

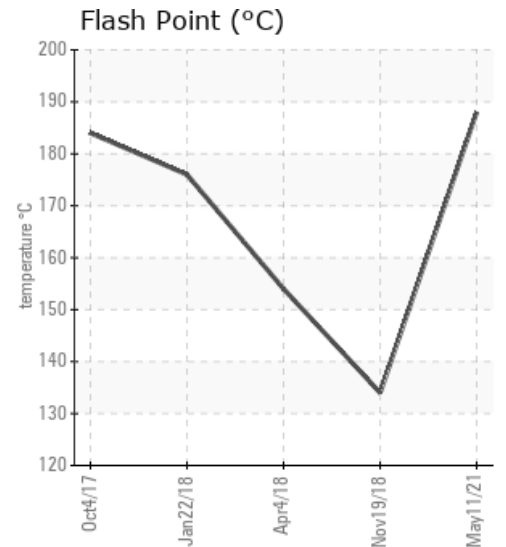
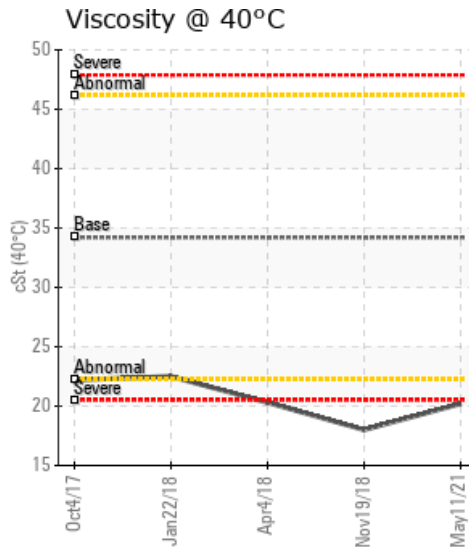
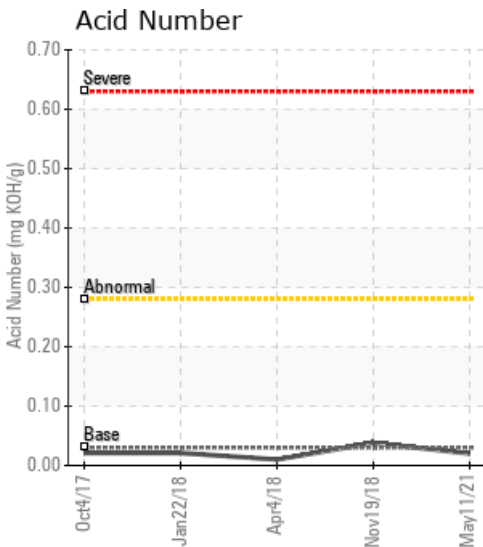
## [SIMONETTE GAS PLANT / LSD: 9-6-63-25-W5] H625 DEETH HOT OIL HEATER

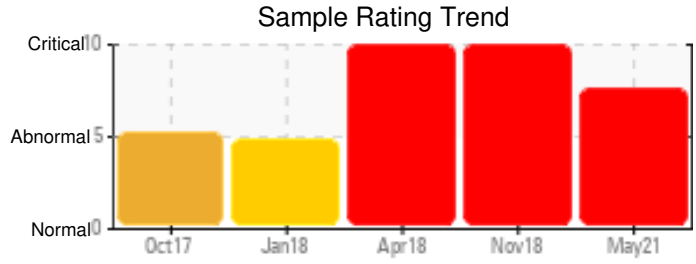
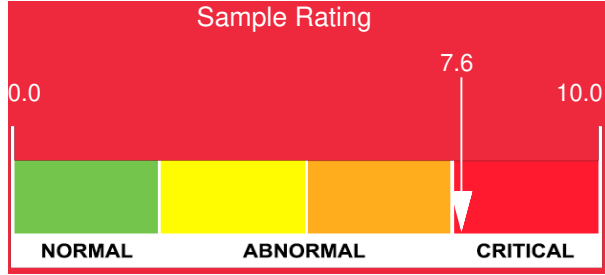
Customer: PTRHTF20187	System Information	Sample Information
KEYERA ENERGY- SIMONETTE GAS PLANT PO BOX 58 VALLEYVIEW, AB T0H 3N0 Canada Attn: Brody Shilka Tel: (780)835-1861 E-Mail: brody_shilka@keyera.com	System Volume: 18000 ltr Bulk Operating Temp: 392F / 200C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: PETROTECH	Lab No: 02421970 Analyst: Clinton Buhler Sample Date: 05/11/21 Received Date: 05/18/21 Completed: 05/20/21 Clinton Buhler Clinton.Buhler@hollyfrontier.com

**Recommendation:** Sample results appear to indicate continued dilution of Petro-Therm with another low viscosity hydrocarbon as shown by the low fluid viscosity, Flash Point and distillation curve. Flash Point of 188C has improved slightly since the last sample. The low boiler vapor content is high (22.24%) and has to be lowered via venting. The fluid is suitable for further use but please increase venting regime on a regular basis and ensure the source of hydrocarbon ingress has been resolved. Re-sample in 6 months.

**Comments:** (GCD) % < 335°C is severely high. (GCD) 10% Distillation Point is severely low. Visc @ 40°C is severely low. COC Flash Point is marginally low.

