

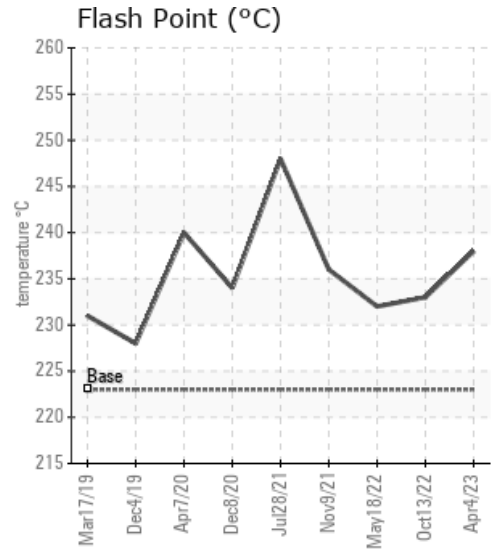
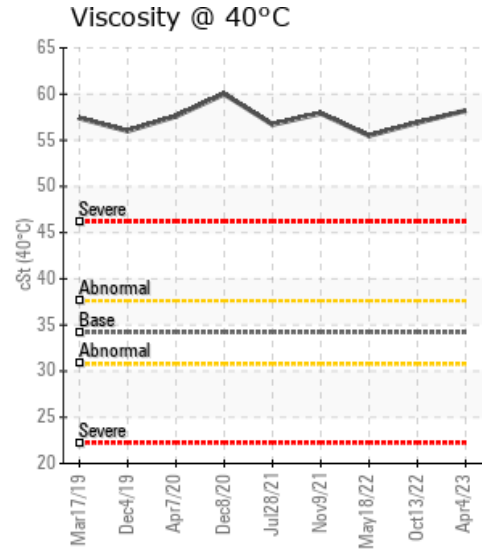
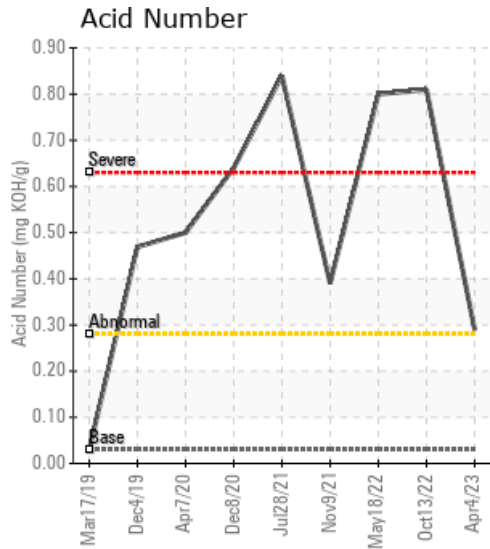
[11-21-55-20W5M] H-802

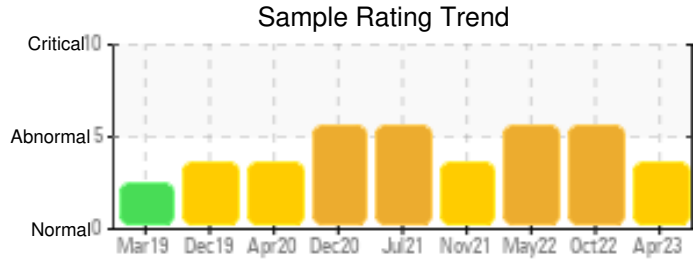
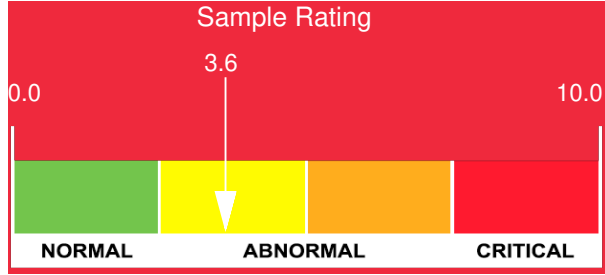
Customer: PTRHTF20228	System Information	Sample Information
PEYTO EXPLORATION Box 7198 EDSON, AB T7E 1V4 Canada Attn: Logan Pillage Tel: (780)712-9444 E-Mail: Lpillage@Peyto.com	System Volume: 27000 ltr Bulk Operating Temp: 370F / 188C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: ALCO	Lab No: 02550512 Analyst: Clinton Buhler Sample Date: 04/04/23 Received Date: 04/10/23 Completed: 04/12/23 Clinton Buhler Clinton.Buhler@HFSinclair.com

Recommendation: Sample results indicate degradation continues in that the fluid viscosity and solids content have risen again compared to the previous sample, although over the course of the last two years, the severity has been fairly stable. It is advised to make plans for system cleaning and fluid replacement at the next convenient plant outage.

Comments: Pentane Insolubles levels are severely high. Visc @ 40°C is severely high. Acid Number (AN) is abnormally high.

