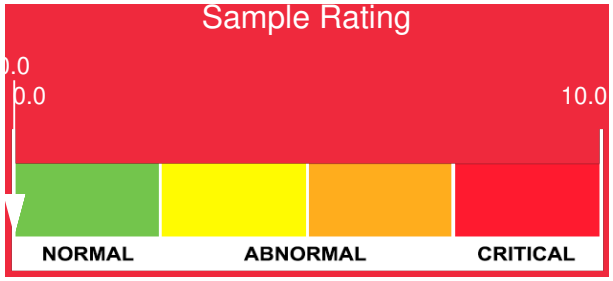
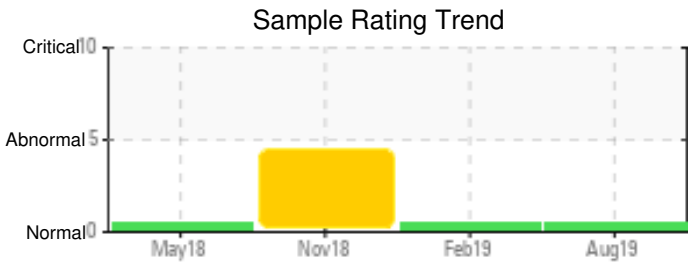




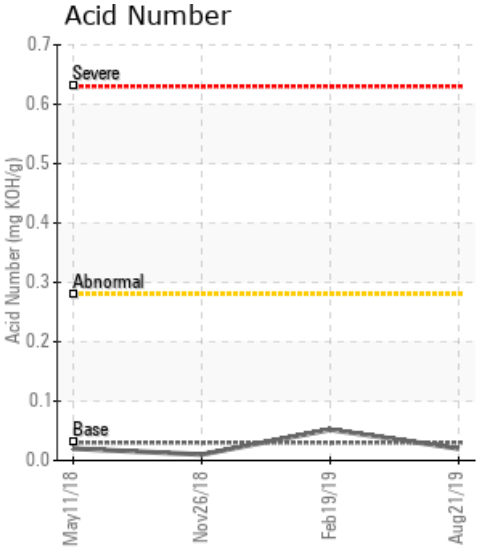
[06-12-044-13W5 / RMH] H-1611

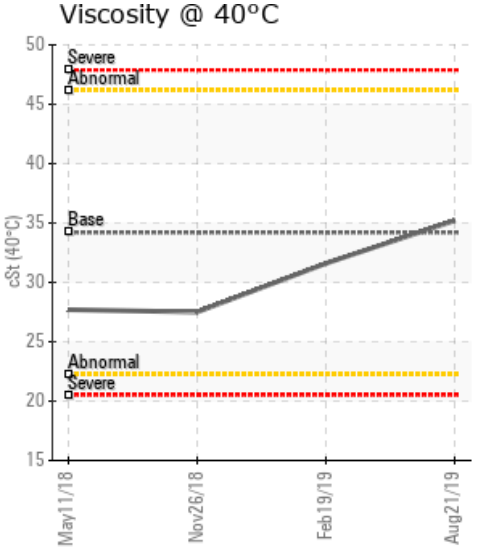
Customer: PTRHTF20124	System Information	Sample Information
PEYTO EXPLORATION BOX 7198 EDSON, AB T7E 1V4 Canada Attn: Brian Ford Tel: (780)712-0977 E-Mail: bford@peyto.com	System Volume: 0 ltr Bulk Operating Temp: 383F / 195C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: HEAT TECH	Lab No: 02304018 Analyst: Terry Veenstra Sample Date: 08/21/19 Received Date: 08/22/19 Completed: 08/26/19

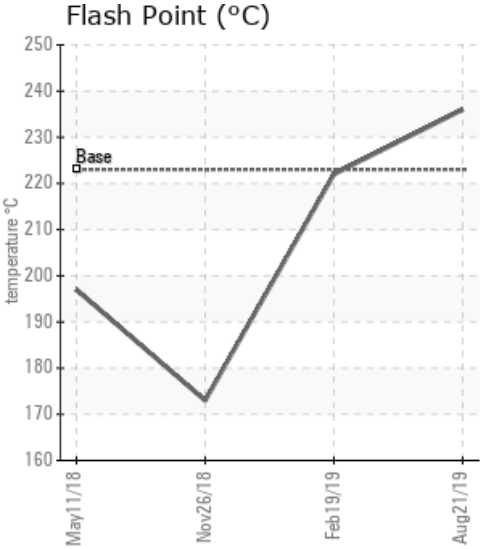
Recommendation: This sample indicates that the in service oil is good for continued use. Continue to vent periodically as part of a good maintenance program and resample in 6 months.

