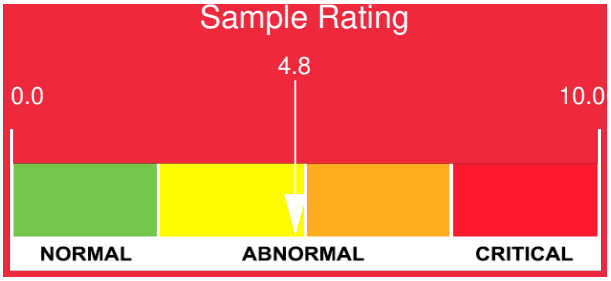
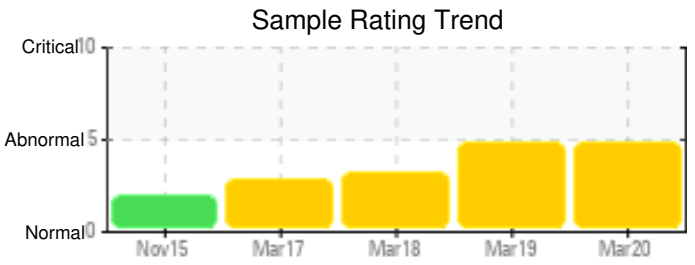




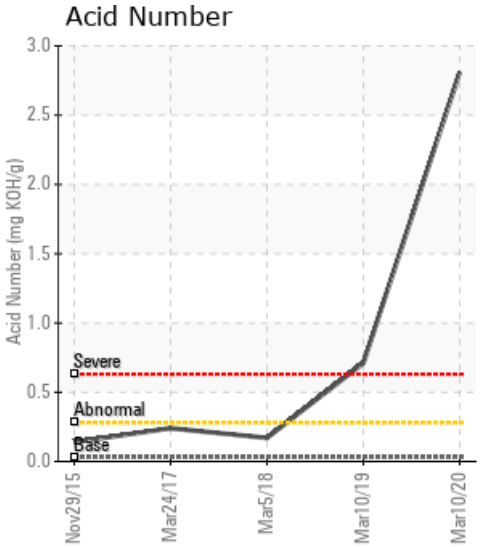
[TOURMALINE / 1-34-51-18W5] H960

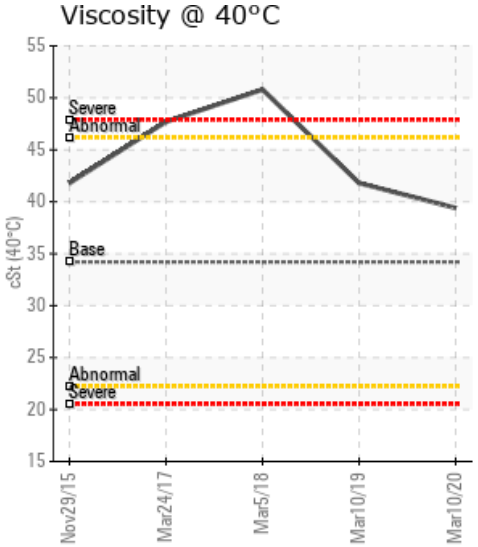
Customer: PTRHTF20039	System Information	Sample Information
BRENNTAG CANADA INC 3124-54TH AVENUE SE CALGARY, AB T2C 0A8 Canada Attn: Matthew Kryska Tel: E-Mail: mkryska@brenntag.ca	System Volume: 8000 ltr Bulk Operating Temp: 410F / 210C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02348706 Analyst: Terry Veenstra Sample Date: 03/10/20 Received Date: 04/14/20 Completed: 04/24/20 Terry Veenstra terry.veenstra@petrocanadalsp.com

