

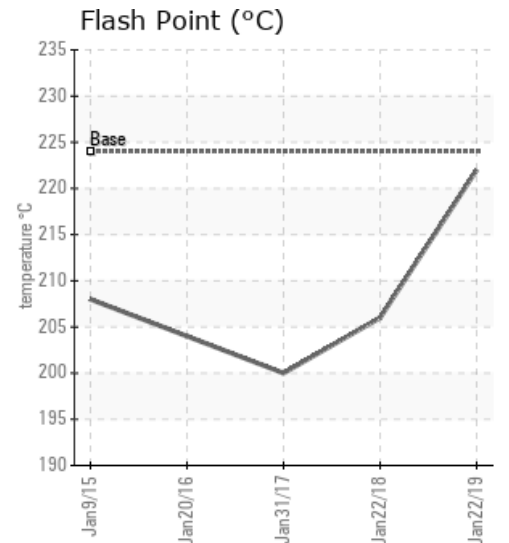
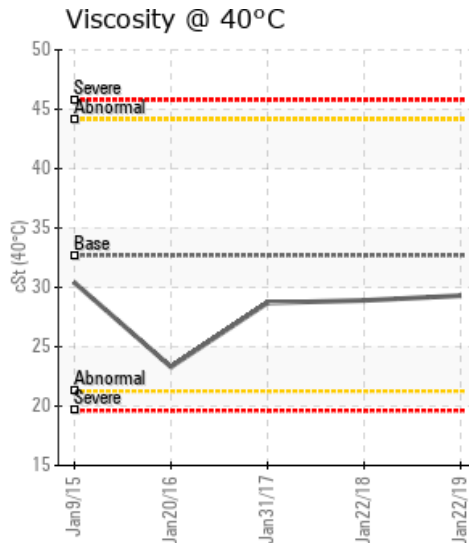
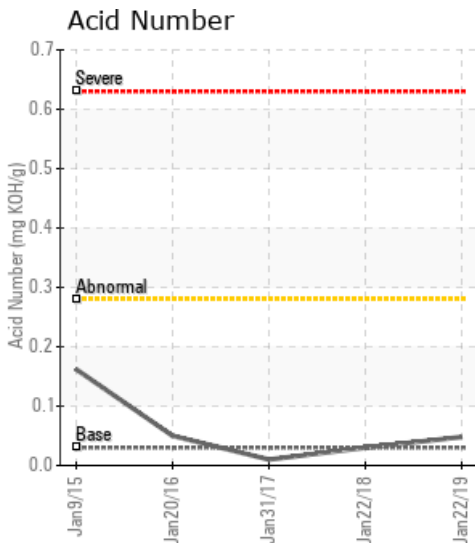
[Pembina Kakwa 8-13-63-5W6] Phase 2 Heat Medium

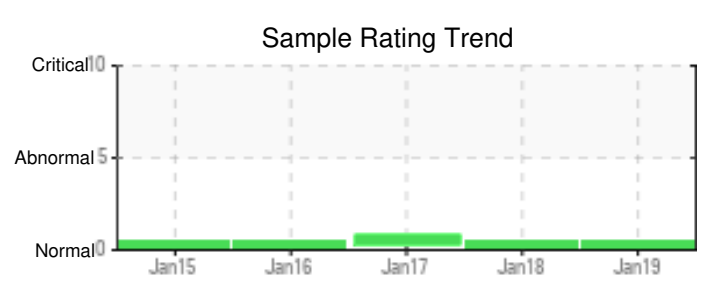
Customer: PTRHTF20062	System Information	Sample Information
Pembina Gas Services	System Volume: 84000 ltr	Lab No: 02265962
GRANDE PRAIRIE, AB T8V 7K2 Canada	Bulk Operating Temp: 482F / 250C	Analyst: Clinton Buhler
Attn: Nicolas Brooks	Heating Source:	Sample Date: 01/22/19
Tel: (403)874-8047	Blanket:	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 the fluid is suitable for continued service. Please re-sample in 12 months

Comments:

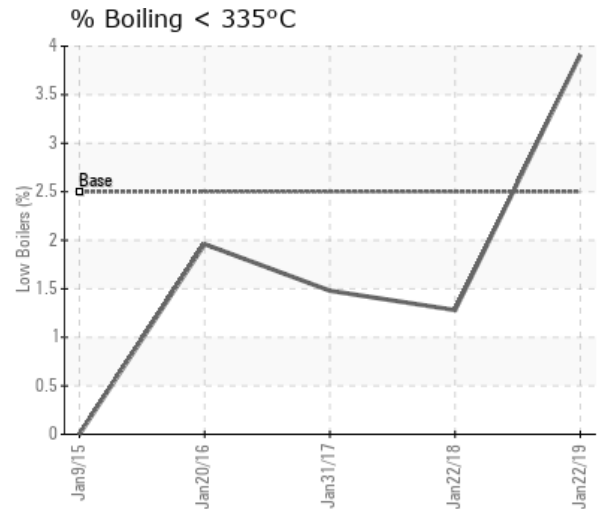
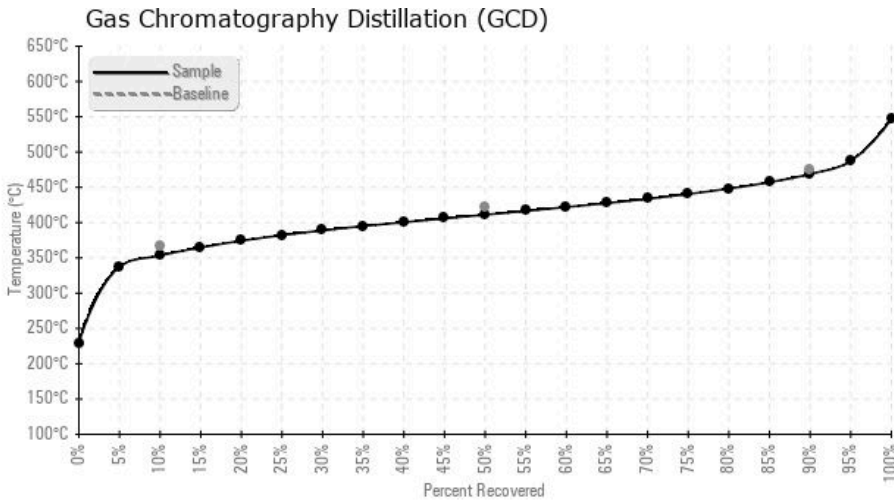
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
01/22/19	02/04/19	5y	FILTER POT	432 / 222	21.9	29.3	0.048	0.044	668 / 353	772 / 411	876 / 469	3.91
01/22/18	01/29/18	4y		403 / 206	33.2	28.9	0.03	0.067	685 / 363	782 / 417	896 / 480	1.28
01/31/17	02/13/17	3y	SLIP STRM FLTR PP DC	392 / 200	6.9	28.7	0.01	0.054	694 / 368	796 / 425	906 / 485	1.48
01/20/16	01/28/16	2y	FILTER CANISTER	399 / 204	105.5	23.3	0.050	0.023	691 / 366	795 / 424	897 / 481	1.96
01/09/15	01/20/15	6y	INLET TO FILTER	406 / 208	12.9	30.4	0.162	0.056	706 / 374	784 / 418	909 / 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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	
01/22/18	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	
01/31/17	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	
01/20/16	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	16	0	
01/09/15	19	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	2	0	2	0	78	1	
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 sampling again in 12 months.
01/31/17	(GCD) 90% Distillation Point is marginally high. TAN and Viscosity are within spec. Flash point is marginally lower than normal however fluid is suitable for continued use. Resample in 6 months. (GCD) 90% Distillation Point is marginally high.
01/20/16	Oil looks fine and is suitable for continued use.
01/09/15	This sample (GCD) 90% Distillation Point is marginally high however is good for continued use. Resample in 6 months. (GCD) 90% Distillation Point is marginally high.

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