

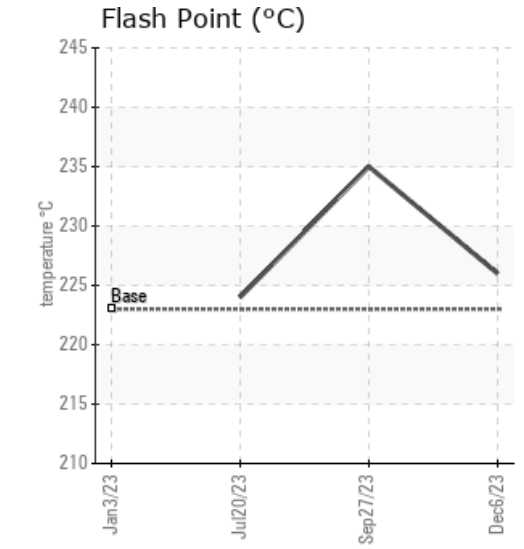
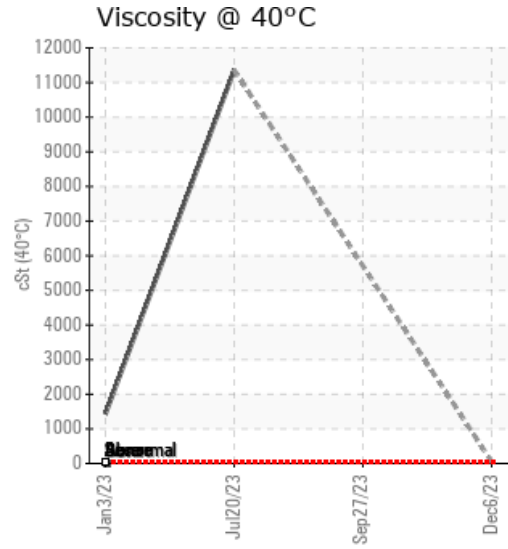
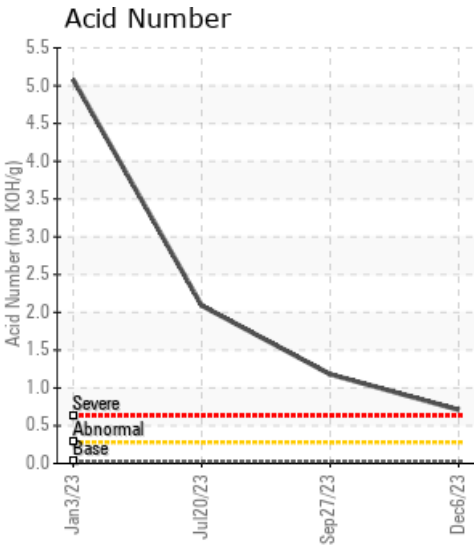
HOH

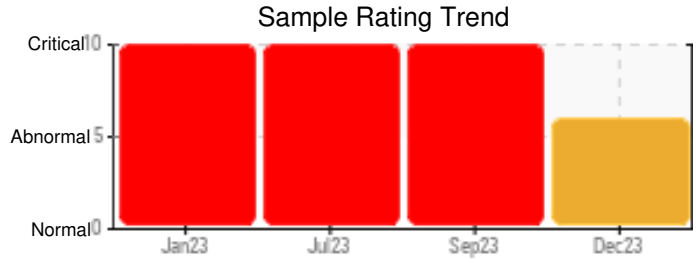
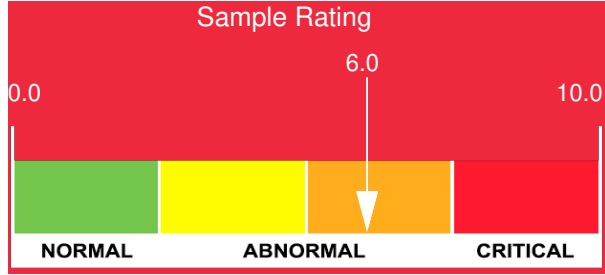
Customer: PTRHTF10213	System Information	Sample Information
HOLLY FRONTIER ASPHALT 4949 EDITH BLVD N.E. ALBUQUERQUE, NM 87107 US Attn: Brian Dodds Tel: (505)712-0895 E-Mail: brian.dodds@hfsinclair.com	System Volume: 3000 gal Bulk Operating Temp: 425F / 218C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: INDUSTRIAL COMBUSTIO	Lab No: 02603354 Analyst: LYLE HOFFMAN Sample Date: 12/06/23 Received Date: 12/14/23 Completed: 01/02/24 LYLE HOFFMAN lyle.hoffman@HFSinclair.com

Recommendation: This is the sample post one cycle of drain, clean, flush, and fill. A tremendous amount of solids were removed during the process. Although Pentane insoluble show severely high they were dropped from 11.1% to .881%. Also, Acid number and viscosity have improved greatly. With this being a large complex system, the numbers do show that there is still some residual fluid in the system, but performance should be back to normal with this vast improvement.

