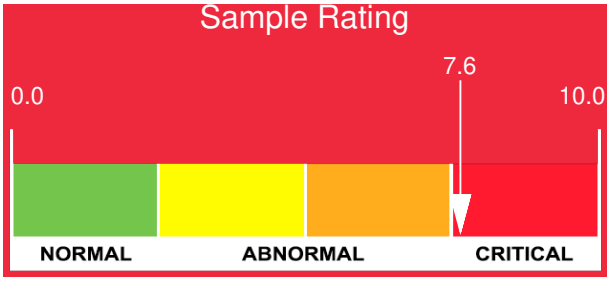
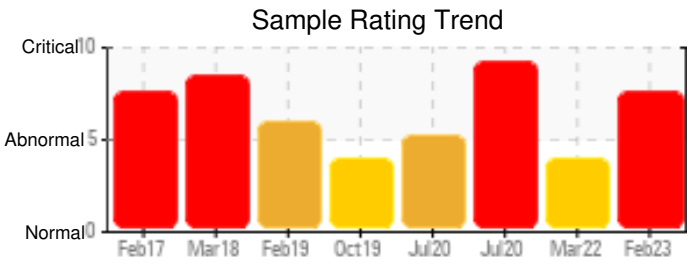




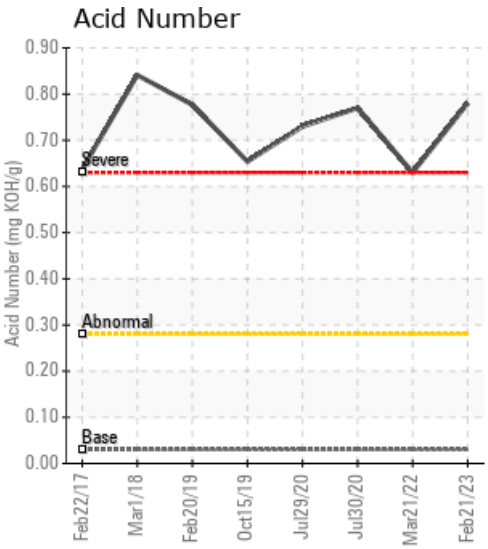
MAIN SYSTEM

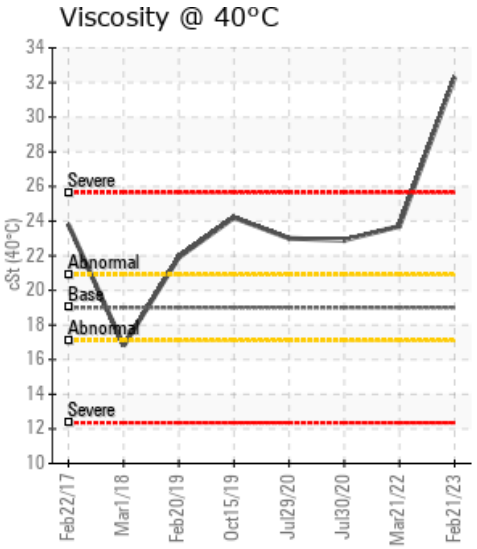
Customer: PTRHTF10183	System Information	Sample Information
Bitumar USA Inc 6000 Pennington Avenue Baltimore, MD 21226 USA Attn: Jason Rodriguez Tel: (410)454-8192 E-Mail: jason.rodriguez@bitumar.com	System Volume: 17000 gal Bulk Operating Temp: 450F / 232C Heating Source: Blanket: Fluid: EASTMAN THERMINOL 55 Make: AMERICAN HEATING	Lab No: 02542197 Analyst: Joe Goecke Sample Date: 02/21/23 Received Date: 02/28/23 Completed: 03/02/23 Joe Goecke Joe.goecke@HFSinclair.com

