

## [KEYERA PARTNERSHIP / 3-12-46-14W5] PLANT 2

**Customer: PTRHTF30084**  
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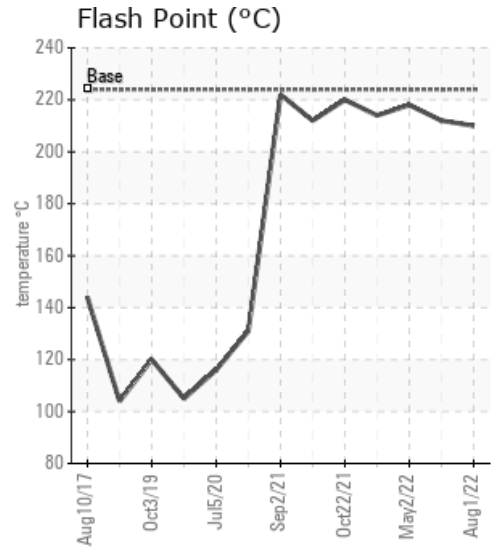
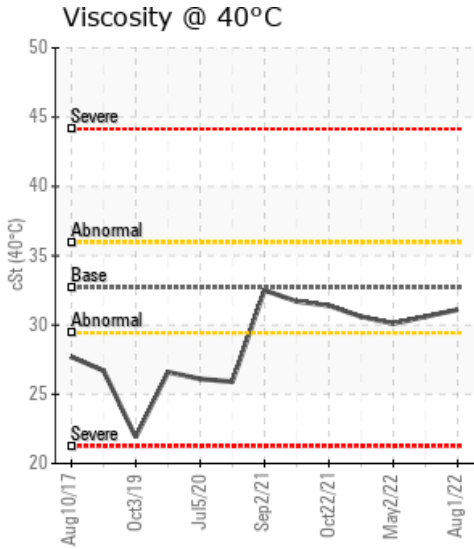
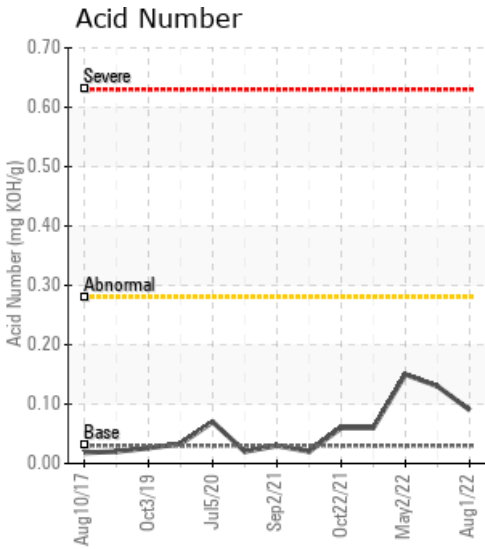
**System Information**  
 System Volume: 14000 ltr  
 Bulk Operating Temp: 455F / 235C  
 Heating Source:  
 Blanket:  
 Fluid: PETRO CANADA CALFLO AF  
 Make: PETROTHERM ENG.

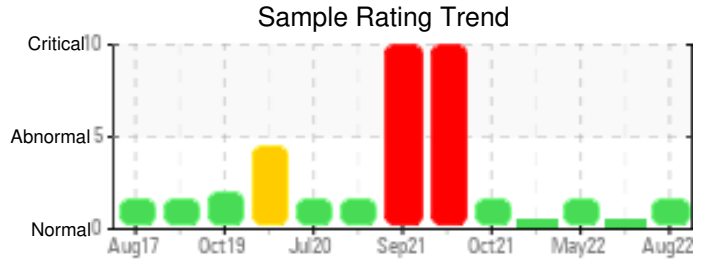
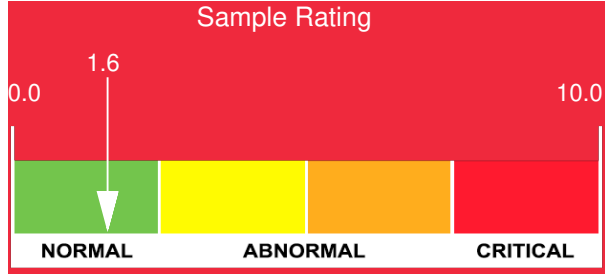
**Sample Information**  
 Lab No: 02506156  
 Analyst: Lyle Dach  
 Sample Date: 08/01/22  
 Received Date: 08/18/22  
 Completed: 08/22/22  
 Lyle Dach  
 lyle.dach@hollyfrontier.com

Recommendation: Fluid is in good condition, water is up slightly and should be boiled off. vent steam to ensure there are no unwanted boil overs. Fluid iPH is 6.26 with acid number being very low at 0.09. Fluid is suitable for continued service. Resample in 12 months.

Comments: Water contamination levels are marginally high. Water contamination levels are marginally high.. ppm Water contamination levels are marginally high.

