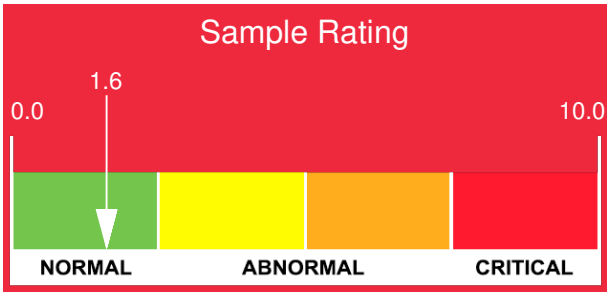
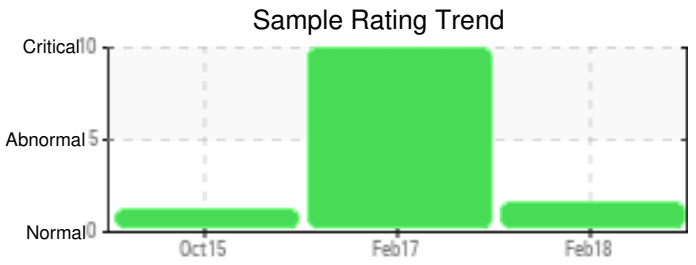




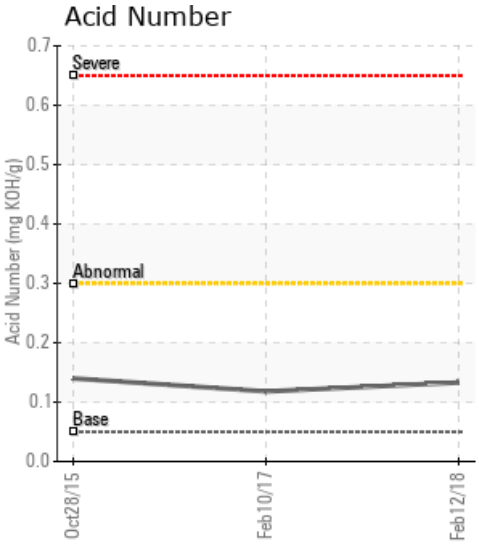
HEAT TRANSFER FLUID

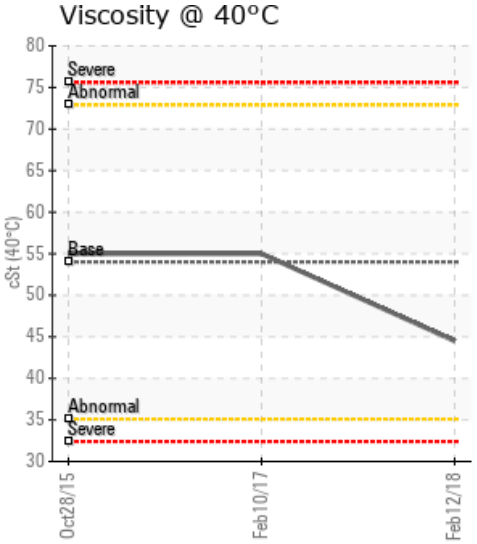
Customer: PTRHTF30099	System Information	Sample Information
Canadian Asphalt 400 EASTPORT BLVD HAMILTON, ON L8E 7S4 Canada Attn: Guy Belanger Tel: (905)961-1415 E-Mail: guy.belanger@canadianasphalt.com	System Volume: 9449 gal Bulk Operating Temp: 430F / 221C Heating Source: Blanket: Fluid: SHELL HEAT TRANSFER OIL S2 X Make:	Lab No: 02198648 Analyst: Adam Koscielak Sample Date: 02/12/18 Received Date: 03/02/18 Completed: 03/06/18 To discuss this report contact Adam Koscielak at 905-331-1323

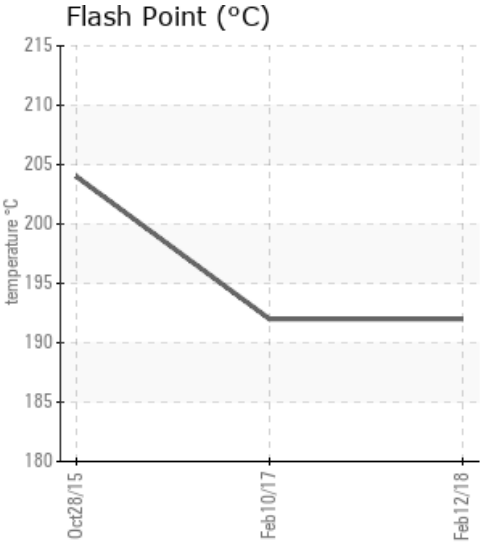
Recommendation: Current sample appears to have increased in low boilers as:1 - the GCD % <335°C has increased more than 2x from the previous sample. 2 - Flash point is also significantly reduced to 192°C from a published value of 232°C. 3 - Possible indication of some cracking of the product due to the increase in low boilers, reduced viscosity from original 56 cSt @ 40°C to 44.5 cSt @ 40°C. 4 - Initial boiling point of the product has been reduced from 365°C to 134.9°C. 5 - There is also an increase in the FBP at 593 compared to 581°C.If possible, steps should be taken to vent off the low boilers, to help decrease the amount of material <335°C, and also help increase the flash point.Another possible correction is to remove some of the current fluid and replace with fresh heat transfer fluid to improve the flash, viscosity and distillation profile.