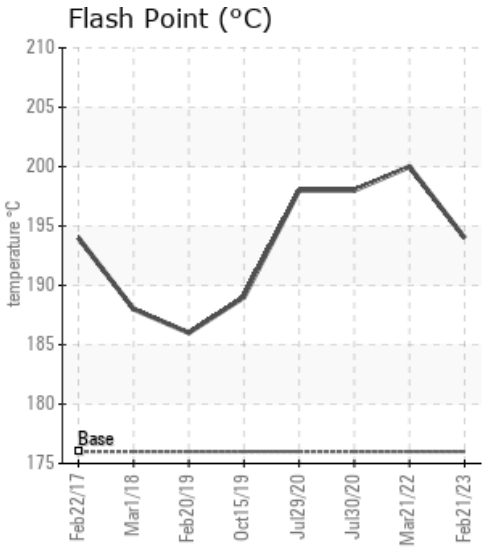
Recommendation: Acid Number remains high although consistent and not making any large jumps. The increase in viscosity leads me to believe that the system has had a significant increase in Petrotherm as the viscosity of Therminol 55 is 19 cst @ 40C and Petrotherm is 35 cst @ 40C. This would not be flagged if the fluid was listed as PetroTherm. Flash Point and low boilers remain consistent indicating the system is fairly stable. Pentane insoluble have risen and should be looked at from a filtration standpoint. Continue to use product and reasample at next scheduled interval and update paperwork to reflect correct product in use.

Comments: Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. (GCD) 90% Distillation Point is severely high. Visc @ 40°C is severely high.

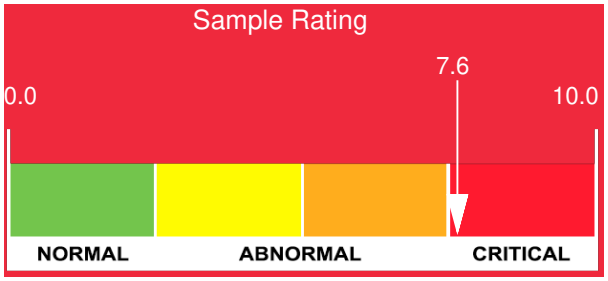
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
02/21/23	02/28/23	15.0y		381 / 194	18.7	32.3	0.78	0.595	655 / 346	748 / 398	854 / 456	5.12
03/21/22	03/29/22	12.0y	AB2	392 / 200	39.5	23.7	0.63	0.456	652 / 344	742 / 394	845 / 452	5.63
07/30/20	08/05/20	10.0y	EXPANSION TANK	388 / 198	1517.7	22.9	0.77	0.489	654 / 346	737 / 392	828 / 442	4.78
07/29/20	08/05/20	10.0y	AB 2 HOT OIL OUTLET	388 / 198	64.5	23.0	0.73	0.161	655 / 346	737 / 392	828 / 442	4.68
10/15/19	10/21/19	0.0y	AFTERBURNER 2	372 / 189	46.8	24.2	0.654	0.308	665 / 352	741 / 394	817 / 436	2.09
Baseline Data				349 / 176		19.0	0.03		655 / 346		790 / 421	3.40

