

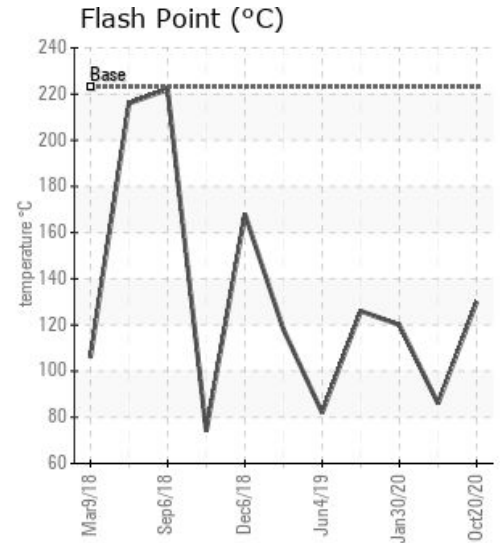
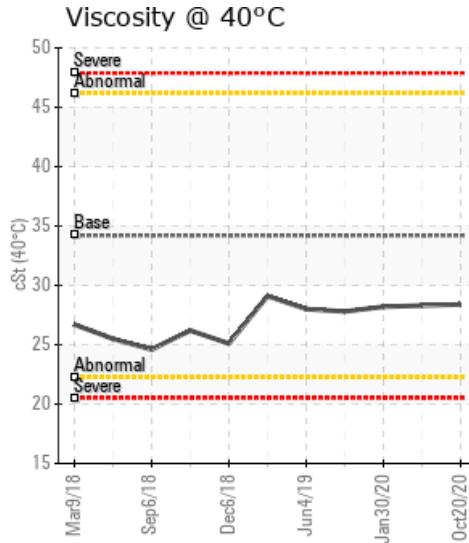
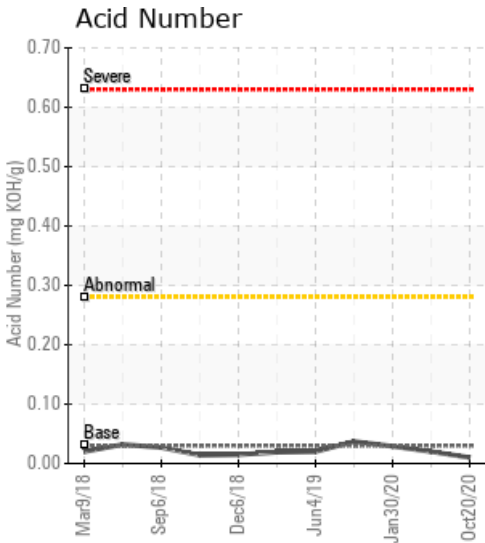
## [14-23-58-26W45] H-3700/H-3750

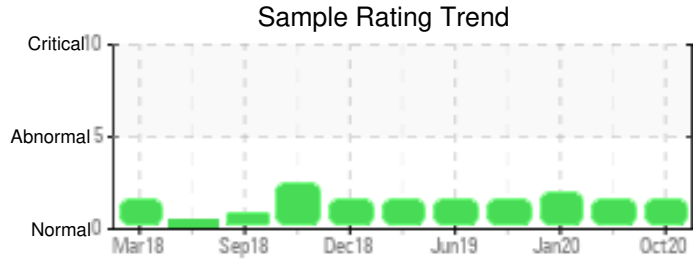
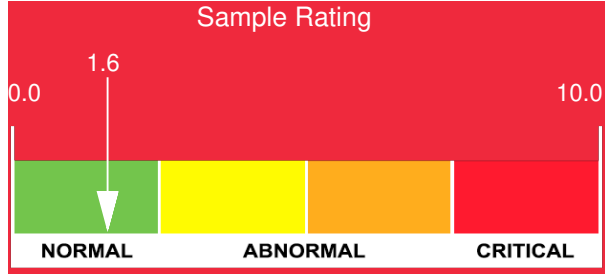
Customer: PTRHTF20103	System Information	Sample Information
CNRL P.O. BOX 6808 EDSON, AB T7E 1L5 Canada Attn: Stewart Rivard Tel: (780)712-9391 E-Mail: stewart.rivard@cnrl.com	System Volume: 10000 ltr Bulk Operating Temp: 365F / 185C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: PETRO TECH HEATERS	Lab No: 02384152 Analyst: Clinton Buhler Sample Date: 10/20/20 Received Date: 10/28/20 Completed: 11/02/20 Clinton Buhler Clinton.Buhler@PetroCanadaLSP.com

Recommendation: Sample results indicate that the fluid is suitable for continues service. Please note that the fluid's flash point has improved since the previous sample, yet the low boiling vapor content has increased. The flash point is still low. It is advised to continue regular venting of low boiling vapors to improve the fluids flash point. Re-sample in 6 months once venting regime has been initiated.