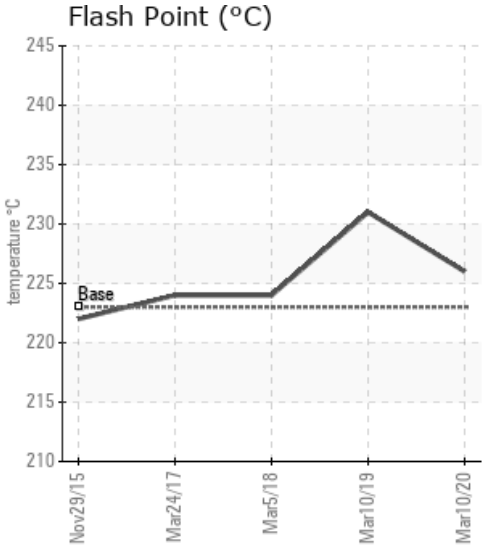
Recommendation: Acid number is higher then normal, Pentane insolubles is higher then normal, both indicating oxidation of fluid. Ensure gas blanket is in in place on system and functioning. Resample in 6 months.

Comments: Pentane Insolubles levels are severely high. Acid Number (AN) is severely high.

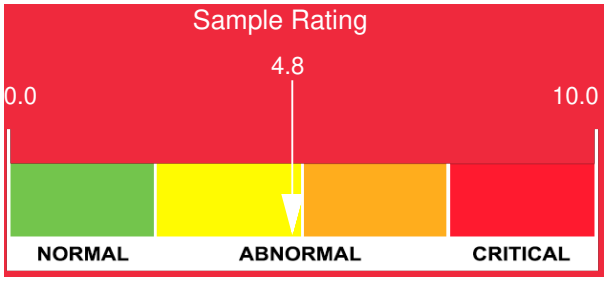
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/10/20	04/14/20	4y	PUMP	439 / 226	249.4	39.4	2.81	2.08	724 / 384	816 / 436	914 / 490	1.26
03/10/19	03/20/19	0y		448 / 231	14.6	41.8	0.71	1.88	719 / 382	812 / 434	911 / 488	1.14
03/05/18	03/06/18	5y		435 / 224	18.6	50.8	0.17	1.17	718 / 381	795 / 424	878 / 470	0.00
03/24/17	03/30/17	0y		435 / 224	15.8	47.7	0.24	0.957	721 / 383	828 / 442	929 / 499	1.28
11/29/15	12/07/15	8y		432 / 222	20.0	41.8	0.14	0.478	713 / 378	822 / 439	927 / 497	1.24
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

