

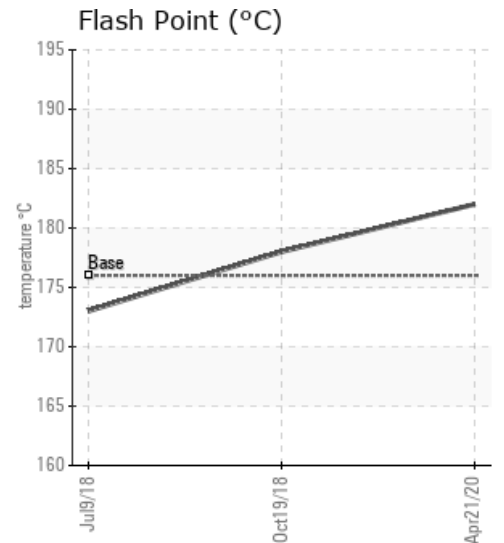
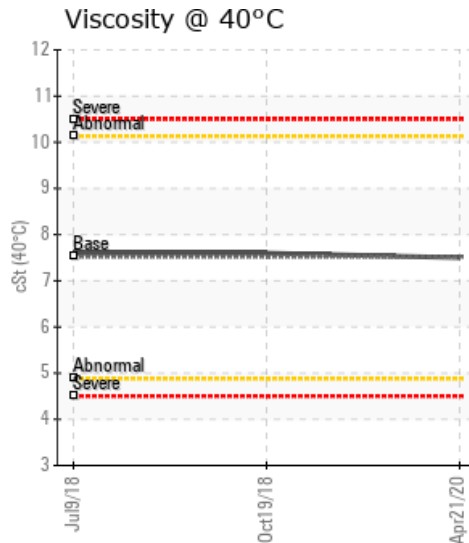
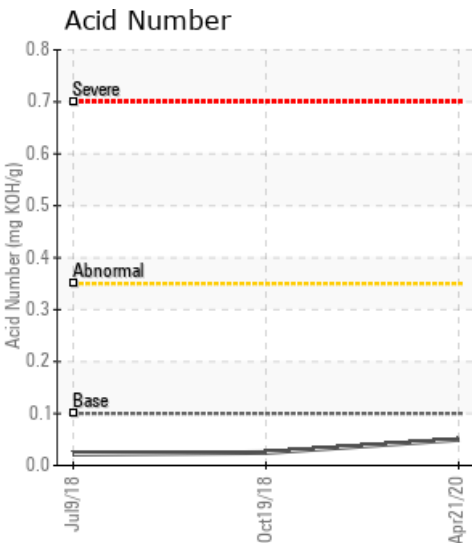
[Ovintiv Q-810 PROCESS HEAT MEDIUM] Ovintiv Q-810 Process Heat Medium –

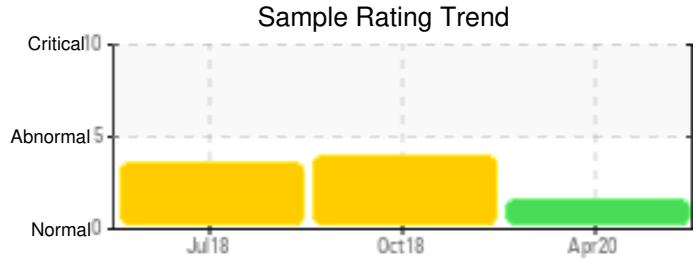
Customer: PTRHTF20046	System Information	Sample Information
QUADRA CHEMICALS 12925 146TH STREET EDMONTON, AB T5L 2H6 CANADA Attn: Quadra Samples Tel: E-Mail: quadra_samples@quadra.ca	System Volume: 50000 ltr Bulk Operating Temp: 450F / 232C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO LT Make:	Lab No: 02356938 Analyst: Clinton Buhler Sample Date: 04/21/20 Received Date: 06/01/20 Completed: 06/11/20 Clinton Buhler Clinton.Buhler@PetroCanadaLSP.com

Recommendation: Sample results indicate that the heat transfer fluid is in excellent condition and suitable for continued service. (GCD) 90% Distillation Point is marginally low but this is not a concern as all other parameters indicate a very healthy fluid. Please re-sample in 12 months.