Comments:

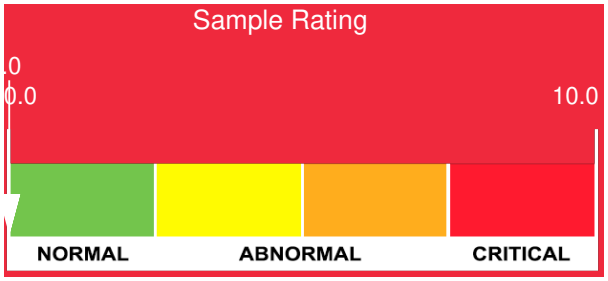
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
08/21/19	08/22/19	4y		457 / 236	0.00	35.2	0.020	0.099	726 / 385	808 / 431	906 / 486	0.00
02/19/19	02/21/19	3y		432 / 222	9.3	31.6	0.052	0.023	719 / 381	807 / 431	911 / 489	0.91
11/26/18	11/29/18	3y		343 / 173	2.6	27.5	0.01	0.039	660 / 349	746 / 396	842 / 450	4.23
05/11/18	05/15/18	2y	100/6-12-44-13W5	387 / 197	0.00	27.7	0.02	0.041	685 / 363	774 / 412	892 / 478	2.86
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

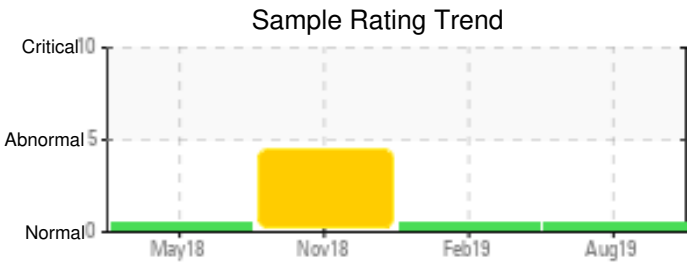






PETRO-CANADA LUBRICANTS

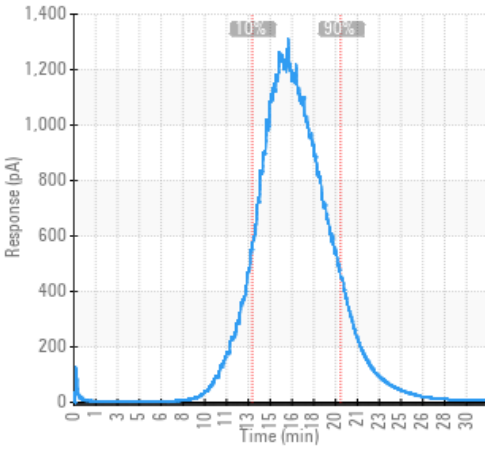




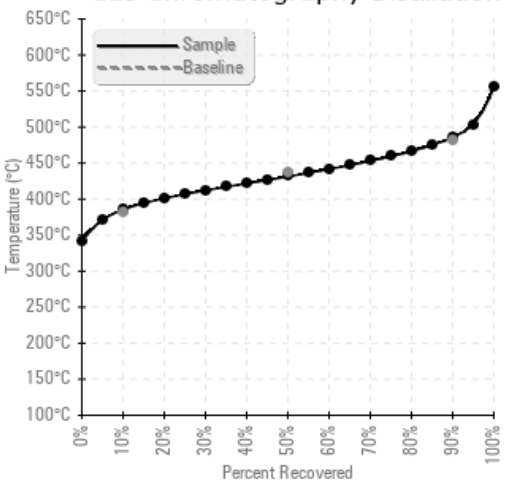
Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
08/21/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
02/19/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/26/18	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0
05/11/18	2	0	0	0	0	0	0	0	0	0	1	4	0	4	0	0	0	0	0	0	3	0	0	0
Baseline Data			0	0						0			0	0					0				0	

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

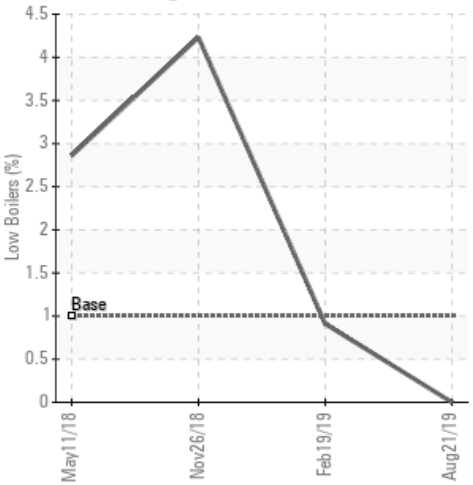
GCD Spectrum



Gas Chromatography Distillation



% Boiling < 335°C



Historical Comments

02/19/19	This fluid has greatly improved since the pressure has been reduced and the system has been vented. Continue to vent periodically as part of a good maintenance program and resample in 6 months.
11/26/18	The condition of the fluid shows signs similar to thermal degradation but as commented previously this is most likely the effect of too high pressure blanket gas.The Flash Point has decreased further and the distillation curve is low as a whole. Percentage low boiler vapors has increased to 4.23%. This will become problematic for the pumps at 7-8%. Since this is probably the result of blanket gas ingress it looks like natural gas is still in use. The use of N2 is recommended. Please re-sample in 6 months. When sending in the sample please list system volume. Fluid is suitable for further use. (GCD) 90% Distillation Point is severely low. COC Flash Point is abnormally low. (GCD) 10% Distillation Point is marginally low. (GCD) 50% Distillation Point is marginally low.
05/11/18	The fluid is in good condition and suitable for further use. Viscosity and Flash Point are slightly low. % boil-off below 335C is slightly high. These parameters in combination with decreased 10%- and 50% GCD temperatures indicate thermal degradation of the fluid and/or ingress of blanket gas. At this moment it is not a problem but it is recommended to start venting-off low boiler vapors to atmosphere to bring the fluid back to a condition closer to the condition of fresh fluid. Venting should be part of regular maintenance. Please re-sample in 6 months.

