

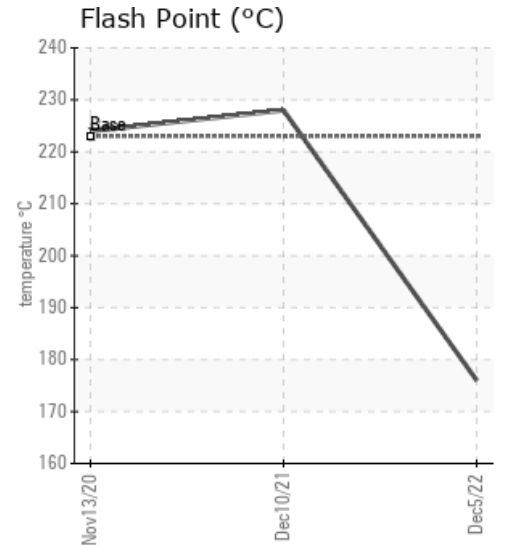
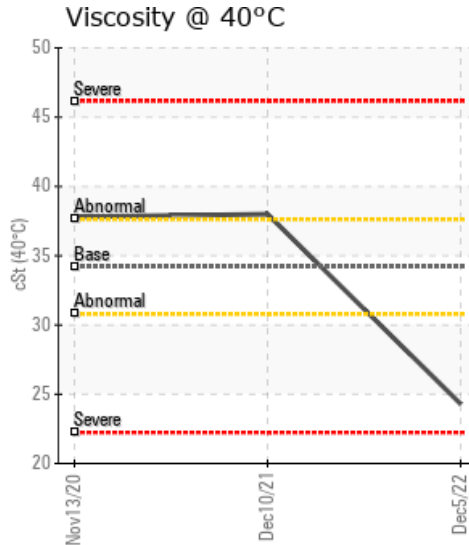
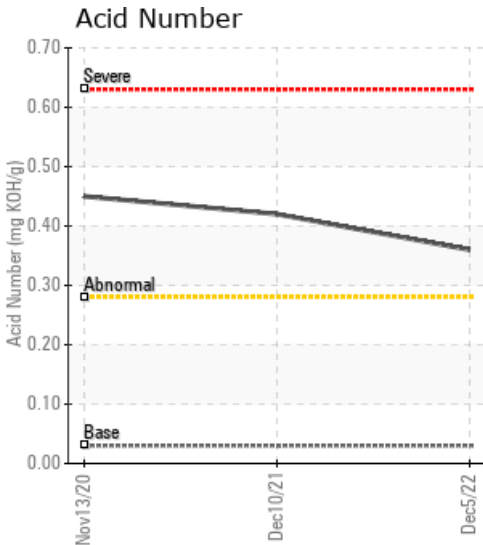
## PULASKI PLANT

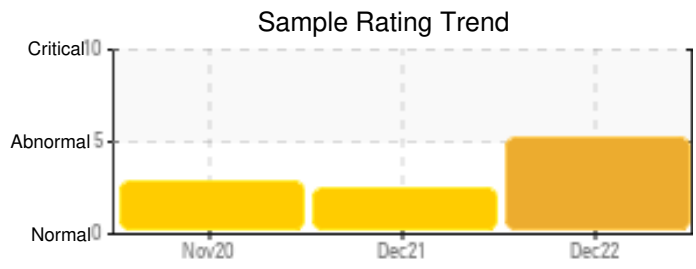
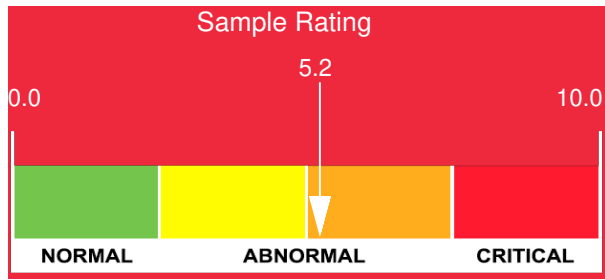
Customer: PTRHTF10238	System Information	Sample Information
Reliable Asphalt Corp 3741 S Pulaski Rd Chicago, IL 60623 USA Attn: Bob Madden Tel: E-Mail: rmadden@biganepaving.com	System Volume: 600 ltr Bulk Operating Temp: 350F / 177C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: STAN STEEL	Lab No: 02530452 Analyst: Yvette Trzcinski Sample Date: 12/05/22 Received Date: 12/22/22 Completed: 01/03/23 Yvette Trzcinski yvette.trzcinski@HFSinclair.com

Recommendation: System has signs of thermal degradation the GCD % < 335 C of 7.72 which is a sign of low boilers. Which has lowered the flash point 84 degrees from 433 F down to 349 F. Lowered the viscosity of the fluid, decrease of 28%. Option of venting the system to remove low boilers or sweetening of the product. Sample in 6 months

Comments: Acid Number (AN) is abnormally high. COC Flash Point is abnormally low. Visc @ 40°C is abnormally low. (GCD) % < 335°C is marginally high. (GCD) 10% Distillation Point is marginally low.

