

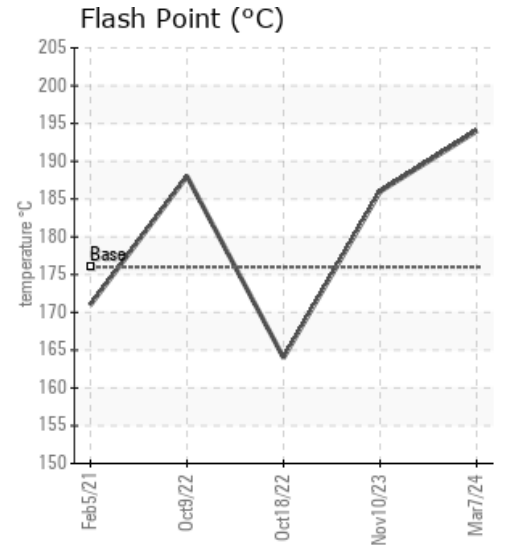
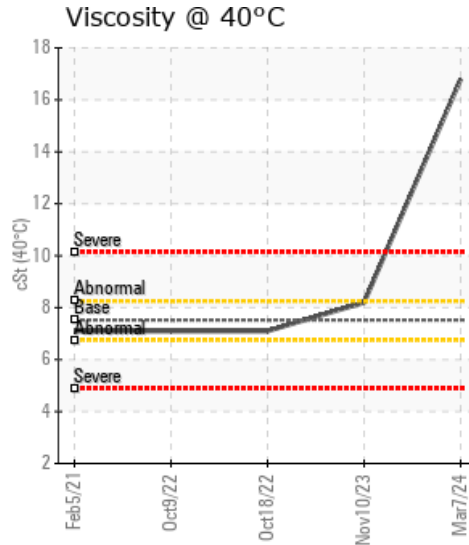
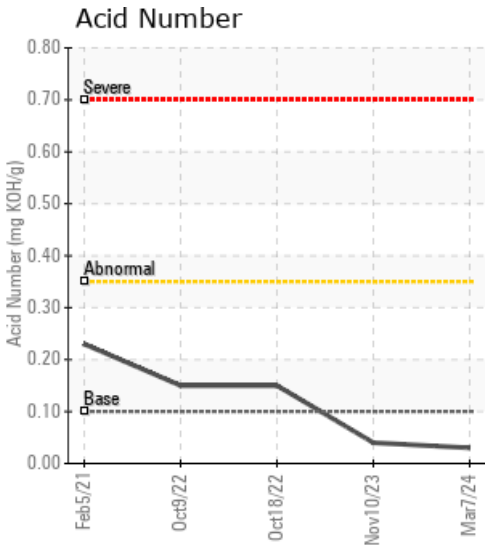
TOWN NORTH HOT OIL

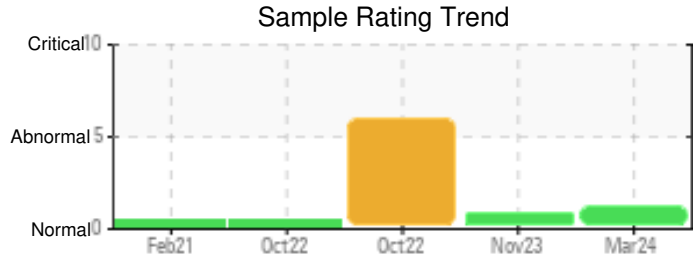
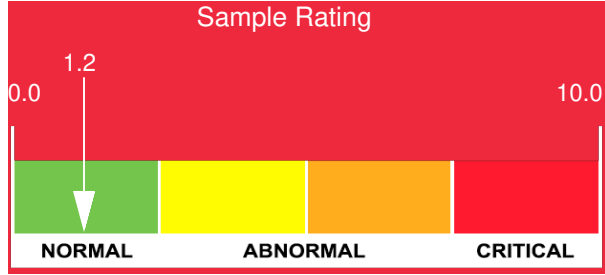
Customer: PTRHTF60062	System Information	Sample Information
Petronas Energy Canada Ltd. - Town ... B89-J/94-B-16 6954 100th Ave. Fort St. John, BC V1J 8L5 CA Attn: Zachary Luszc Tel: (250)794-5612 E-Mail: zluszc@petronascanada.com	System Volume: 120000 ltr Bulk Operating Temp: 410F / 210C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO LT Make: CLEAVER BROOKS	Lab No: 02621624 Analyst: Clinton Buhler Sample Date: 03/07/24 Received Date: 03/12/24 Completed: 04/01/24 Clinton Buhler Clinton.Buhler@HFSinclair.com

Recommendation: Sample taken 3 months post-fire incident. Before 2023 fire the HO system was made up of 109000L of Calflo LT and 15000L of petrotherm. Due to HO leaking after fire, additional 56000L of petrotherm was added. Rough calculations based on fluid viscosity @40°C suggest ~43% Calflo LT and ~53% Petro-Therm mix. Auto-Ignition Temperature (ASTM D2155): 340°C (ignition delay: 10sec @ 749 mm/Hg). Please re-sample in 4-6 months

