

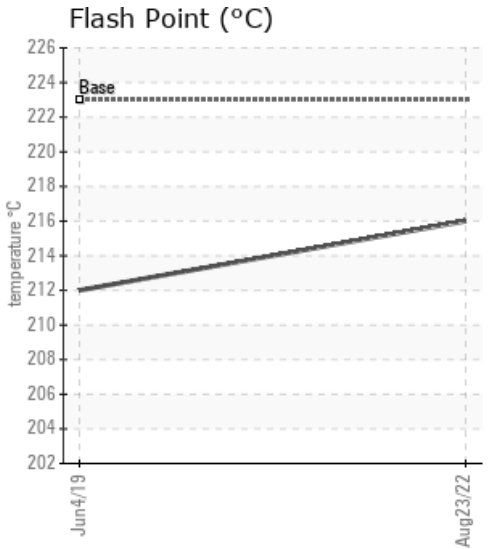
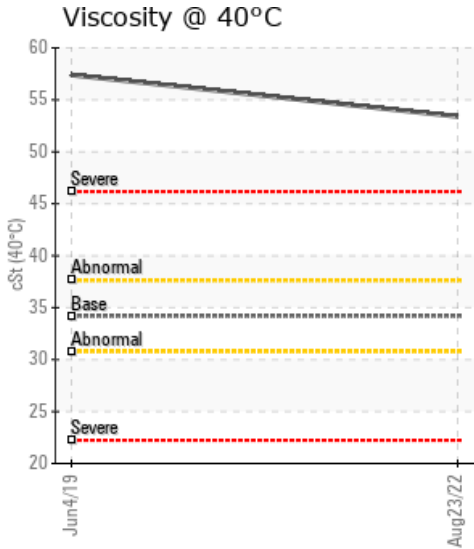
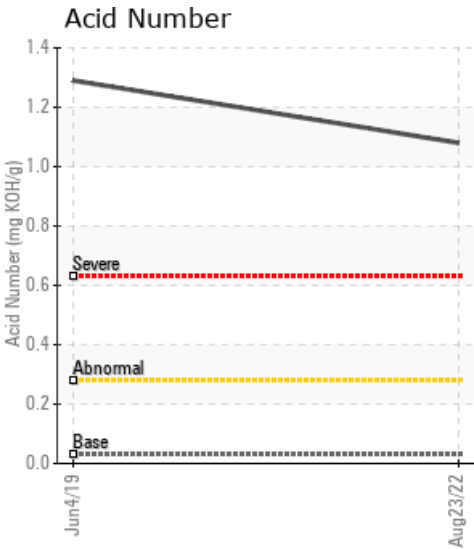
## [PMA] 451-PMA

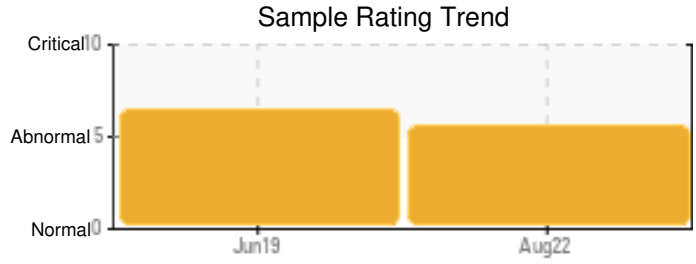
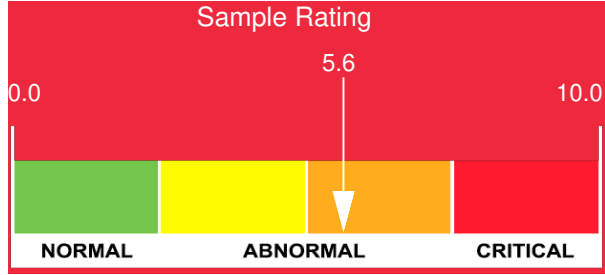
Customer: PTRHTF20056	System Information	Sample Information
McAsphalt 26222 TOWNSHIP ROAD 530A ACHESON, AB T7X 5A7 Canada Attn: Luis Salinas Tel: (780)699-2447 E-Mail: lsalinas@mcasphalt.com	System Volume: 12000 ltr Bulk Operating Temp: Not Specified Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: CEI	Lab No: 02509201 Analyst: Yutong Gao Sample Date: 08/23/22 Received Date: 09/06/22 Completed: 09/15/22 Yutong Gao yutong.gao@HFSinclair.com

