

[KEYERA BRAZEAU RIVER GAS PLANT / 3-12-46-14W5] PLANT 1

Customer: PTRHTF30084
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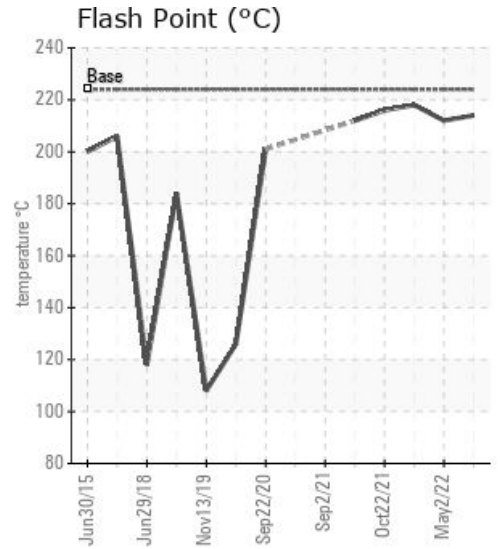
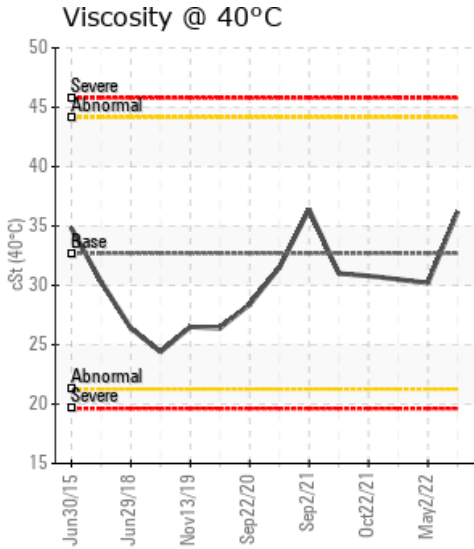
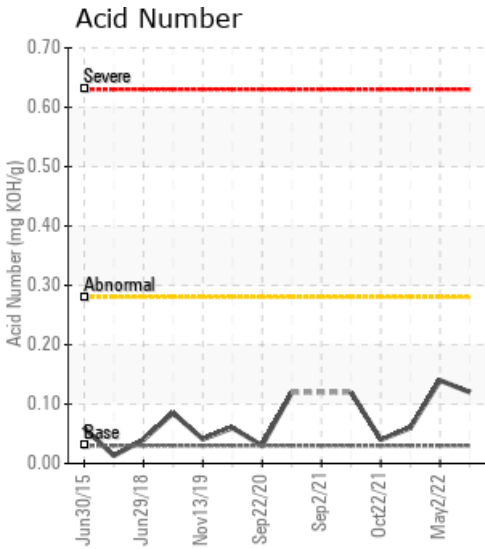
System Information
 System Volume: 14000 ltr
 Bulk Operating Temp: 446F / 230C
 Heating Source:
 Blanket:
 Fluid: PETRO CANADA CALFLO AF
 Make: IAP HEATER

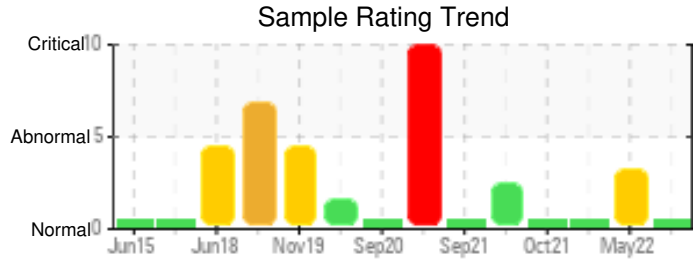
Sample Information
 Lab No: 02491081
 Analyst: Lyle Dach
 Sample Date: 05/18/22
 Received Date: 05/26/22
 Completed: 05/30/22
 Lyle Dach
 lyle.dach@hollyfrontier.com

Recommendation: Sample results indicate that the fluid is in suitable condition for continued service. Resample in 12 months.

