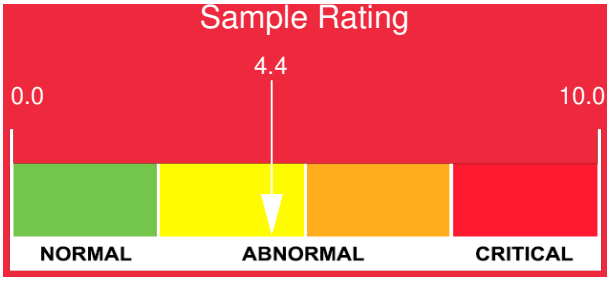
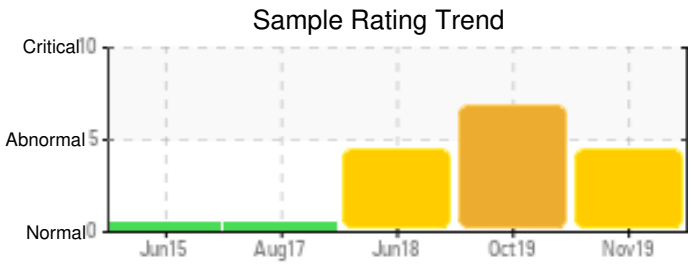




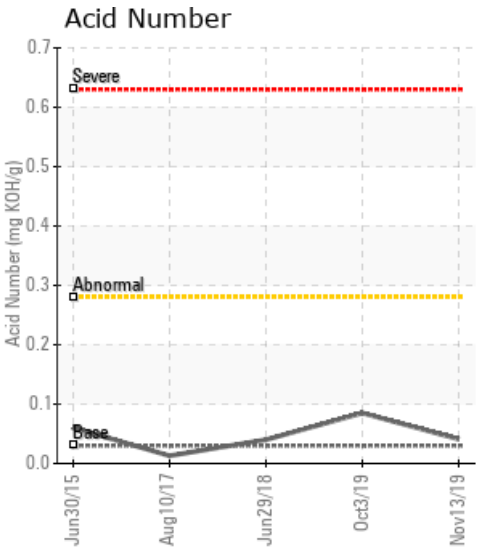
[KEYERA BRAZEAU RIVER GAS PLANT / 3-12-46-14W5] HOT OIL SYSTEM PLT 1

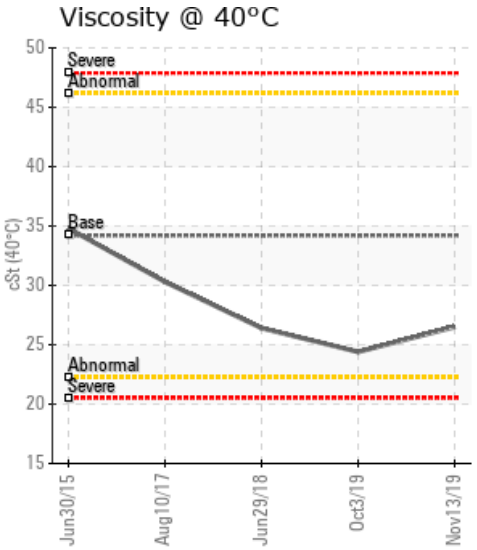
Customer: PTRHTF30084	System Information	Sample Information
Keyera Partnership Brazeau River Ga... Box 7318 3-12-46-14W5 Drayton Valley, AB T7A 1S5 Canada Attn: Ken Bouchard Tel: (780)894-3601 E-Mail: ken_bouchard@keyera.com	System Volume: 25000 ltr Bulk Operating Temp: 446F / 230C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: IAP HEATER	Lab No: 02321346 Analyst: Kevin McDermott Sample Date: 11/13/19 Received Date: 11/20/19 Completed: 11/28/19

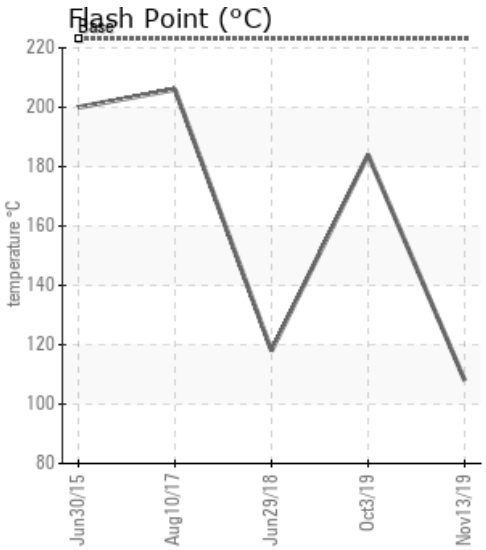
Recommendation: Nice to see absence of water that we saw in the Oct 30 sample. Must have been a bad sample. Suggest submitting annual samples - sooner if fluid gets exposed to stressed condition or exchange leak is suspected.

Comments: Water content seen in previous sample is resolved. Flash point is very low, GCD 10% & viscosity also low. Likely from previous thermal cracking and/or exchanger leak. However these valve are all very similar to sample from July 2018.

