

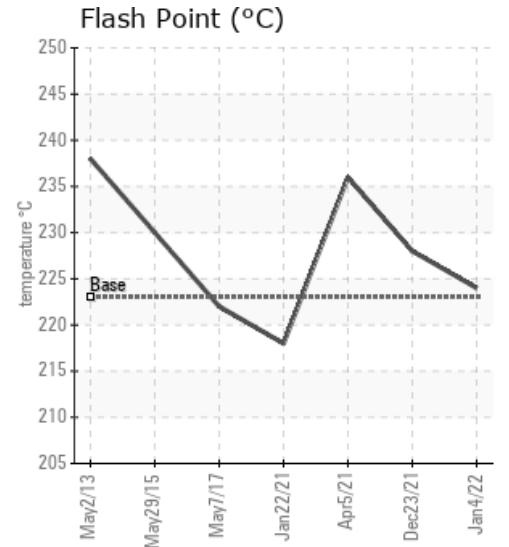
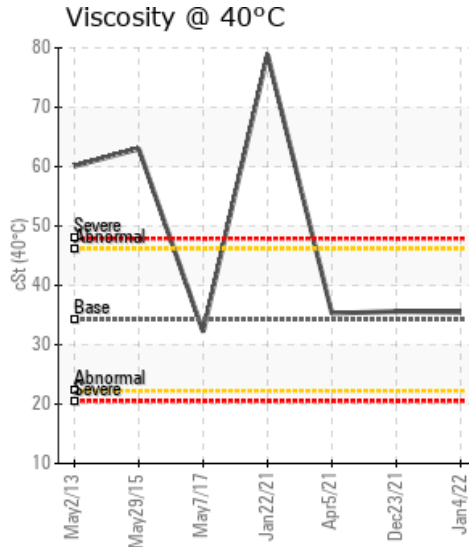
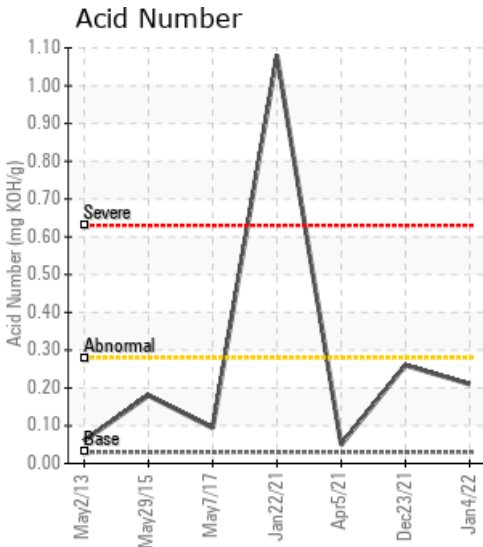
[7-27-51-19W5] HEAT MEDIUM

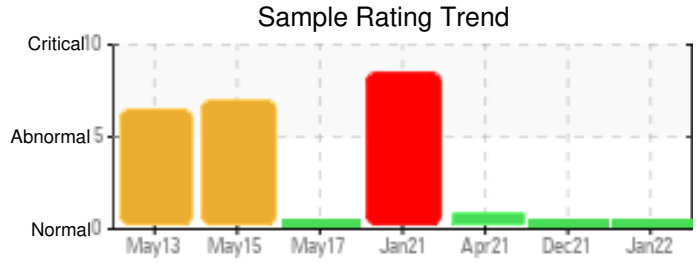
Customer: PTRHTF20103	System Information	Sample Information
CANADIAN NATURAL RESOURCES (CNRL) P.O. BOX 6808 EDSON, AB T7E 1L5 Canada Attn: Shilo Croteau Tel: (780)728-8151 E-Mail: shilo.croteau@cnrl.com	System Volume: 14200 ltr Bulk Operating Temp: 446F / 230C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: PRESSON	Lab No: 02467892 Analyst: Clinton Buhler Sample Date: 01/04/22 Received Date: 01/24/22 Completed: 01/26/22 Clinton Buhler Clinton.Buhler@hollyfrontier.com

Recommendation: Sample results indicate the fluid is in suitable condition for continued service. Please ensure that blanket gas is operational in the expansion tank. Please re-sample after 12 months.