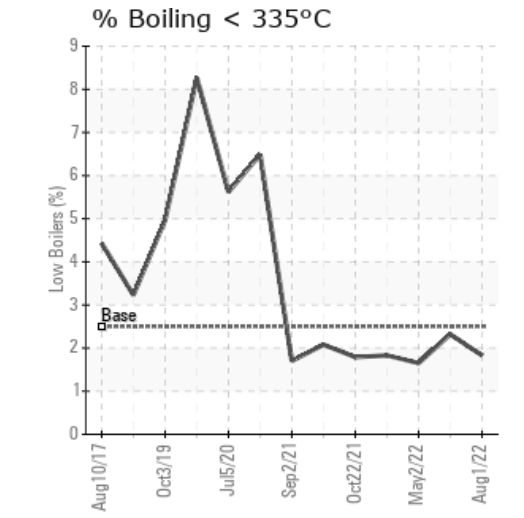
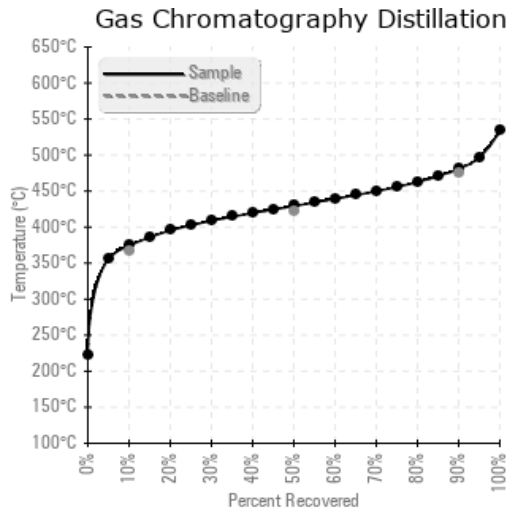
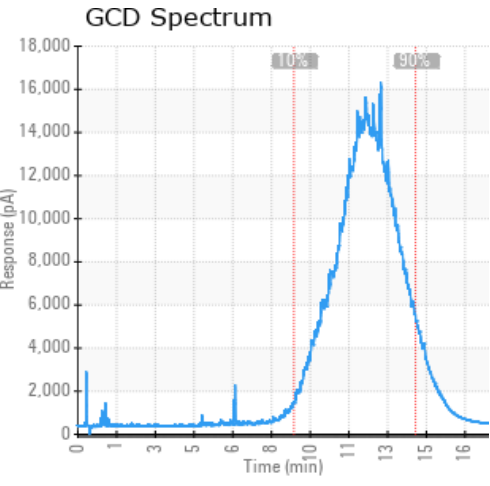
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
08/01/22	08/18/22	1.3y	PUMP DISCHARGE	410 / 210	474.1	31.1	0.09	0.116	705 / 374	805 / 429	898 / 481	1.83
05/18/22	05/26/22	1.0y		414 / 212	173.5	30.6	0.13	0.080	702 / 372	804 / 429	899 / 481	2.32
05/02/22	05/09/22	1.0y	Hot oil filter	424 / 218	712.7	30.1	0.15	0.049	705 / 374	806 / 430	900 / 482	1.65
01/14/22	02/04/22	0.0y	hot oil pump	417 / 214	142.4	30.6	0.06	0.017	703 / 373	803 / 429	897 / 481	1.83
10/22/21	11/02/21	0.0y	HOT OIL PUMP PLANT 2	428 / 220	614.7	31.4	0.06	0.301	705 / 374	805 / 429	899 / 482	1.79
Baseline Data				435 / 224		32.7	0.03		693 / 367	790 / 421	887 / 475	2.5





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
08/01/22	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	41	0
05/18/22	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	33	0
05/02/22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	33	0
01/14/22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	33	0
10/22/21	8	0	0	0	0	0	0	0	0	0	0	8	18	0	0	0	0	0	12	0	0	0	75	0
<b>Baseline Data</b>			0	0						0			0	0					0				270	

Elemental analysis results (above) in parts per million (ppm). [10,000 ppm = 1.0%]



Historical Comments	
05/18/22	Sample results indicate that the fluid is in suitable condition for continued service. Resample in 12 months.
05/02/22	Water was flagged again, ensure any ingress points are closed up. Is there any process locations that could allow water to enter the heating fluid? It would be best to boil off excess water to reduce the corrosion risk, vent the steam to ensure there are no unwanted boil overs. Resample in 6 months Water contamination levels are abnormally high. ppm Water contamination levels are abnormally high.
01/14/22	Sample results indicate that the fluid is in suitable condition for continued service. Water content has been lowered successfully. Resample in 12 months
10/22/21	Current sample has improved from the Oct 4 sample, water is still a concern and it would be beneficial to reduce the concentration further. Be sure to vent steam when boiling off water. Iron, sodium, potassium, boron and phosphorous are all down. Acid number is low and pentane insolubles continue to drop. Viscosity and flash point are in spec and GCD is good. System fluid is Calfo AF. Please resample in 6 months. Water contamination levels are abnormally high. ppm Water contamination levels are abnormally high.

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