

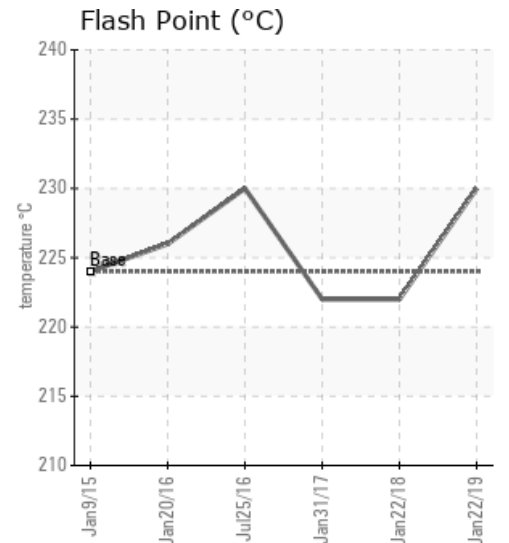
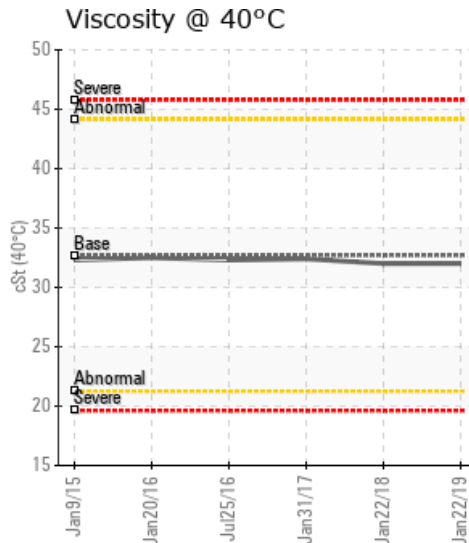
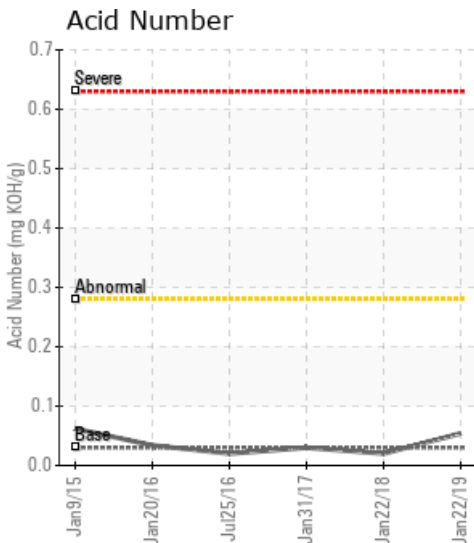
[PEMBINA KAKWA RIVER / LSD 8-13-63-5W6] PARAMOUNT PHASE #3 HEAT

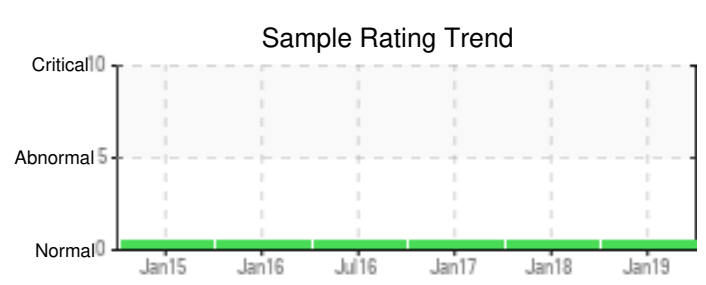
Customer: PTRHTF20062	System Information	Sample Information
Pembina Gas Services	System Volume: 60000 ltr	Lab No: 02265960
GRANDE PRAIRIE, AB T8V 7K2 Canada	Bulk Operating Temp: 149F / 65C	Analyst: Clinton Buhler
Attn: Nicolas Brooks	Heating Source:	Sample Date: 01/22/19
Tel: (403)874-8047	Blanket:	Received Date: 02/04/19
E-Mail: nbrooks@pembina.com	Fluid: PETRO CANADA CALFLO AF	Completed: 02/07/19
	Make: HEATECH	

Recommendation: Sample results indicate that the fluid is suitable for continued service. Please re-sample in 12 months.

