

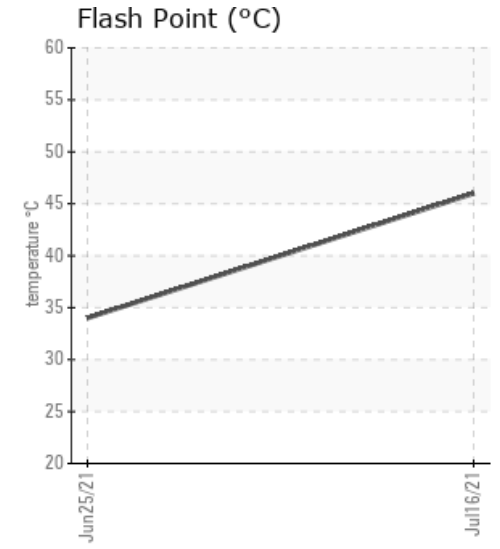
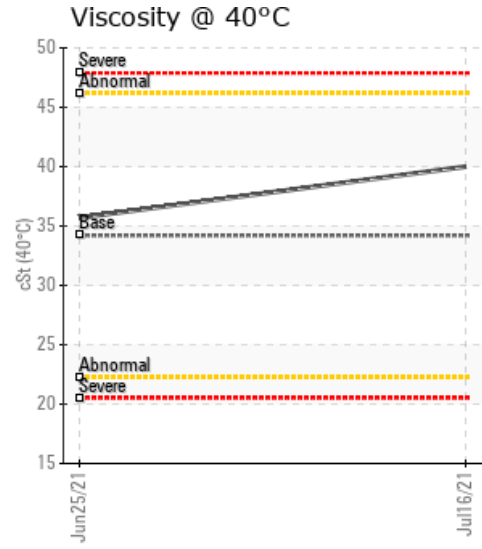
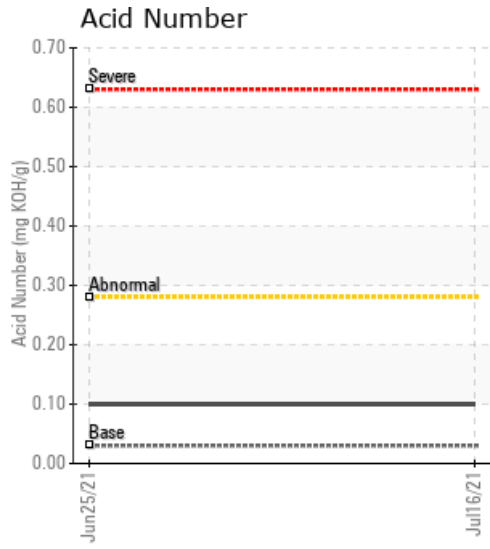
[11-34-79-12W6] ARC RESOURCES

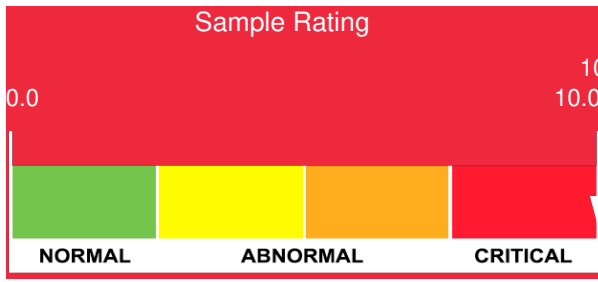
Customer: PTRHTF20257	System Information	Sample Information
ARC RESOURCES LTD. 721 HIGHWAY 2 DAWSON CREEK, BC V1G 0B8 Canada Attn: Elliot MacTavish Tel: (250)219-0874 E-Mail: emactavish@arcresources.com	System Volume: 4000 ltr Bulk Operating Temp: 302F / 150C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02434766 Analyst: Clinton Buhler Sample Date: 07/16/21 Received Date: 07/23/21 Completed: 08/03/21 Clinton Buhler Clinton.Buhler@hollyfrontier.com

Recommendation: This is a re-sample after the June 25, 2021 sample: Sample results indicate that the fluid is not in good condition. It is contaminated with sodium and has a drastically reduced flash point (46C) which is a safety concern. The fluid has 13.54% low boiling vapors and very reduced 10% GCD temperature which may be due to thermal degradation or mixture with process fluid. It is advised to change out this fluid at the nearest opportunity. Please contact Petro-Canada Lubricants technical services for further discussion.