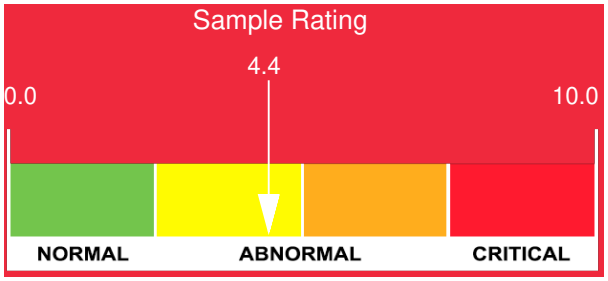
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/13/19	11/20/19	0y	HOT/COLD 100P	226 / 108	18.1	26.5	0.041	0.116	642 / 339	778 / 415	882 / 472	8.93
10/03/19	10/30/19	9y	TANK	363 / 184	5187.7	24.4	0.085	0.044	647 / 342	781 / 416	888 / 476	8.43
06/29/18	07/10/18	0y	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	2y	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	4y	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

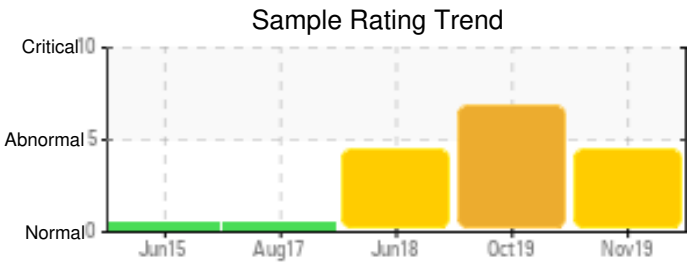






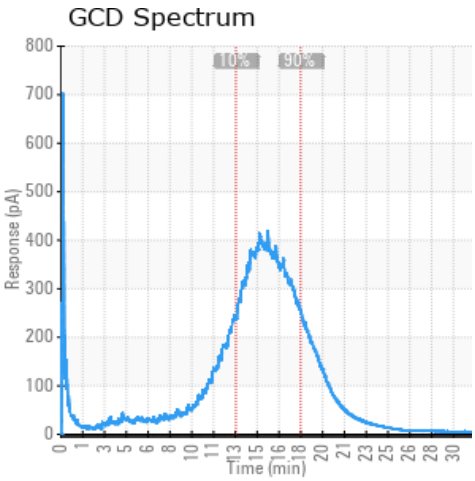
PETRO-CANADA LUBRICANTS

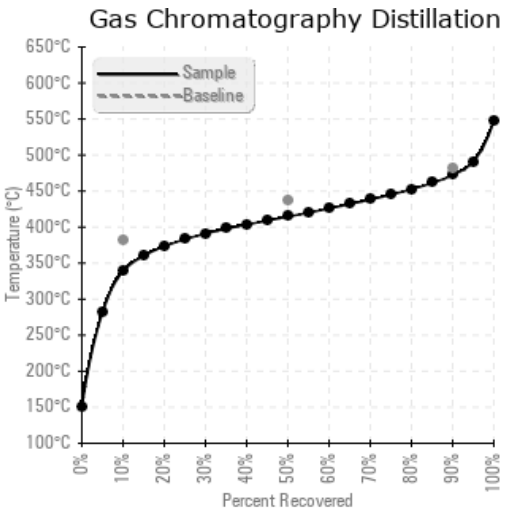


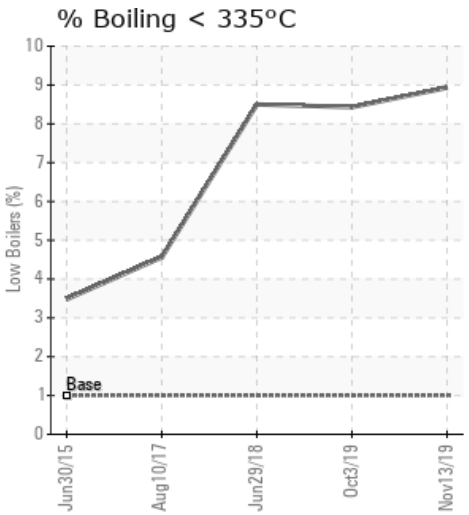


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
11/13/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/03/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06/29/18	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 anaysis results (above) in parts per million (ppm). [10,000 ppm = 1.0%]







Historical Comments

10/03/19	Some level of thermal cracking has occurred over time but no additional degradation since the June 2018 sample. There is significant amount of water present in the fluid sample. Water contamination can sometimes be from a poorly purged sample point. Suggest to submit another sample ensuring a thorough purge of sample point. (GCD) 10% Distillation Point is abnormally low. (GCD) % < 335°C is marginally high. COC Flash Point is marginally low.
06/29/18	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. COC Flash Point is severely low. (GCD) % < 335°C is marginally high. (GCD) 10% Distillation Point is marginally low.
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 Numder PTRHTF30084 on the sample submisison form to ensure future samples can be linked up to previous sample history.