Comments:

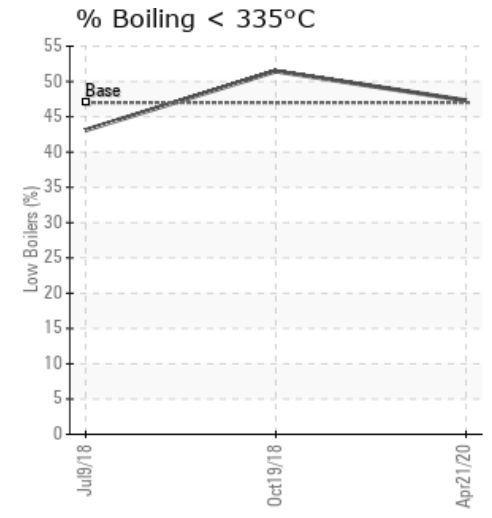
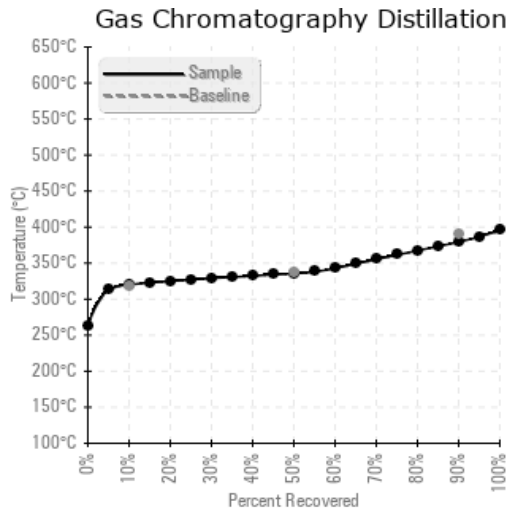
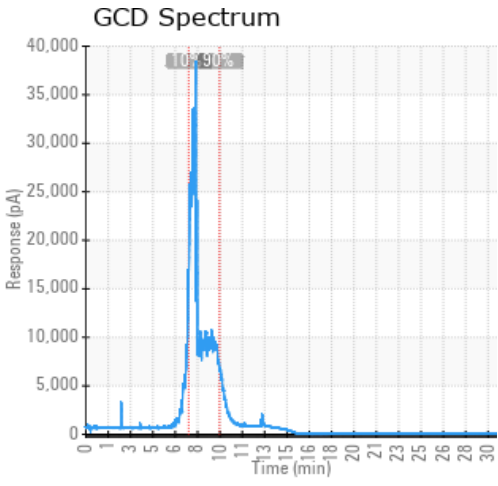
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
04/21/20	06/01/20	22m	TOP OF FILTER	360 / 182	4.8	7.5	0.05	0.041	608 / 320	636 / 336	715 / 380	47.30
10/19/18	10/29/18	4m		352 / 178	58.7	7.6	0.025	0.042	604 / 318	634 / 334	725 / 385	51.45
07/09/18	08/01/18	1m	U-813 FILLER	343 / 173	481.6	7.6	0.022	0.017	610 / 321	641 / 338	750 / 399	43.11
Baseline Data				349 / 176		7.52	0.1		604 / 318	640 / 338	734 / 390	47.0





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
04/21/20	17	0	0	0	0	0	0	0	0	0	10	0	2	0	0	0	1	0	0	0	0	0	249	0
10/19/18	14	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	1	0	0	0	1	0	247	0
07/09/18	13	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	1	0	4	0	1	0	248	0
Baseline Data			0	0						0			0	0				0	0				270	

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



Historical Comments

10/19/18	Sample results indicate that there are excess low boiling vapors as evidenced by the increased percentage boil-off (51.45% vs 43.11% last sample). All other parameters show that the heat transfer fluid is suitable for continued service. Recommendation is to thoroughly vent off low boiling vapors from expansion tank. During venting, blanket gas needs to be turned off to allow vapors to escape. If blanket gas is required for pump suction head, further investigation into venting is needed. From the fluid's perspective, 2-3 psi blanket gas pressure is ideal, but pump suction head requirements may dictate otherwise. re-sample in 6 months after thorough venting regime. (GCD) % < 335°C is severely high.
07/09/18	This fill of Calflo LT is reported as having 21 days of service life. (new system/fill start-up ?) The water content is elevated. It is recommended to boil-off the water by venting to atmosphere. The low boiler vapor content (% < 335°C) is high with 43%. (fresh = 35%) This can be influenced by the water content of the fluid. Please boil-off the water until the steaming stops and re-sample after doing that. Water contamination levels are marginally high. Water contamination levels are marginally high.. ppm Water contamination levels are marginally high. (GCD) % < 335°C is marginally high.

Petro-Canada makes no representation or warranty of any kind, either express or implied, as to the accuracy or completeness of the analysis and assumes no responsibility and shall have no liability whatsoever with respect to such analysis, or a party's use of it. Petro-Canada is a division of HollyFrontier Corporation.