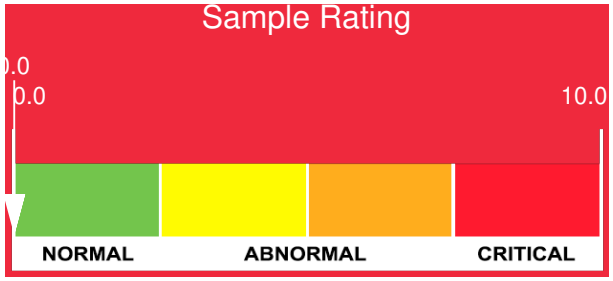
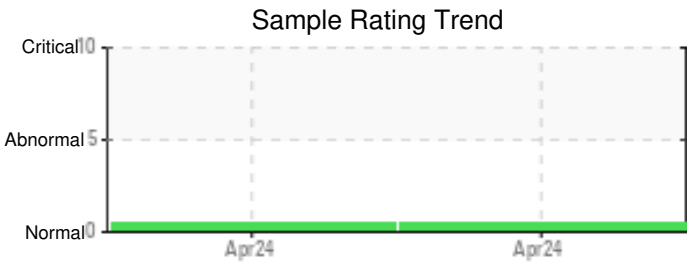




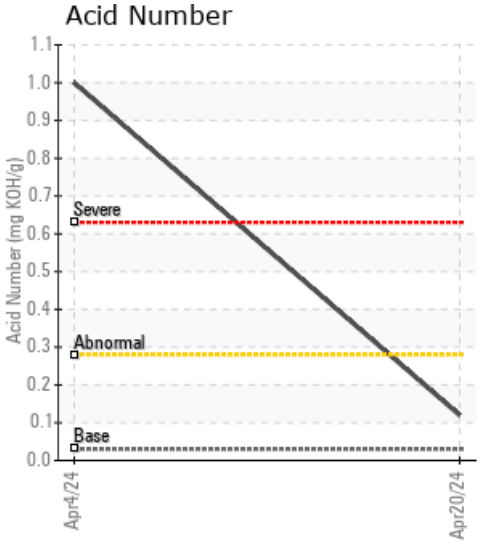
[14-24-59-16W5] OUTLIER RESOURCES

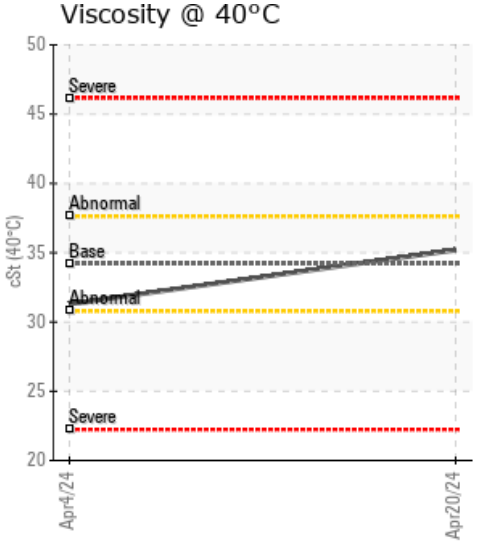
Customer: PTRHTF60069	System Information	Sample Information
OUTLIER RESOURCES LTD 3330 33RD ST BAY 1 WHITECOURT, AB T7S 0A2 CA Attn: Dean Halbert Tel: (780)778-0131 E-Mail: dhalbert@outlierresources.com	System Volume: 32000 ltr Bulk Operating Temp: 374F / 190C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02631428 Analyst: Clinton Buhler Sample Date: 04/20/24 Received Date: 04/25/24 Completed: 04/29/24 Clinton Buhler Clinton.Buhler@HFSinclair.com

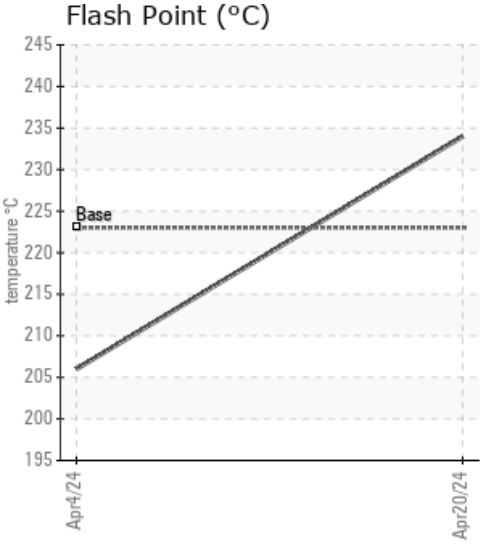
Recommendation: Baseline sample after Petro-Therm replacement. Sample results show a great improvement compared to the previous sample. Acid Number is at 0.12, Iron content is at 8 ppm and Solids content is at 0.179; both are greatly improved from last sample, but aren't completely reflective of brand new fluid, indicating some residual used fluid and/or deposits were left behind. Please ensure blanket gas is operational to protect the fluid from oxidation. Re-sample in three months.

