

[3-09-81-16W6] HOT OIL PH1

Customer: PTRHTF20257
 ARC RESOURCES LTD.
 721 HIGHWAY 2
 DAWSON CREEK, BC V1G 0B8 CA
 Attn: Chris Stevens
 Tel: (250)719-5367
 E-Mail: crstevens@arcresources.com

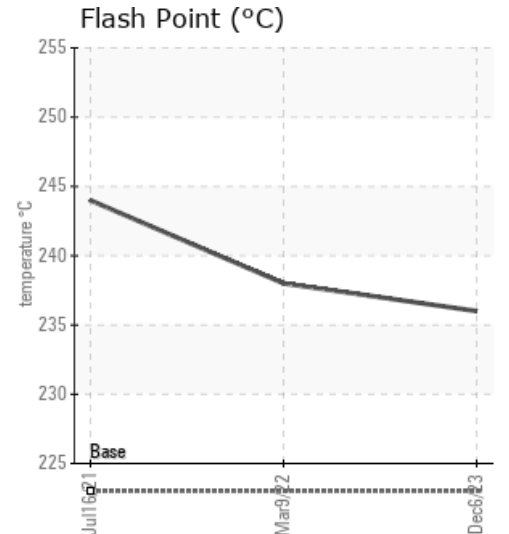
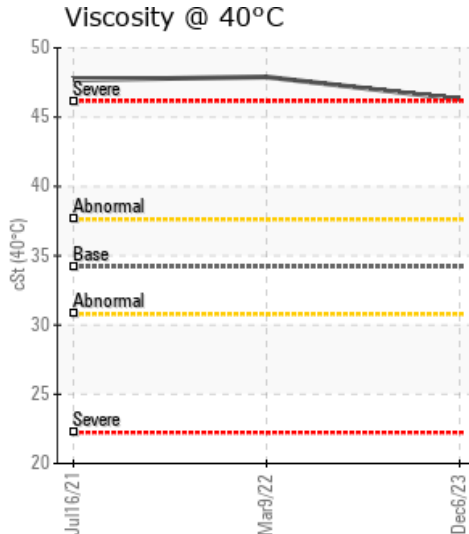
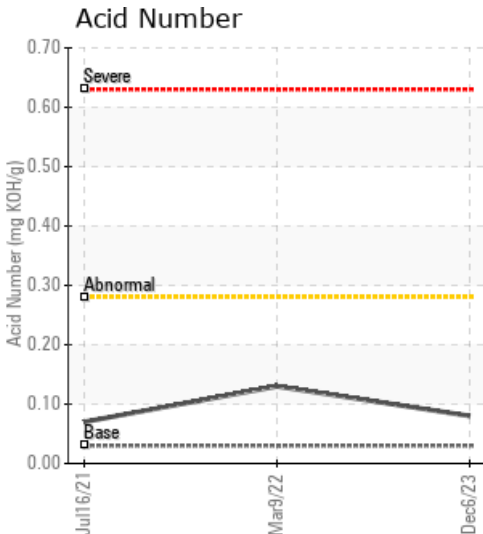
System Information
 System Volume: 35000 ltr
 Bulk Operating Temp: 210F / 99C
 Heating Source:
 Blanket:
 Fluid: PETRO CANADA PETRO-THERM
 Make: HEATECH

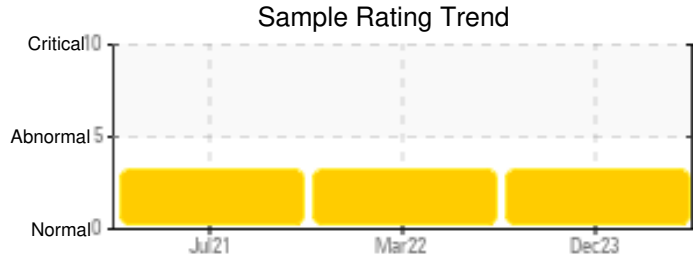
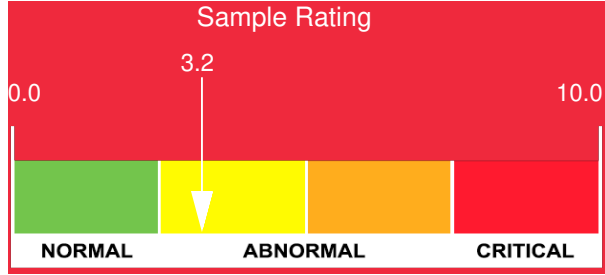
Sample Information
 Lab No: 02603358
 Analyst: Clinton Buhler
 Sample Date: 12/06/23
 Received Date: 12/14/23
 Completed: 12/19/23
 Clinton Buhler
 Clinton.Buhler@HFSinclair.com