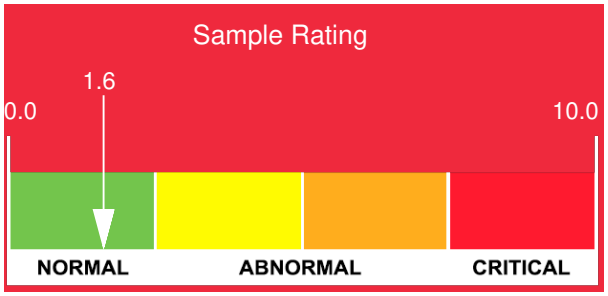
Comments: COC Flash Point is severely low.

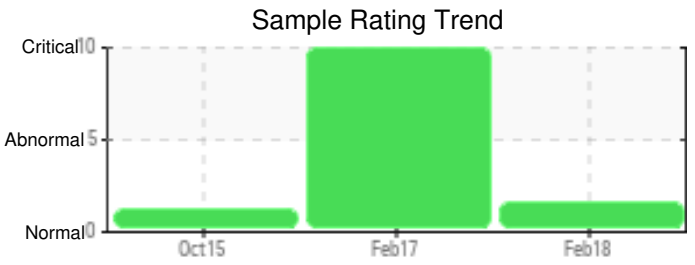
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
02/12/18	03/02/18	15y		378 / 192	15.4	44.5	0.133	0.056	731 / 389	854 / 457	961 / 516	5.41
02/10/17	02/15/17	13y	HOHCP001 13:00PM	378 / 192	5.1	55.0	0.118	0.044	778 / 415	861 / 461	972 / 522	1.94
10/28/15	11/04/15	2y		399 / 204	7.4	55.0	0.14	0.151	752 / 400	832 / 444	938 / 504	0.00
Baseline Data				500 / 260		54	0.05					





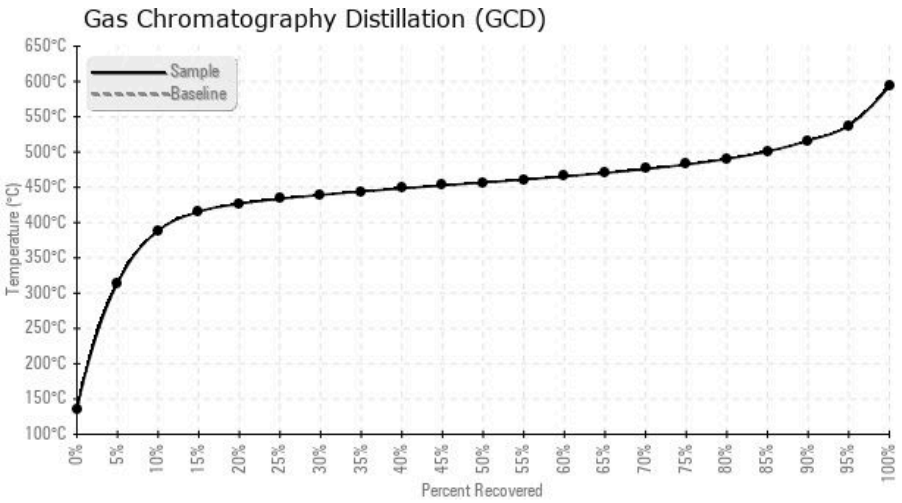


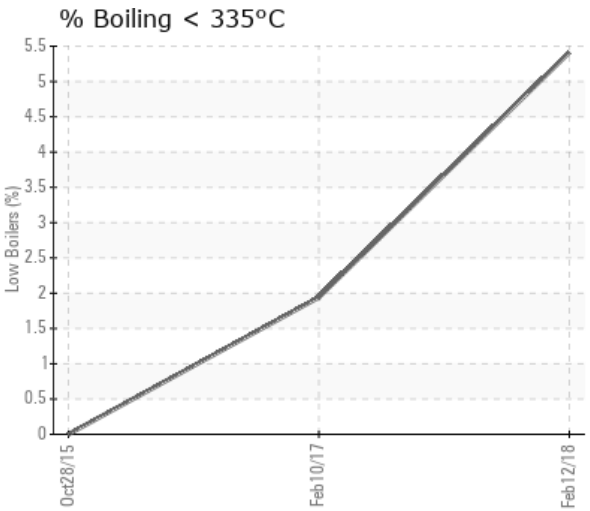




Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
02/12/18	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02/10/17	13	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
10/28/15	212	0	0	0	9	1	0	3	0	0	2	6	0	0	0	0	5	0	0	1	3	1	2	2
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

02/10/17	Confirm that this sample is Shell Heat Transfer Oil S2. Viscosity of the oil does not match published data of 29 cSt @ 40°C. If this is Shell Heat Transfer Oil S2, the viscosity of the oil is abnormally high. Has another oil been added? GCD profile is quite different.Initial boiling point of 217.7°C. Published data indicates the Initial boiling point is >330°C. Percent boilers below 335°C has increased to 1.94%. (GCD) 90% Distillation Point is abnormal. Visc @ 40°C is abnormally high.
10/28/15	Viscosity is higher than typical indicating some thermal degradation occurring. Iron level is abnormal, however, the low PQ value indicates the iron level is due to corrosion. Advise resample at next normal interval.Iron ppm levels are abnormal. Visc @ 40°C is abnormally high.