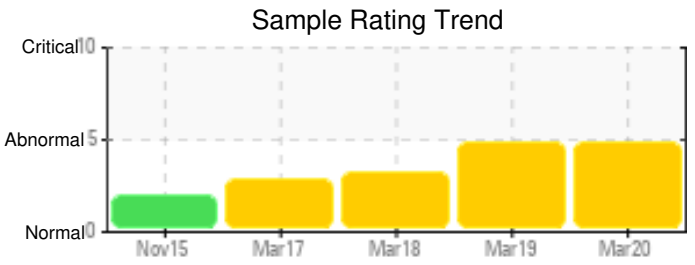






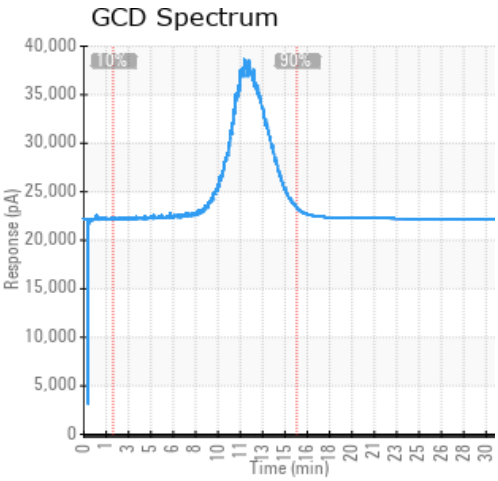
PETRO-CANADA LUBRICANTS

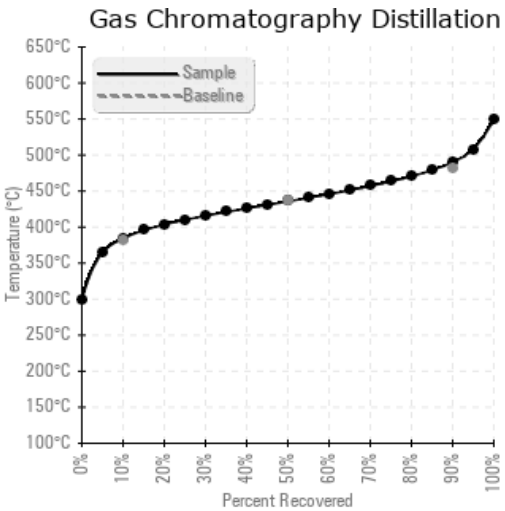


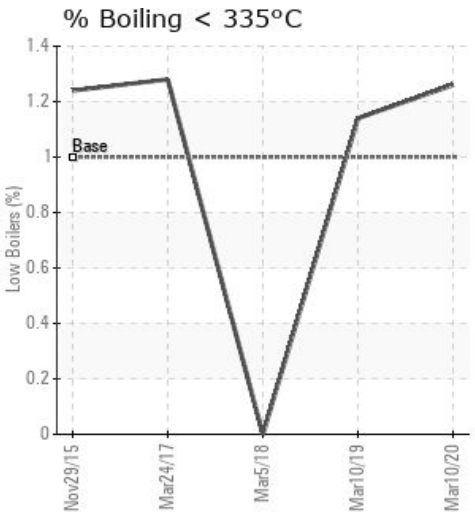


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
03/10/20	92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03/10/19	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03/05/18	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03/24/17	17	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
11/29/15	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Baseline Data			0	0						0			0	0					0				0	

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







Historical Comments

03/10/19	The fluid is in a reasonable condition and suitable for further use. The Acid Number is high (condemning limit is 1) and solids content of the fluid is high. It looks like the degradation mode is oxidation. Please check proper operation of the blanket gas system of the expansion tank. Although the fluid is currently suitable for use a consideration should be to clean the system and replace the fluid before the 2019 winter. Oxidation of heat transfer fluids will progress at an accelerated pace once started. Not taking corrective action now may result in operational problems next winter. Please re-sample in June. Knowing the fluid condition then allows time for corrective action if required. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high.
03/05/18	The fluid is in a reasonable condition and suitable for further use but the viscosity is high which will reduce the efficiency of heat transfer. The Pentane Insoluble (solids) content of the fluid is high and has increased. Filtration of the fluid is required.Please re-sample in 6 months. Pentane Insolubles levels are severely high. Visc @ 40°C is severely high. (GCD) 90% Distillation Point is marginally low.
03/24/17	An increase of viscosity, 90% GCD temperature and TAN indicates fluid degradation by oxidation. Please ensure the blanket gas system is working properly to limit contact between the hot fluid and outside air (oxygen). Pentane Insoluble (solids) content has exceeded the warning limit of 0.5%. The fluid is suitable for further use but it is recommended to start filtration of the fluid to bring the solids content down to a more acceptable level. Please resample after filtration. Pentane Insolubles levels are severely high. (GCD) 90% Distillation Point is abnormally high. Visc @ 40°C is abnormally high.
11/29/15	The viscosity of the fluid has increased. This in combination with an elevated 90% GCD temperature indicates degradation of the fluid by oxidation. The Pentane Insoluble (solids) content is high with 0.478%. It is getting close to the warning limit of 0.5%. Please verify proper operation of the blanket gas system. It is recommended to filter the fluid in order to bring the solids level down. The fluid is suitable for further use. Please re-sample after filtration of the fluid. Pentane Insolubles levels are abnormally high. Visc @ 40°C is abnormally high. (GCD) 90% Distillation Point is marginally high.