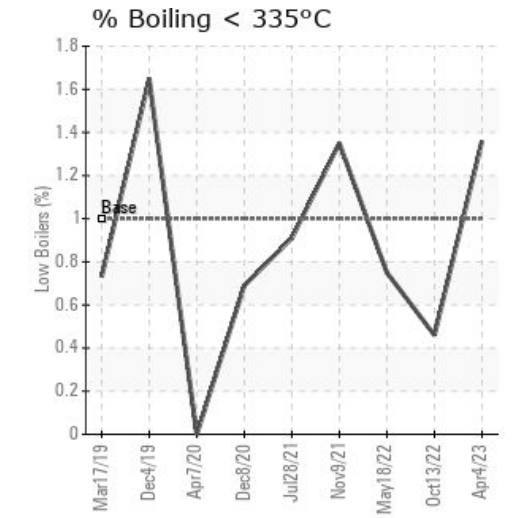
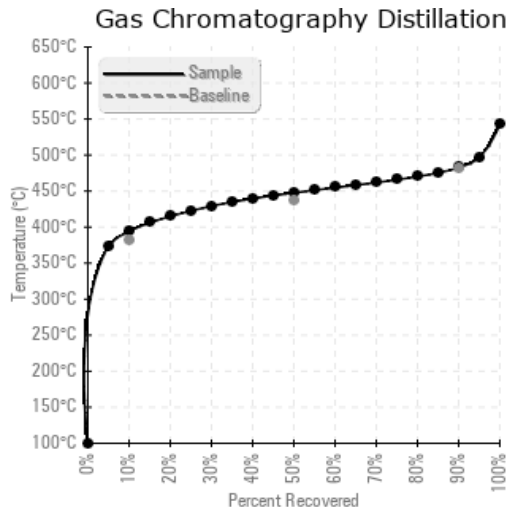
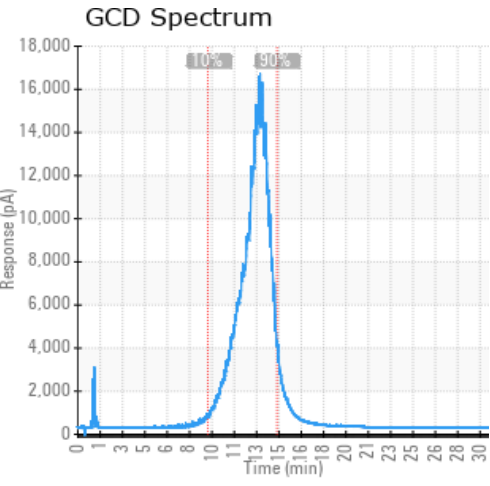
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
04/04/23	04/10/23	0.0y		460 / 238	23.5	58.2	0.29	1.66	741 / 394	838 / 448	901 / 483	1.36
10/13/22	10/18/22	0.0y	DISCHARGE PUMP SIDE	451 / 233	39.6	56.9	0.81	1.29	745 / 396	838 / 448	899 / 482	0.46
05/18/22	05/24/22	0.0y		450 / 232	15.7	55.5	0.80	1.24	742 / 395	836 / 447	899 / 482	0.75
11/09/21	11/12/21	0.0y	Discharge of pump	457 / 236	21.0	57.9	0.39	1.04	742 / 394	838 / 448	900 / 482	1.35
07/28/21	08/04/21	0.0y	DISCHARGE OF PUMP	478 / 248	31.9	56.7	0.84	2.08	744 / 396	838 / 448	898 / 481	0.91
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
04/04/23	62	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	1	0	0	0	0	0	0	0
10/13/22	61	0	0	0	0	0	1	0	0	0	2	4	0	0	0	0	1	0	0	0	1	0	0	0
05/18/22	64	0	0	0	0	0	1	0	0	0	2	4	0	0	0	0	1	0	0	0	1	0	0	0
11/09/21	66	0	0	0	0	0	1	0	0	0	2	4	0	0	0	0	1	0	0	0	1	0	0	0
07/28/21	67	0	0	0	0	0	1	0	0	0	2	4	0	0	0	0	1	0	0	0	1	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	
10/13/22	Sample results show that the fluid remains fairly similar to the last couple analysis'. Long term, system will require cleaning and fluid replacement. Please ensure blanket gas stays active in expansion tank. Please consider sweetening of system to negate elevated Acid Number. Please re-sample in 6 months.
05/18/22	Although not in ideal condition, the fluid parameters are similar to the sample taken 6 months prior. Of concern is the elevated fluid viscosity, acid number and solids content. Long term, the system will require cleaning and fluid replacement during a planned outage. With Acid Number at 0.8, it is advised to sweeten the system to mitigate corrosion. Please re-sample in 6 months
11/09/21	Fluid condition, although not ideal, appears to be somewhat stable with regards to fluid oxidation; Acid Number is slightly less than last sample and Solids content has reduced. Please continue filtering of solids and ensure that blanket gas is functional in the expansion tank. Eventually the fluid may require replacement, depending on the future rate of degradation and solids formation. Please re-sample in 6 months
07/28/21	TAN, Viscosity and Pentane insolubles are severely high indicating oxidation of the fluid . Ensure gas blanket is functioning. Considering filtering out solids. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Visc @ 40°C is severely high.

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