

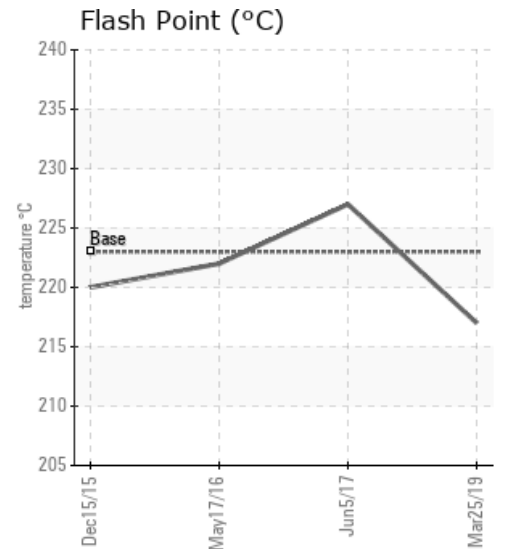
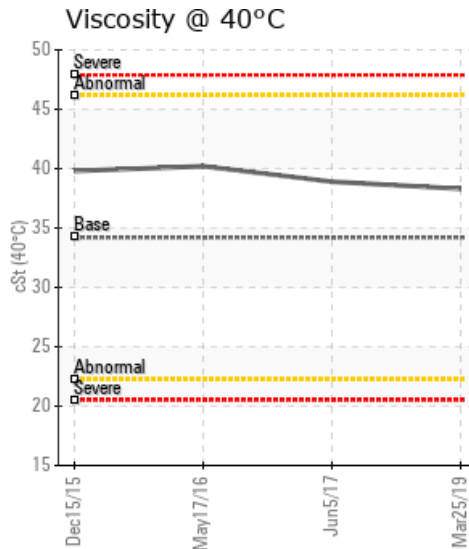
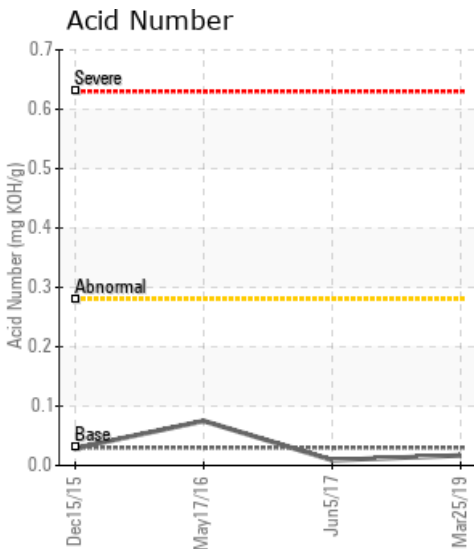
[LSD 09-27-31-04W5] ALTAGAS HARMATTAN

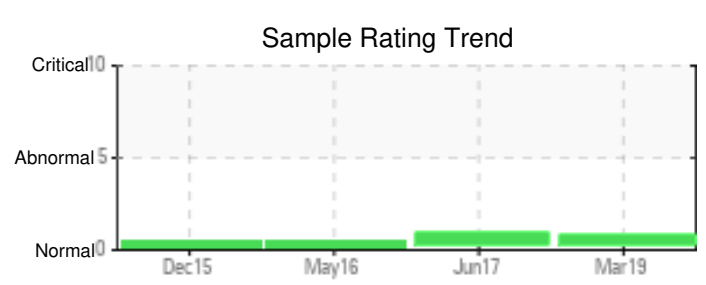
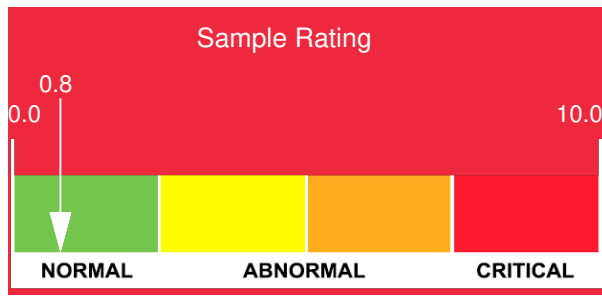
Customer: PTRHTF20169	System Information	Sample Information
HARMATTAN GAS PROCESSING LTD PARTNE... BOX 2280 DIDSBURY, AB T0M 0W0 Canada Attn: Denny McLean Tel: (403)335-7588 E-Mail: denny.mclean@altagas.ca	System Volume: 90000 ltr Bulk Operating Temp: 464F / 240C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02275346 Analyst: Kevin McDermott Sample Date: 03/25/19 Received Date: 03/26/19 Completed: 03/30/19

Recommendation: Fluid remains in very good condition. No significant change from the previous sample June 2017. Suggest to continue submitting samples of used fluid annually to proactively monitor the condition.