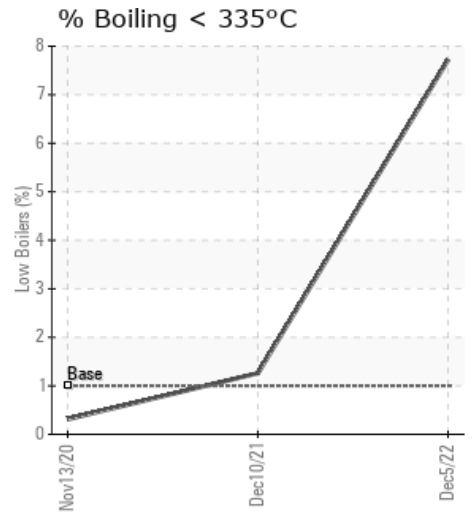
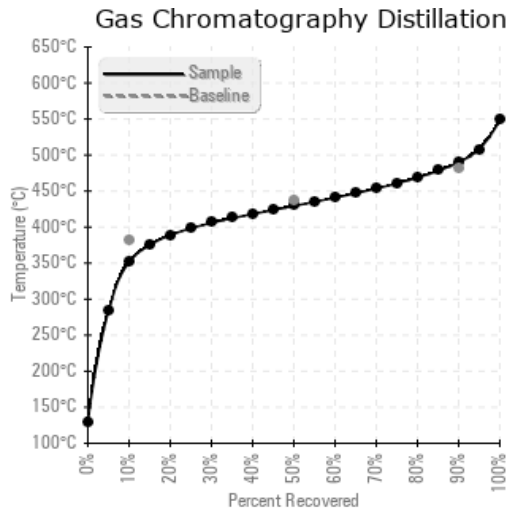
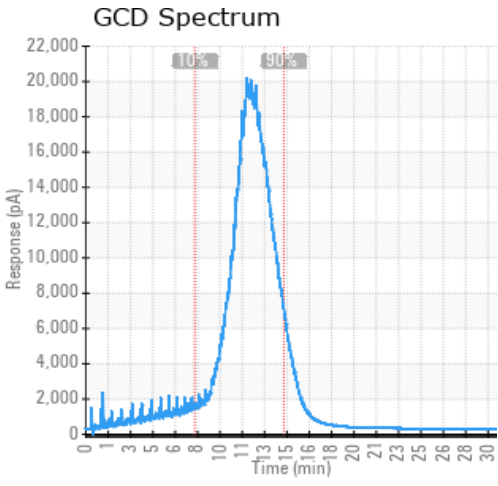
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
12/05/22	12/22/22	0.0y		349 / 176	9.6	24.3	0.36	0.184	665 / 352	805 / 429	914 / 490	7.72
12/10/21	12/21/21	5.0y		442 / 228	31.2	38.0	0.42	0.221	727 / 386	819 / 437	922 / 495	1.26
11/13/20	11/24/20	2.0y	BOILER	435 / 224	52.4	37.8	0.45	0.403	731 / 388	820 / 438	923 / 495	0.31
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
12/05/22	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/10/21	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0	2	3
11/13/20	2	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	4	0	0	2
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

12/10/21	There is some oxidation happening that has caused an increase in acid number, viscosity and GCD 90% over new oil but the sample is consistent and similar to the last sample taken in 2020. System is acceptable for continued use resample at the next interval. Acid Number (AN) is abnormally high. (GCD) 90% Distillation Point is marginally high.
11/13/20	The fluid is showing signs of degradation the acid number is increasing as well as the pentane insoluble both signs the fluid is oxidizing forming acidic compounds and deposits that will continue to degrade the fluid and cause fouling build up in the system which affects the efficiency of the system. Recommend drain and flush to remove solids and recharge of the system with new fluid within the next 12 -18 months Pentane Insolubles levels are abnormally high. Acid Number (AN) is abnormally high. (GCD) 90% Distillation Point is marginally high.

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