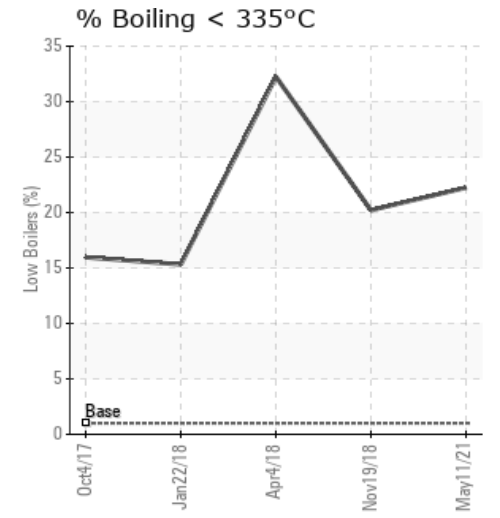
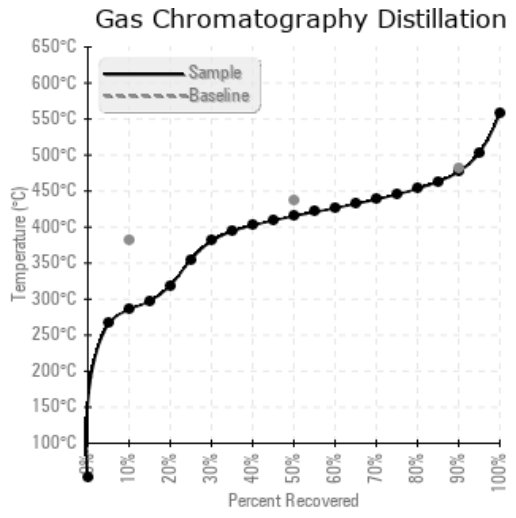
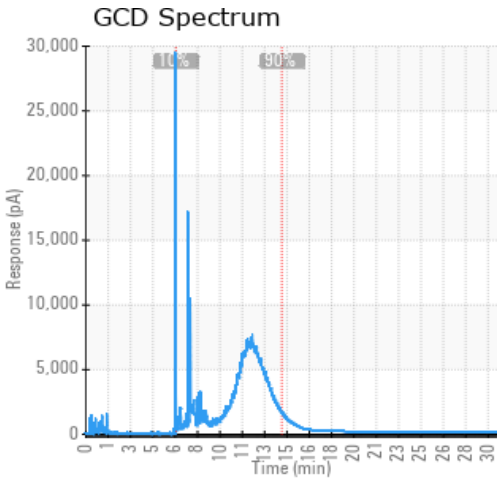
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
05/11/21	05/18/21	45.0m	Pump discharge	370 / 188	10.5	20.2	0.02	0.129	547 / 286	780 / 415	890 / 477	22.24
11/19/18	11/29/18	15.0m		273 / 134	22.3	18.0	0.038	0.040	498 / 259	727 / 386	838 / 448	20.21
04/04/18	04/16/18	7.0m		309 / 154	10.3	20.3	0.01	0.015	531 / 277	735 / 391	857 / 458	32.25
01/22/18	01/29/18	5.0m		349 / 176	2.6	22.5	0.021	0.037	559 / 293	801 / 427	916 / 491	15.32
10/04/17	10/17/17	42.0m		363 / 184	19.0	22.2	0.021	0.038	556 / 291	798 / 426	911 / 489	15.96
<b>Baseline Data</b>				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
05/11/21	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/19/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/04/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/22/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/04/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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	
11/19/18	As a result of assumed mixing with a lighter fluid the following parameters are low and not representative for Petro-Therm: Viscosity, Flash Point and distillation curve. A Flash Point of 134 degrees is a safety concern in cases of an external leak. The low boiler vapor content is high (20.21%) and has to be lowered via venting. The fluid is suitable for further use but please start venting on a regular basis. Re-sample in 6 months. (GCD) % < 335°C is severely high. (GCD) 10% Distillation Point is severely low. (GCD) 90% Distillation Point is severely low. COC Flash Point is severely low. Visc @ 40°C is severely low.
04/04/18	The sample shows very low viscosity and low Flash Point. % boil-off below 335C. is high. The distillation curve as a whole is not representative for Petro-Therm. It is believed that this condition is the result of mixing with a different, low viscosity fluid (Therminol 59) mainly. Thermal degradation may have an additional effect on the condition of the fluid. Please vent-off low boiler vapors to atmosphere and resample in 3 months. (GCD) % < 335°C is severely high. (GCD) 10% Distillation Point is severely low. (GCD) 90% Distillation Point is severely low. COC Flash Point is severely low. Visc @ 40°C is severely low. (GCD) 50% Distillation Point is abnormally low.
01/22/18	The condition of the fluid has remained the same. Viscosity, Flash Point and 10% GCD temp are low and the low boiler vapor (% <335C) content is too high. This is possibly the result of mixing with a lighter fluid. The fluid is suitable for use but it would be good to top-up with Petro-Therm (10% of total volume) to bring the Flash Point up to a more acceptable level and lower the low boiler vapor content because 15% is a problem for the pumps (cavitation) and could result in loss of flow due to vapor lock. Please re-sample in 6 months. (GCD) 10% Distillation Point is severely low. (GCD) % < 335°C is abnormally high. COC Flash Point is abnormally low.
10/04/17	A combination of low viscosity, Flash Point and 10% GCD temperature plus a very high low boiler vapor content (% boil-off <335C.) would normally indicate thermal degradation but since fluid service life has only been 42 days this condition could be the result of one of the following: 1. Mixing with another (low viscosity) heat transfer fluid. 2. Contamination with a process fluid. 3. Ingress of blanket gas when blanket gas pressure is too high and natural gas is in use. Please identify the problem and rectify. (GCD) 10% Distillation Point is severely low. (GCD) % < 335°C is abnormally high. Visc @ 40°C is abnormally low. COC Flash Point is marginally low.

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