Comments:

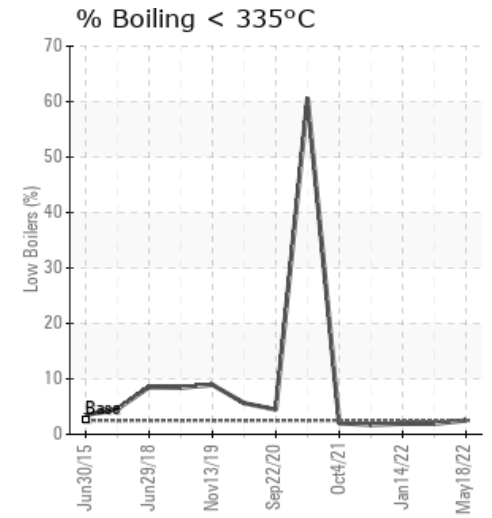
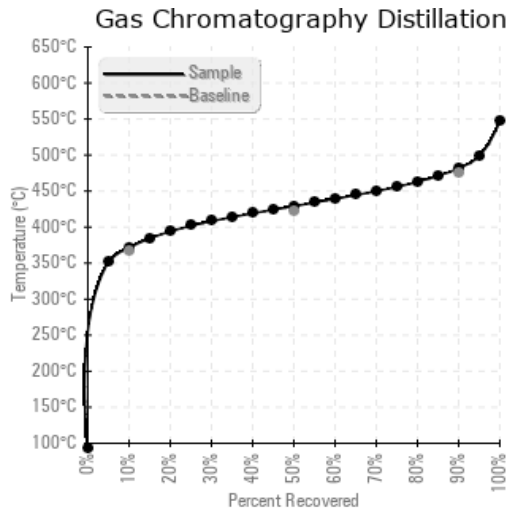
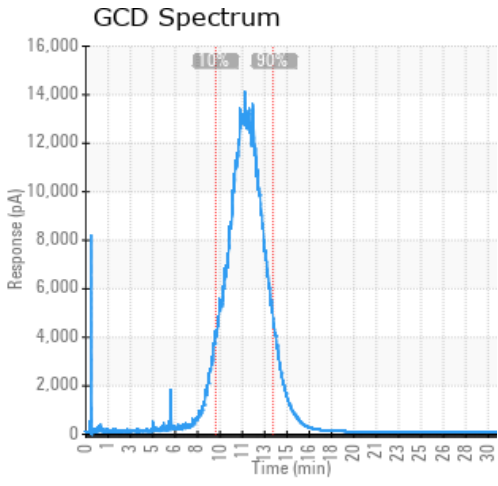
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
05/18/22	05/26/22	12.0m		417 / 214	131.6	36.2	0.12	0.062	701 / 371	804 / 429	899 / 482	2.51
05/02/22	05/09/22	12.0m	Hot oil filter	414 / 212	1015.6	30.2	0.14	0.060	704 / 374	805 / 430	900 / 482	1.91
01/14/22	02/04/22	0.0m	hot oil pump 1	424 / 218	308.7	30.5	0.06	0.034	703 / 373	804 / 429	899 / 482	1.90
10/22/21	11/02/21	0.0m	HOT OIL PUMP #1	421 / 216	254.8	30.8	0.04	0.053	705 / 374	805 / 429	899 / 482	1.72
10/04/21	10/13/21	0.5m	after pump	414 / 212	578.5	31.0	0.12	0.178	704 / 373	804 / 429	897 / 481	2.00
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
05/18/22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	43	0
05/02/22	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0	45	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	56	0
10/22/21	8	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	7	0	0	0	77	0
10/04/21	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	10	0	0	0	68	0
Baseline Data			0	0						0			0	0					0				270	

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



Historical Comments	
05/02/22	Water content has climbed again, ensure all ingress locations are closed. 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. Confirm samples are representative of the entire system, if possible the collection points are turbulent areas (pump discharge) and that sample lines are purged until hot fluid has flowed for several seconds prior to collecting the sample. Resample in 6 months. Water contamination levels are severely high. ppm Water contamination levels are severely high.
01/14/22	Sample results indicate that the fluid is in suitable condition for continued service. Resample in 12 months
10/22/21	Sample results indicate that the fluid is in suitable condition for continued service. Metals, and contamination are all very low. Water has been reduced to a safe level but is still higher than 2020 samples. Viscosity and flashpoint are in spec and acid # is low. GCD is good and pentane insolubles are low. Resample in 1 year.
10/04/21	Fluid appears to be in good condition other than the water content being in alarm. Water content is at much lower levels than previous samples. It would be best to boil off the water and vent the steam to ensure there are no unwanted boil overs and reduce the corrosion risk. Fluid is Calfo AF not HTF Water contamination levels are marginally high. ppm Water contamination levels are marginally high.

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