Comments:

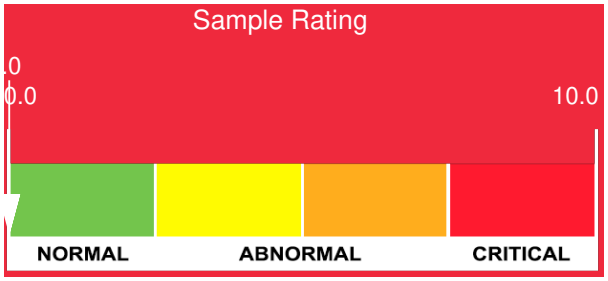
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
04/20/24	04/25/24	4.0d	discharge of the pum	453 / 234	53	35.2	0.12	0.179	715 / 379	810 / 432	910 / 488	2.39
04/04/24	04/08/24	3.0d		403 / 206	1970	31.3	1.00	1.15	678 / 359	798 / 426	895 / 480	6.54
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

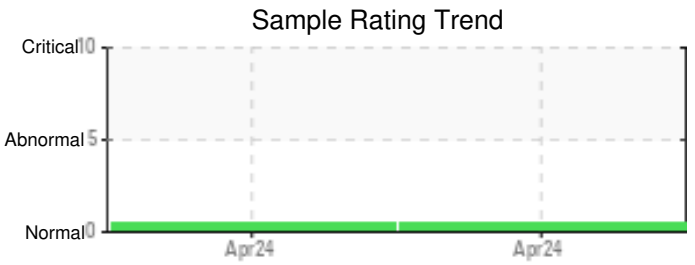






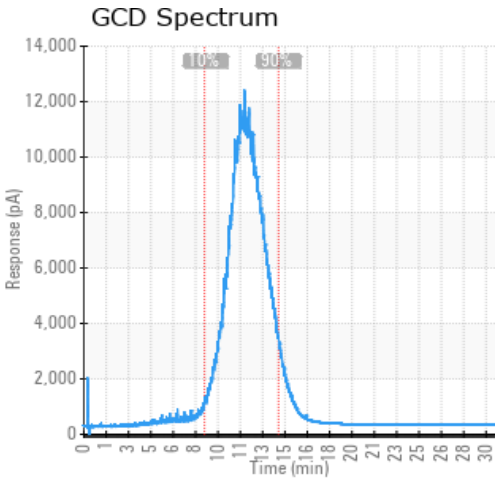
PETRO-CANADA LUBRICANTS

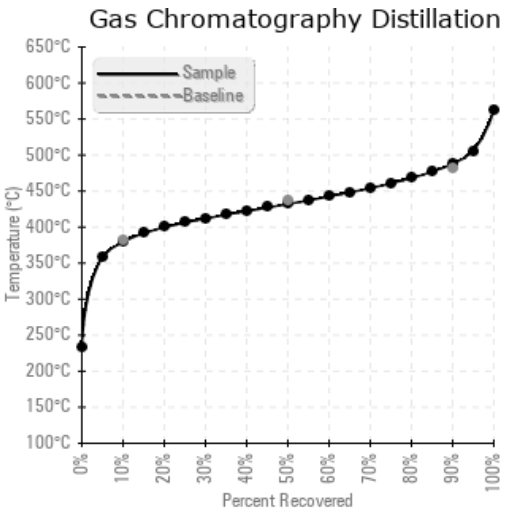


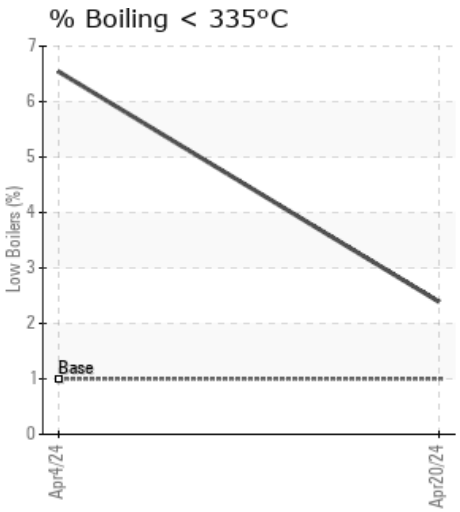


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
04/20/24	8	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	2	0	2	3
04/04/24	33	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	2	0	1	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

04/04/24	Sample results indicate the fluid has been both thermally and oxidatively stressed. Reduced fluid viscosity, flash point and 10-90% GCD temperatures as well as increased low boiler vapor content of 6.54% are consistent with thermal degradation/cracking while the elevated Acid Number of 1 is likely due to fluid oxidation. The excess water contamination of 1970 ppm would also influence the rate of fluid oxidation. Both fluid oxidation and thermal degradation can contribute to the excessive solids formation (1.15%) and indicates system fouling. The fluid is degraded and requires replacement. Due to the excessive solids content (fouling), the system should be cleaned and flushed with Calflo Cleaning Fluid and Calflo Flushing Fluid before filling with fresh Petro-Therm.Please contact Technical Services to discuss further. Water contamination levels are severely high. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high.