

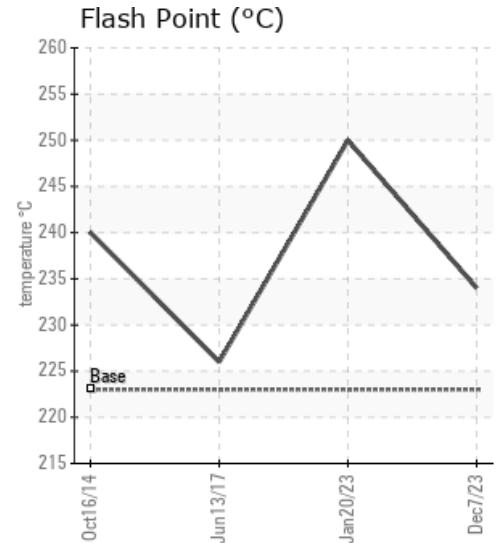
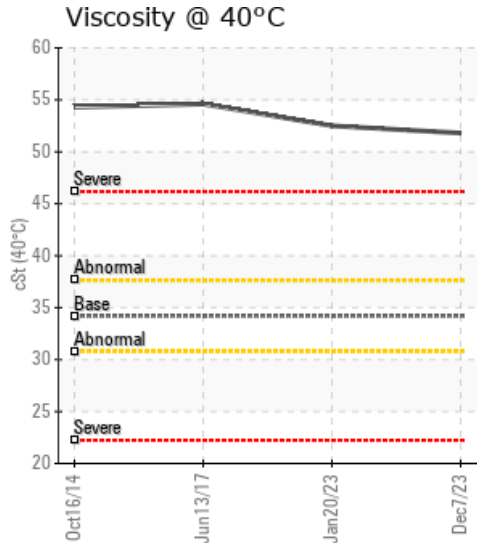
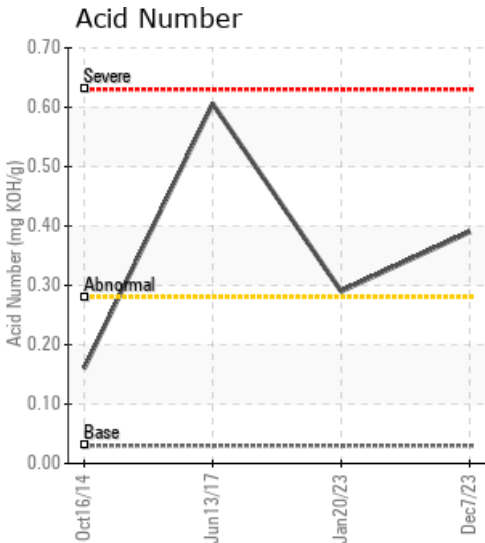
[08-11-060-03W6] H380

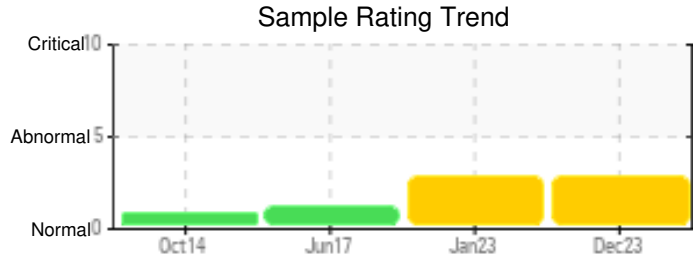
Customer: PTRHTF20148	System Information	Sample Information
PEMBINA GAS SERVICES 144 SWONSON DRIVE HINTON, AB T7B 1H1 CA Attn: R Harris Tel: E-Mail: rharris@pembina.com	System Volume: 1500 ltr Bulk Operating Temp: 482F / 250C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: COMBUSTION SOLUTIONS	Lab No: 02604546 Analyst: Clinton Buhler Sample Date: 12/07/23 Received Date: 12/20/23 Completed: 01/03/24 Clinton Buhler Clinton.Buhler@HFSinclair.com

Recommendation: Sample results indicate the fluid is in suitable condition for continued service. Although Acid Number remains elevated, it appears that it is stable. Iron content is up to 132 ppm, which may be associated with corrosion. Please re-sample after 6 more months of operation to monitor the Acid concentration.