Comments:

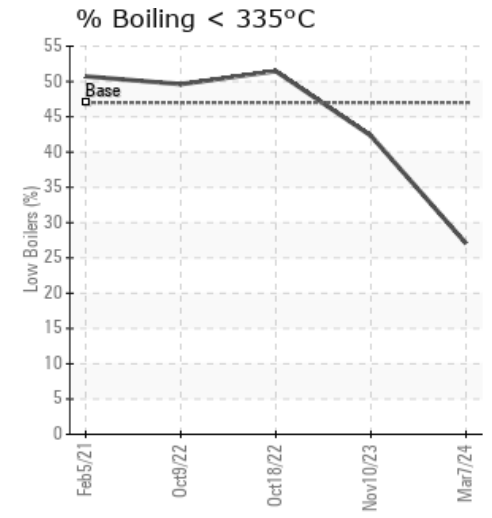
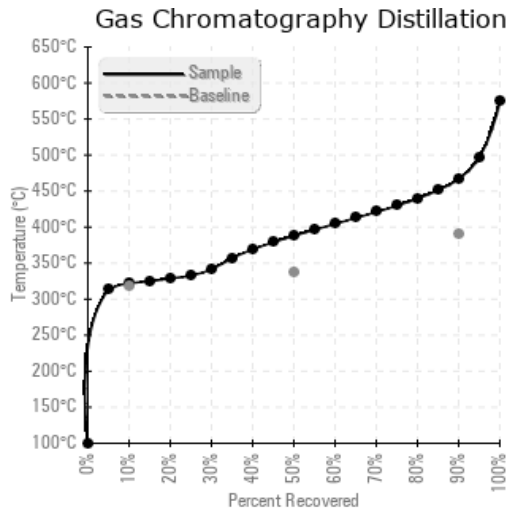
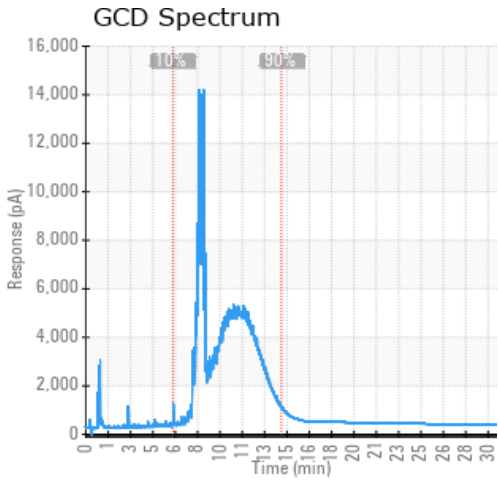
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/07/24	03/12/24	3.0y	3 months after mixng	381 / 194	202	16.8	0.03	0.042	611 / 322	730 / 388	872 / 467	27.05
11/10/23	11/20/23	3.0y		367 / 186	26	8.2	0.04	0.035	609 / 320	645 / 341	795 / 424	42.31
10/18/22	11/07/22	5.0y		327 / 164	33.3	7.1	0.15	0.278	609 / 320	634 / 335	737 / 392	51.46
10/09/22	11/07/22	88.0y		370 / 188	46.1	7.1	0.15	0.072	609 / 320	635 / 335	737 / 392	49.61
02/05/21	02/23/21	12.0y	Suction of pump	340 / 171	0.6	7.1	0.23	0.088	608 / 320	634 / 335	737 / 392	50.73
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
03/07/24	11	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	23	0
11/10/23	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0
10/18/22	7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	59	0
10/09/22	7	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	59	0
02/05/21	18	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	2	0	175	2
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	
11/10/23	This sample was drawn from the system following a fire event in November 2023. System is estimated to contain ~108 m3 of Calflo LT and ~15m3 of Petro-Therm. Sample results indicate that the fluid is in suitable condition for continued service. The addition of Petro-Therm to the system has (expectedly) increased the fluid viscosity, 90% GCD temperature and fluid flash point while also reducing the low boiler vapor content (42.31%). Acid Number is low, indicating that fluid oxidation is being mitigated. Please re-sample system after additional Petro-Therm is added to the system (please indicate the final mixing ratios and volumes for the next sample) and after at least 48-72 hours of operation at design temperature.
10/18/22	Sample taken after 6m3 of Petro-Therm added to system. Sample results remain very similar to Calflo LT due to low mixing ratio. Please re-sample in 12 months
10/09/22	Sample results indicate the fluid is in suitable condition for continued service. This sample preceded top-up with 6m3 of Petro-Therm on top of the Calflo LT
02/05/21	Sample results indicate that the fluid is in suitable condition for continued service. Please re-sample in 6 months to help build a trend.

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