Comments: (GCD) 90% Distillation Point is marginally high.

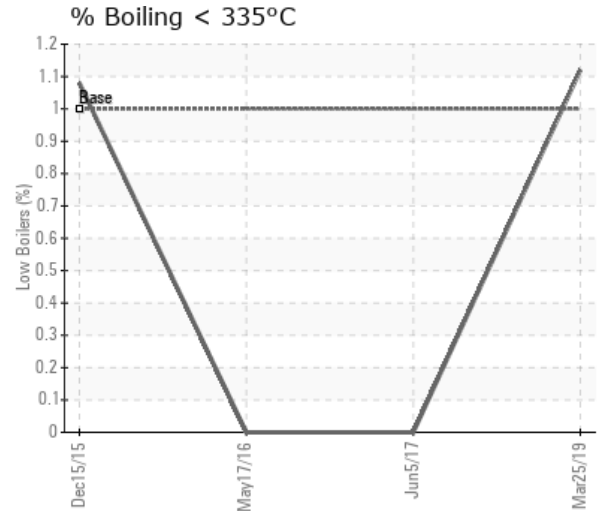
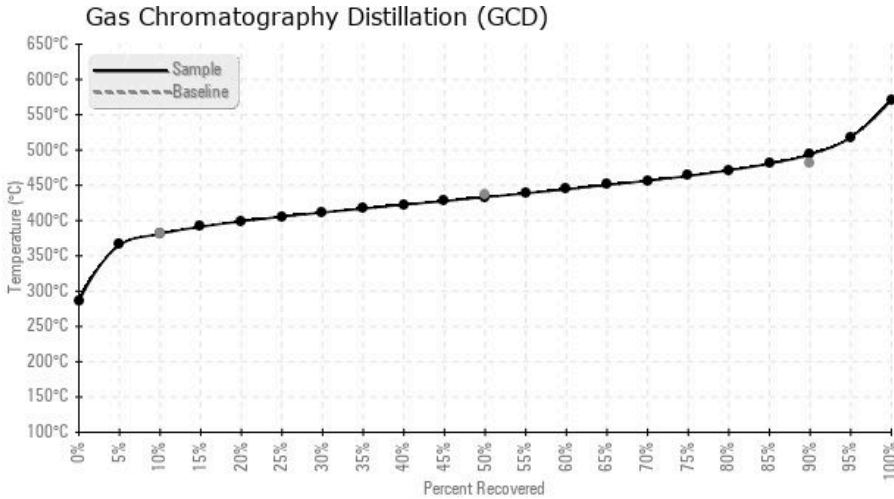
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/25/19	03/26/19	0y	CL1903-0258	423 / 217	11.5	38.3	0.017	0.017	718 / 381	812 / 433	921 / 494	1.12
06/05/17	08/03/17	0y	HOT OIL PUMP SUCTION	441 / 227	5.0	38.9	0.009	0.041	735 / 391	826 / 441	946 / 508	0.00
05/17/16	05/18/16	17y		432 / 222	0.00	40.2	0.075	0.013	730 / 388	823 / 440	932 / 500	0.00
12/15/15	12/21/15	17y	PUMP SUCTION	428 / 220	1.4	39.8	0.029	0.086	721 / 383	813 / 434	917 / 491	1.08
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
03/25/19	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06/05/17	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/17/16	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	1
12/15/15	17	0	0	0	0	0	0	0	0	0	0	1	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%]



Historical Comments	
06/05/17	Viscosity @ 40c a little higher than expected as in previous samples. The GCD 90% number is also high. Fluid remains in good condition overall and fit for continued use. Resample in a year or so. Or sooner if the fluid gets exposed to harsh conditions such as overheating, lack of circulation or absence of blanket gas.
05/17/16	Viscosity @ 40c is a little higher than expected but no change since Dec 2015 sample. Otherwise fluid in very good condition. Resample in 12 months to proactively monitor fluid condition.
12/15/15	Viscosity values are higher than expected but fluid is otherwise in very good condition. Re-sample in 12 months or sooner if process conditions become severe. Visc @ 40°C is abnormally high.

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