Comments: Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Visc @ 40°C is severely high. Calcium ppm levels are abnormally high.

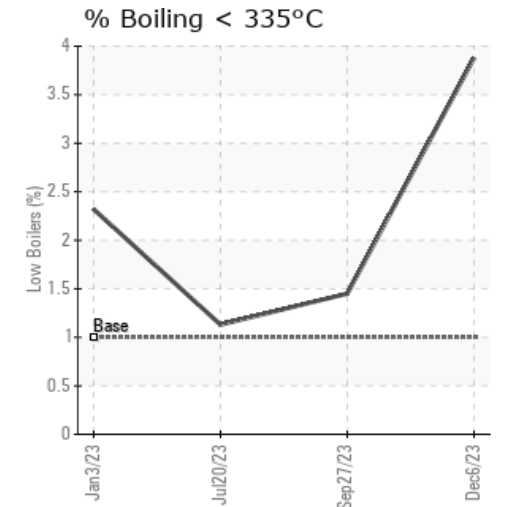
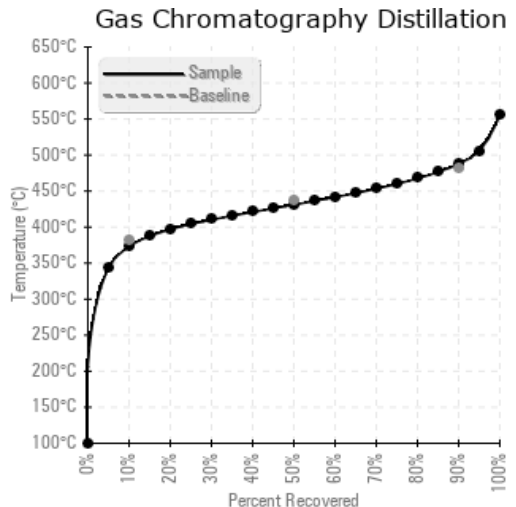
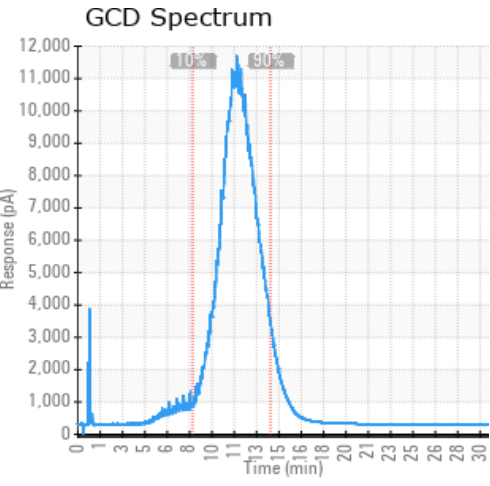
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
12/06/23	12/14/23	2.0y	INLET SAMPLE VALVE	439 / 226	61	51.7	0.71	0.881	704 / 373	808 / 431	910 / 488	3.88
09/27/23	10/10/23	10.0y		455 / 235	14.7		1.18	8.47	717 / 380	809 / 432	919 / 493	1.45
07/20/23	07/25/23	0.0y		435 / 224	85.1	11359	2.09	6.82	719 / 382	808 / 431	916 / 491	1.13
01/03/23	01/13/23	10.0y			2268.1	1434	5.08	11.1	692 / 367	799 / 426	919 / 493	2.32
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	82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	0	4	2
09/27/23	330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	0	0	0
07/20/23	232	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	116	0	1	2
01/03/23	411	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	4	0	1	0	76	0	1	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	
09/27/23	Viscosity cannot be determined as fluid is too thick. A complete shutdown with a drain and clean and flush is scheduled for end of November to improve this systems operation. Please note that the fluid was too thick to perform some of the normal laboratory tests. After system has been reconditioned, please resample at regular intervals. PQ levels are severe. Iron ppm levels are abnormal. Severally high acid number is a probable cause of wear and high iron content. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Calcium ppm levels are severely high. (GCD) 90% Distillation Point is marginally high.
07/20/23	There has been a significant effort in bleed and feed attempts to help with contaminants and wear particles. viscosity has continued to climb. A shutdown with clean and flush and new fluid has been scheduled for end of November. PQ levels are abnormal. Iron ppm levels are abnormal. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Calcium ppm levels are severely high. Visc @ 40°C is severely high.
01/03/23	Fluid is at end of life. Very high viscosity, AN, water content, and Iron. Continued operation with current fluid poses an elevated risk to fire and or explosion due to increased skin film temperature in order to get the desired bulk oil temperature. Recommend drain, clean, and refill with PetroTherm. Iron ppm levels are severe. PQ levels are severe. Water contamination levels are severely high. Water contamination levels are severely high.. ppm Water contamination levels are severely high. Pentane Insolubles levels are severely high. Acid Number (AN) is severely high. Calcium ppm levels are severely high. Visc @ 40°C is severely high. (GCD) 90% Distillation Point is marginally high.

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