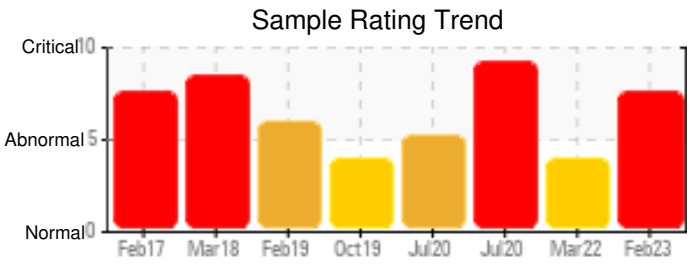






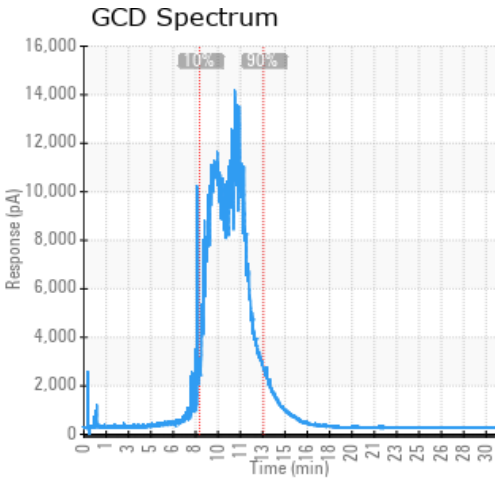
PETRO-CANADA LUBRICANTS

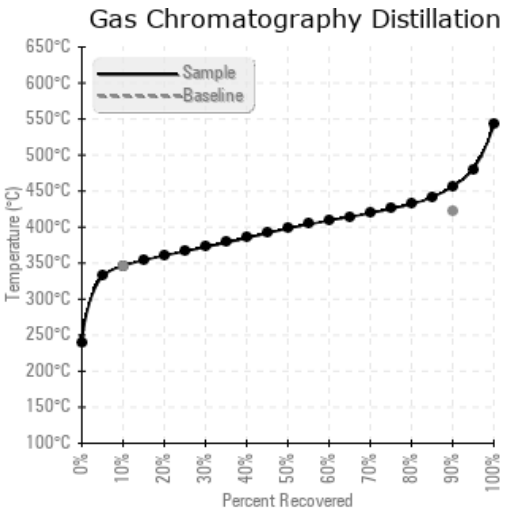


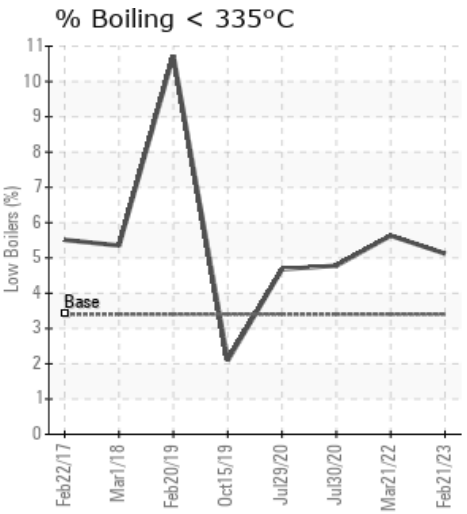


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
02/21/23	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
03/21/22	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0
07/30/20	34	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	1	0	0	0	1	0	0	0
07/29/20	23	0	0	0	0	0	0	0	0	0	0	8	1	0	0	0	1	0	0	0	1	0	0	0
10/15/19	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Baseline Data			0	0						0			0	0				0	0				0	

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







Historical Comments

03/21/22	We have seen some improvement in this system as water numbers are much lower and the flash point and viscostiy have remained steady and increased slightly. The dirt level is still there although steady. We still see a high acid number which can be of a concern with corrosion and system damage. Fluid listed is Therminol 55, so maybe these items are carryover from previous product if this has not been cleaned. Please correct fluid name on sheet and consider partial exchange to lower acid number Pentane Insolubles levels are abnormally high. (GCD) 90% Distillation Point is severely high. Acid Number (AN) is abnormally high.
07/30/20	The sample from the expansion tank shows a very high water concentration (0.15%), a high acid number and a high amount of solids (0.5% by weight). We would check the bottom of the expansion tank for leaks to make sure the water and high acidity of the oil accumulated at the bottom of the tank has not eaten through the tank. We would recommend to manually remove some of this stagnant material from the bottom of the tank by draining from the very bottom if possible or with a used oil collection truck, but keeping in mind that disturbance of this accumulation of acids, water and solids can cause some of it to go into the main system line. Water contamination levels are severely high. ppm Water contamination levels are severely high. Pentane Insolubles levels are abnormally high. Acid Number (AN) is severely high. (GCD) 90% Distillation Point is severely high.
07/29/20	This system from the main system line shows a high Acid Number, slightly higher than the last sample in October 2019. The oxidation (degradation) of the oil continues to increase the flash point and contributes to the 20%+ higher viscosity vs fresh Therminol 55. Acid Number (AN) is severely high. (GCD) 90% Distillation Point is severely high.
10/15/19	The properties like insoluble solids and iron (wear and corrosion) seem to be getting better. Along with the increasing Sulfur it indicates a significant addition of fresh Therminol 55 to the system. However, the problem identified 2 years ago of fluid degradation by oxidation remains judging by the Acid Number which stubbornly stays high through the additions of oil. An Acid Number this high for a system this size means the oil has generated a lot of oxidation products. They are what causes the 25% viscosity increase, they accumulate in the bottom of the expansion tank and elbows and reduces the effective diameter of the piping to carry the hot oil. Our Petro-Therm is significantly less expensive so a lot more fresh oil could be added for the same cost vs Therminol 55, thus making a much stronger impact in reducing the oxidation level (and acid level) of the oil. This would help reduce the corrosiveness and maintain the integrity of the piping and maintain better flow. Acid Number (AN) is severely high. (GCD) 90% Distillation Point is abnormally high.