Comments:

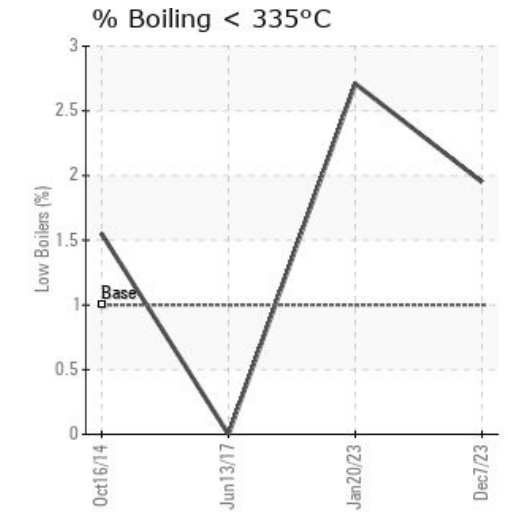
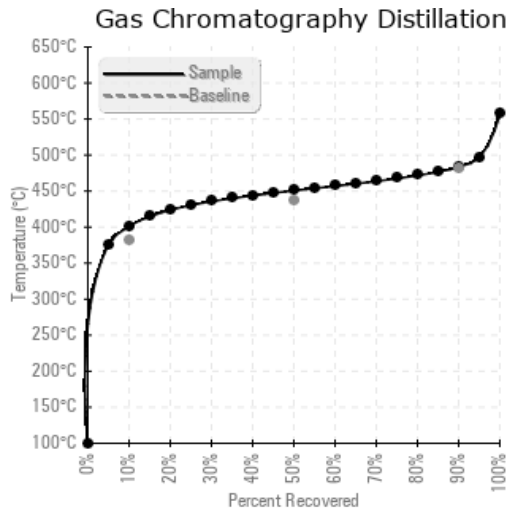
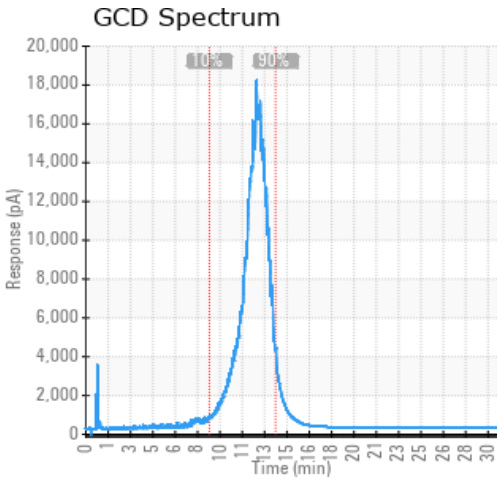
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
12/07/23	12/20/23	12.0h		453 / 234	158	51.8	0.39	0.072	754 / 401	843 / 451	902 / 483	1.95
01/20/23	03/09/23	0.0h		482 / 250	103.6	52.5	0.29	0.398	755 / 402	845 / 451	901 / 483	2.71
06/13/17	07/11/17	0.0h	FILTER OUTLET	439 / 226	46.7	54.6	0.606	0.382	780 / 416	853 / 456	920 / 494	0.00
10/16/14	10/27/14	0.0h	PUMP DISCHARGE	464 / 240	41.1	54.3	0.16	0.077	729 / 387	824 / 440	881 / 472	1.55
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
12/07/23	132	0	0	0	0	0	0	0	0	0	0	3	17	0	0	0	2	0	0	0	2	0	9	2
01/20/23	78	0	0	0	0	0	0	0	0	0	2	2	17	0	0	0	2	0	2	0	0	0	9	1
06/13/17	57	0	0	0	0	0	1	0	0	0	0	3	1	0	0	0	1	0	0	0	1	0	0	1
10/16/14	77	0	0	0	0	0	0	0	0	0	2	3	2	0	0	0	1	0	0	0	2	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

01/20/23	Sample results indicate the fluid is in suitable condition for continued service. Acid Number remains somewhat elevated, although it has decreased since the last sample in 2017; Iron levels are up a bit which can be associated with corrosion. Solids content has slightly increased to 0.398%. Solids can form from both thermal and oxidative fluid degradation; Iron particles can also contribute to this. Please ensure blanket gas remains operational and re-sample in 6 months.
06/13/17	The Acid Number of the fluid is high but not at the condemning limit of 1. The solids content is elevated but no problem at this time. The warning limit for solids content is 0.5%. The fluid is suitable for further use and can be topped-up with Petro-Therm or Calflo LT. Please re-sample in 6 months. Acid Number (AN) is abnormally high.
10/16/14	The distillation curve of the Sunoil 21 indicates the presence of a lighter fluid. Since the reported service life is 24 hrs the lighter fluid could be the residual of a flushing fluid. The Sunoil 21 is in good condition and suitable for further use. (GCD) 90% Distillation Point is marginally low.

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