Recommendation: The current fluid has severe oxidation resulting in the substantial elevated Acid Number (AN) and the viscosity at 40C. The high fluid viscosity and the associated solid contents all decrease the system heat transfer efficiency. The fluid is not suitable for further operation. Please plan a fluid change in the near future. or at least to change 30% of the fluid to reduce the viscosity and acid number if the budget/timing reaches the limit this year.

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

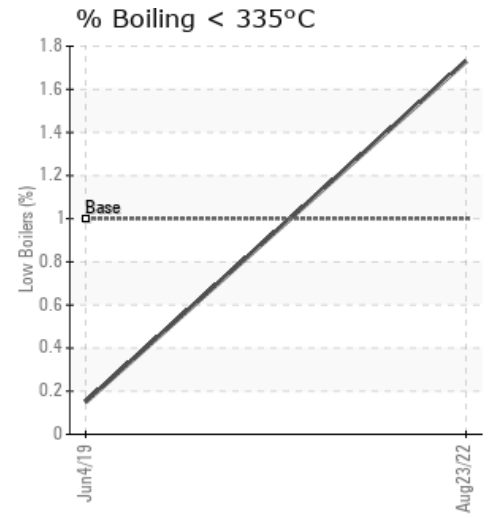
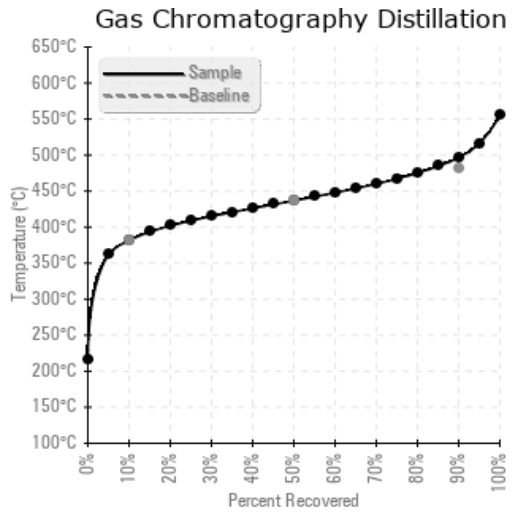
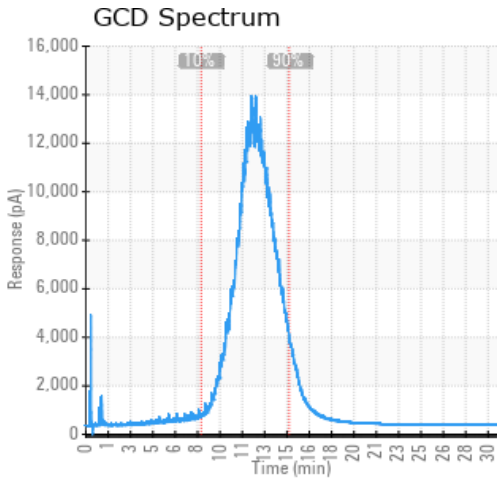
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
08/23/22	09/06/22	13.0y		421 / 216	102.1	53.4	1.08	0.417	719 / 381	818 / 437	926 / 497	1.73
06/04/19	07/12/19	8.0y		414 / 212	47.2	57.4	1.29	1.78	713 / 378	810 / 432	922 / 494	0.15
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
08/23/22	50	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	2	0	10	0
06/04/19	66	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	0	2	0	12	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	
06/04/19	High acid number and pentane insoluble results on increase on viscosity. this increase will affect the heat transfer efficiency of the whole system. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Visc @ 40°C is severely high. (GCD) 90% Distillation Point is marginally high.

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