Comments:

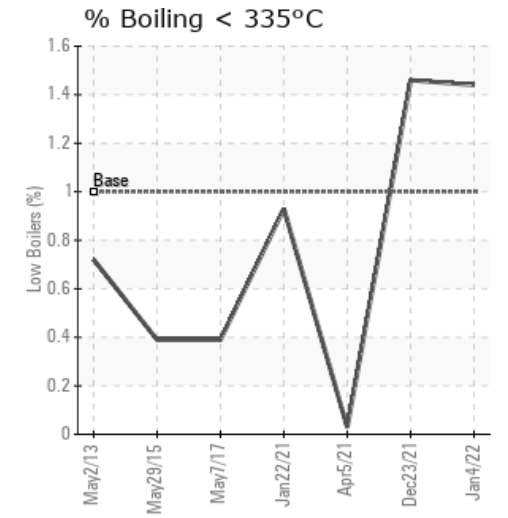
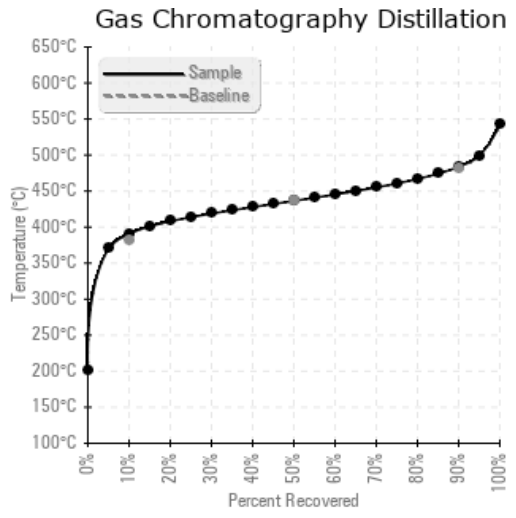
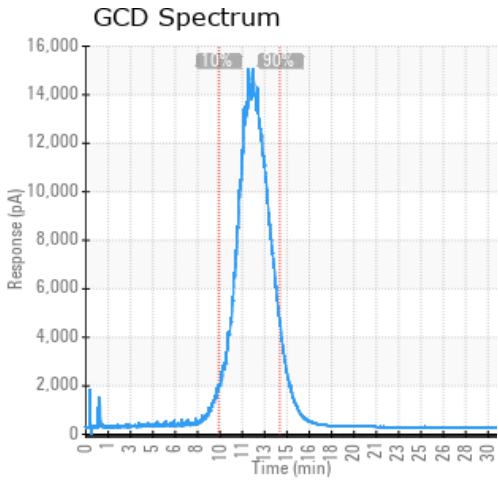
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
01/04/22	01/24/22	1.0y	Pump	435 / 224	64.0	35.5	0.21	0.251	735 / 391	818 / 436	903 / 484	1.44
12/23/21	01/13/22	0.0y	pump discharge	442 / 228	124.4	35.6	0.26	0.158	735 / 391	817 / 436	903 / 484	1.46
04/05/21	04/06/21	0.0y	Pump dischard	457 / 236	67.7	35.3	0.05	0.162	735 / 391	818 / 437	927 / 497	0.03
01/22/21	01/27/21	0.0y	Pump Discharge	424 / 218	27.0	78.9	1.08	2.79	727 / 386	814 / 434	911 / 488	0.93
05/07/17	05/24/17	0.0y		432 / 222	21.2	32.2	0.094	0.180	726 / 385	816 / 436	913 / 490	0.39
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
01/04/22	17	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0
12/23/21	17	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0
04/05/21	18	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	4	0	2	1
01/22/21	154	0	0	0	0	0	0	0	0	0	0	4	3	0	0	0	2	0	0	0	0	0	1	0
05/07/17	20	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	1	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	
12/23/21	Sample results indicate the fluid is in suitable condition for continued service. Acid number has increased since previous sample and can indicate acids formed from oxidation. Please ensure that blanket gas is operational in the expansion tank. Please re-sample in 12 months
04/05/21	Sample results indicate that the fluid is in suitable condition for continued service. Please re-sample in 6 months.
01/22/21	The fluid viscosity and AN are high. Fe content is high. Corrosion is ongoing within the system. Pentane Insoluble (solids) content of the fluid is very high. Oxidation of the fluid is the likely cause of this. Since the AN has exceeded the limit it is recommended to replace the fluid. The high solids content of the fluid is an indication that system cleaning/flushing may be required prior to filling with fresh fluid. Please consult with your Petro-Canada Tech Service Advisor. PQ levels are abnormal. Iron ppm levels are abnormal. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Visc @ 40°C is severely high.
05/07/17	The fluid is in good condition and suitable for further use. Please re-sample in 12 months. (List system volume and fluid service hours when sending in the next sample)

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.