### Comments:

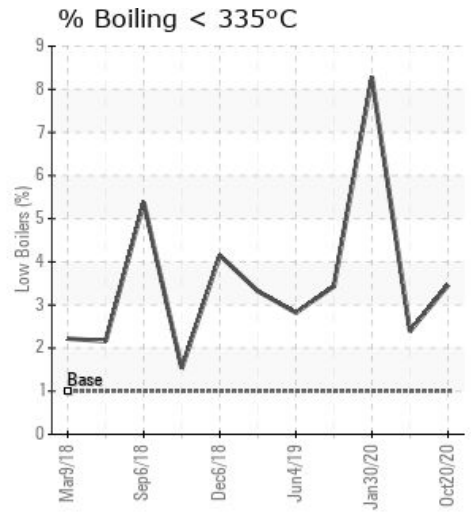
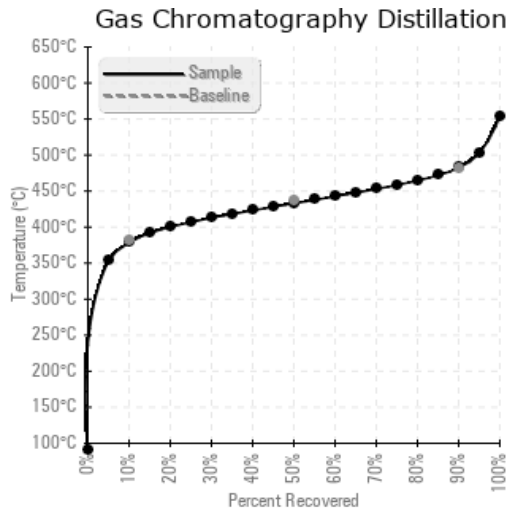
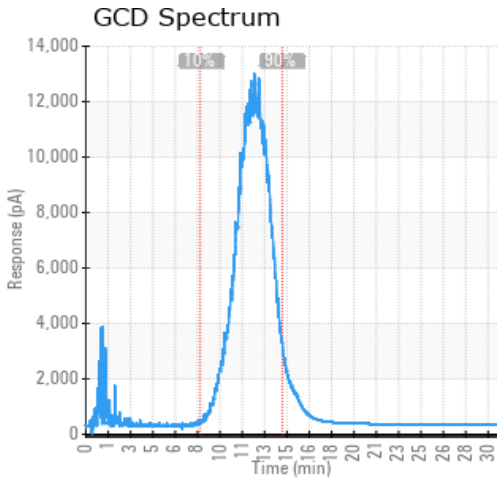
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
10/20/20	10/28/20	11y	Pump discharge	266 / 130	36.6	28.4	0.01	0.092	713 / 378	811 / 433	900 / 482	3.46
03/25/20	04/02/20	0y	PUMP DISCHARGE	187 / 86	31.1	28.3	0.02	0.118	719 / 382	815 / 435	907 / 486	2.39
01/30/20	02/06/20	0y	PUMP SEAL	248 / 120	25.7	28.2	0.029	0.057	736 / 391	808 / 431	888 / 475	8.28
07/09/19	07/12/19	0y		259 / 126	66.5	27.8	0.037	0.026	708 / 375	805 / 430	898 / 481	3.43
06/04/19	06/07/19	10y	PUMP SEAL	180 / 82	97.8	28.0	0.020	0.081	710 / 377	811 / 433	907 / 486	2.82
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
10/20/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03/25/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/30/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/09/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06/04/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	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	
03/25/20	This is the re-run of the sample taken on March 25th when a low boiler vapor content of 15.8% was reported due to a GC fault. After GC repair the low boiler vapor content is 2.39%. The other parameters remain the same. The fluid is in a reasonable condition and suitable for further use. Venting is still important to try and increase the Flash Point of the fluid. COC Flash Point is severely low.
01/30/20	The fluid is in reasonable condition and suitable for further use. Viscosity is slightly low. Flash Point is very low. This is the result of a low boiler vapor content of 8.28% which is considered high. A Flash Point below 150 degrees C is a safety concern and the low boiler vapor content at this level may result in pump cavitation, flow problems or pump seal leakage. Venting of low boiler vapor to atmosphere is recommended. Please re-sample in 6 months. COC Flash Point is severely low. (GCD) % < 335°C is marginally high.
07/09/19	The fluid is in the same condition as the sample taken on the 4th of June. Flash Point has improved with an increase from 82C to 126C. This is still low and we have to keep in mind that the test method for Flash Point has low repeatability/reproducibility. Flash Points below 150C are considered a safety concern. Please keep venting on a regular basis. Considering a switch to N2 blanket gas is strongly advised. COC Flash Point is severely low.
06/04/19	The fluid is in a reasonable condition but the Flash Point is a safety concern. Venting has resulted in a decrease of the low boiler vapor content (GCD% <335C.) but the 150 kPa fuel gas blanket is causing the Flash Point to be at 82C. As a result of the high blanket gas pressure the fuel gas is dissolved in the fluid and will not escape from the fluid easily while venting. This theory is confirmed by a normal distillation curve with the exception of the initial boiling point. It is recommended to change blanket gas to nitrogen as this inert gas will not affect the Flash Point of the fluid. Please re-sample after this change has been made. COC Flash Point is severely low.

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