Comments:

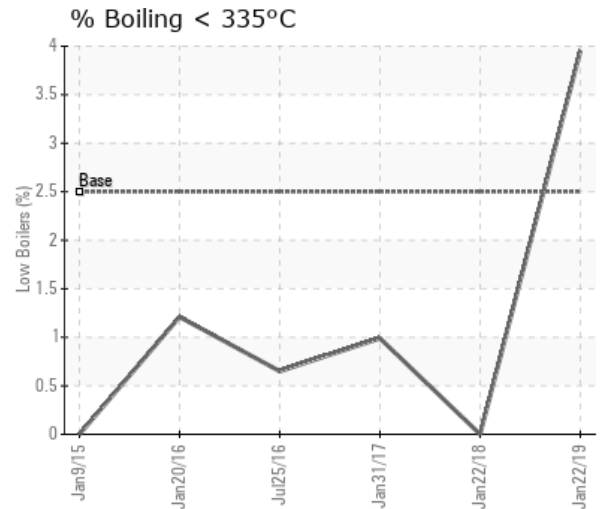
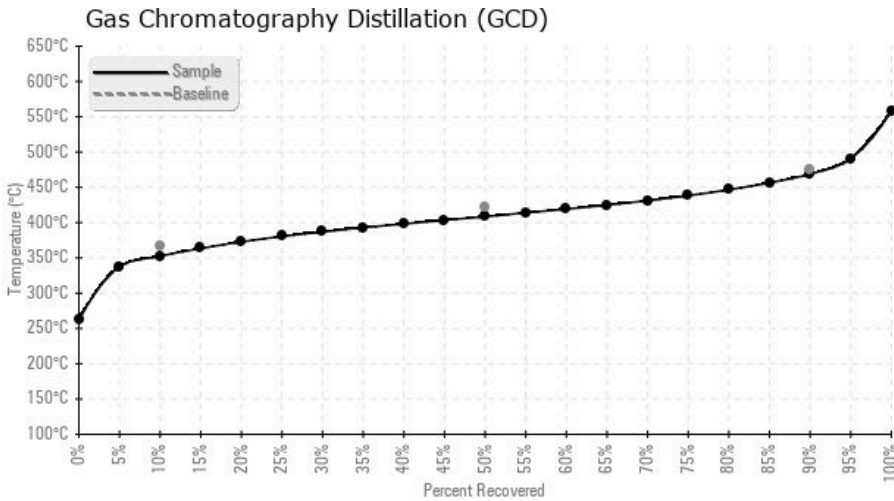
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
01/22/19	02/04/19	4y	FILTER POT	446 / 230	18.6	32.0	0.054	0.066	666 / 352	767 / 409	876 / 469	3.95
01/22/18	01/29/18	3y		432 / 222	35.5	32.0	0.02	0.034	696 / 369	785 / 419	893 / 478	0.00
01/31/17	02/13/17	2y	PUMP DISCHARGE	432 / 222	0.6	32.4	0.03	0.009	699 / 371	797 / 425	902 / 483	0.99
07/25/16	07/28/16	2y	PUMP DISCHARGE	446 / 230	345.1	32.3	0.02	0.013	700 / 371	797 / 425	902 / 484	0.65
01/20/16	01/28/16	1y	BEOFRE FILTERS	439 / 226	10.3	32.5	0.034	0.061	698 / 370	799 / 426	901 / 483	1.21
01/09/15	01/20/15	1y	INLET TO FILTER	435 / 224	85.8	32.3	0.062	0.159	715 / 379	800 / 427	908 / 487	0.00
Baseline Data				435 / 224		32.7	0.03		693 / 367	790 / 421	887 / 475	2.5





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
01/22/19	14	0	0	0	0	0	0	0	0	0	5	10	0	0	0	0	0	0	0	0	2	0	251	0
01/22/18	13	0	0	0	0	0	0	0	0	0	5	9	0	0	0	0	0	0	0	0	2	0	272	0
01/31/17	14	0	0	0	0	0	0	0	0	0	4	9	0	0	0	0	0	0	0	0	4	0	273	0
07/25/16	12	0	0	0	0	0	0	0	0	0	4	6	1	0	0	0	0	0	0	0	3	0	281	0
01/20/16	14	0	0	0	0	0	0	0	0	0	5	6	0	0	0	0	0	0	0	0	2	0	275	0
01/09/15	10	0	0	0	0	0	0	0	0	0	5	3	0	0	0	0	0	0	0	0	1	0	277	0
Baseline Data			0	0						0			0	0					0				270	

Elemental analysis results (above) in parts per million (ppm). [10,000 ppm = 1.0%]



Historical Comments	
01/22/18	Sample results indicate that the fluid is suitable for continued service. Consider re-sampling in 12 months
01/31/17	Sample indicates that oil is in good condition and suitable for continued use. Resample in 6 months.
07/25/16	The fluid is in good condition but the water content has increased. The reported operating temperature of 65 degrees C (is very low !) may result in some condensation taking place. If the water content increases further, please boil-off the water. At the moment this water content is not a problem. The fluid is suitable for further use. Please re-sample in 6 months.
01/20/16	Oil looks fine and is suitable for continued use.
01/09/15	This sample is marginally high in the (GCD) 90% Distillation Point indicating some heavier ends in the oil sample however the oil is suitable for continued use. Resample in 6 months. (GCD) 90% Distillation Point is marginally high.

Petro-Canada makes no representation or warranty of any kind, either express or implied, as to the accuracy or completeness of the analysis and assumes no responsibility and shall have no liability whatsoever with respect to such analysis, or a party's use of it. Petro-Canada is a division of HollyFrontier Corporation.