Comments: Sodium ppm levels are severely high. (GCD) % < 335°C is severely high. (GCD) 90% Distillation Point is severely high. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low.

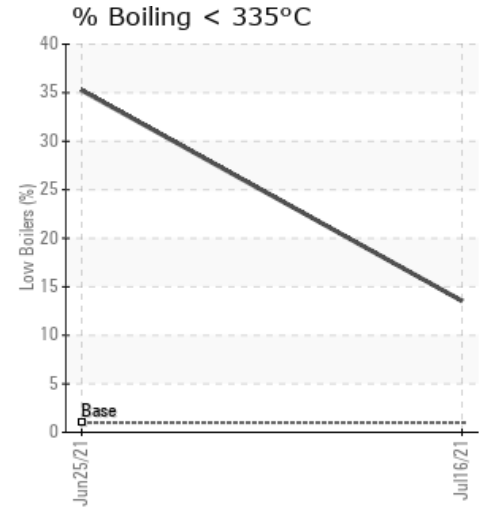
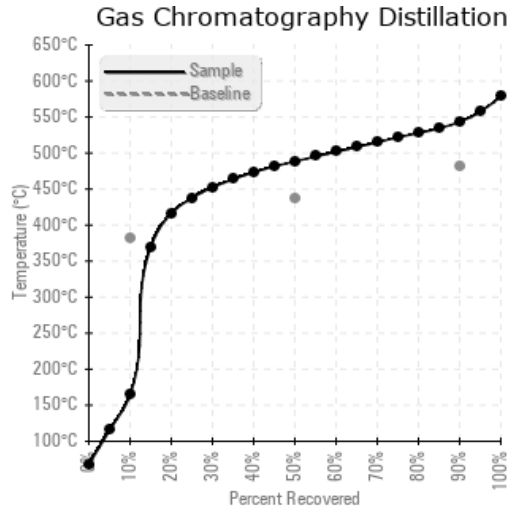
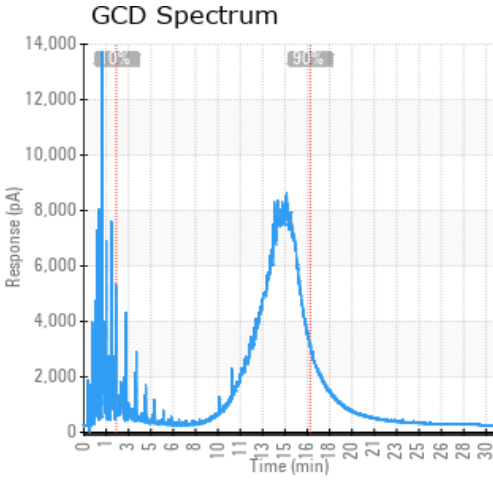
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
07/16/21	07/23/21	60.0m	discharge of boiler	115 / 46	55.6	40.0	0.10	0.322	327 / 164	911 / 488	1010 / 543	13.54
06/25/21	07/06/21	24.0m		93 / 34	63.2	35.7	0.10	0.034	240 / 116	781 / 416	938 / 503	35.25
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
07/16/21	102	0	0	0	0	0	0	0	0	0	4	179	2	0	0	0	1	0	0	1	21	0	69	4
06/25/21	48	0	0	0	0	0	1	0	0	0	1	108	2	0	0	0	0	0	0	0	13	0	24	3
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	
06/25/21	Sample results indicate that the fluid is not in good condition. It is contaminated with sodium, but of more concern is the fluid's drastically reduced flash point (34C). The fluid has 35.25% low boiling vapors and very reduced 10% GCD temperature which may be due to thermal degradation of mixture with process fluid. If this sample is pulled from a representative zone, the fluid needs to be replaced. Please contact Petro-Canada Lubricants technical services for further discussion. Sodium ppm levels are severely high. (GCD) % < 335°C is severely high. (GCD) 90% Distillation Point is severely high. (GCD) 10% Distillation Point is severely low. COC Flash Point is severely low.

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