Recommendation: Sample results indicate that the blend of Sun Oil 21 and Petro-Therm is in suitable condition for continued service. The blend of fluids leads to the higher fluid viscosity and increased 10% distillation temperature. Please re-sample in 12 months

Comments:

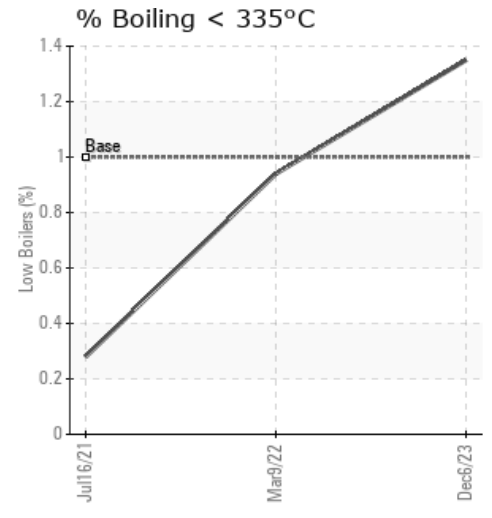
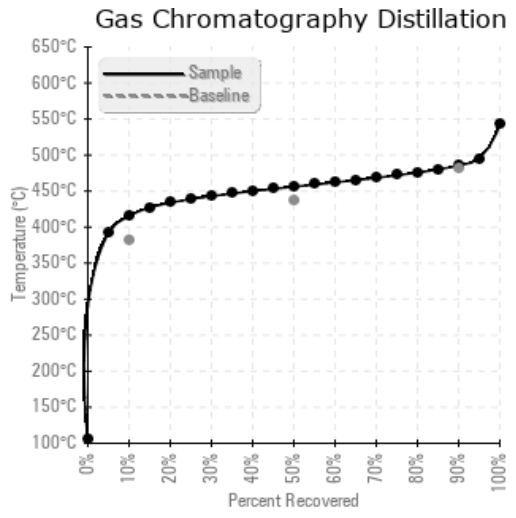
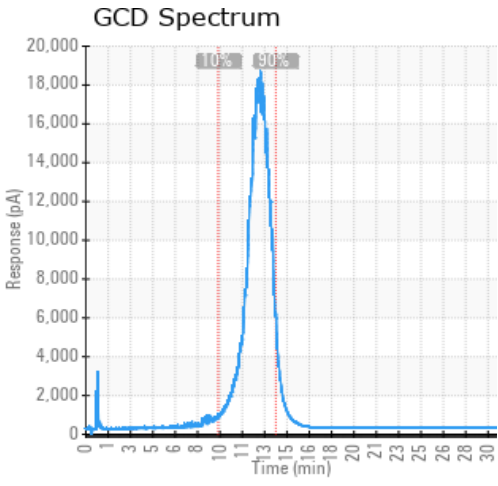
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
12/06/23	12/14/23	20.0y	COOLING LINE	457 / 236	27	46.3	0.08	0.057	780 / 416	853 / 456	906 / 486	1.35
03/09/22	04/11/22	12.0y	off main pump	460 / 238	0.00	47.9	0.13	0.030	788 / 420	854 / 457	905 / 485	0.94
07/16/21	07/23/21	10.0y	downstream of pump	471 / 244	7.3	47.7	0.07	0.160	791 / 422	852 / 456	902 / 483	0.28
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	
12/06/23	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
03/09/22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07/16/21	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	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	
03/09/22	Sample results indicate that the blend of Sun Oil 21 and Petro-Therm is in suitable condition for continued service. The blend of fluids leads to the higher fluid viscosity and increased 10% distillation temperature. Please ensure that blanket gas is operational in the expansion tank. Please re-sample in 12 months
07/16/21	Sample results indicate that the fluid is in suitable condition for continued service. It is understood that this system is a blend of Sun Oil 21 and Petro-Therm and we can see that in the results: the fluid's viscosity, 10% and 50% GCD temperature and flash point are elevated over new Petro-therm yet there aren't obvious signs of fluid degradation (Acid Number is low and solids content acceptable). The mixture of fluids can, unfortunately, make it more difficult to identify thermal degradation. Please re-sample in 6 months

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