

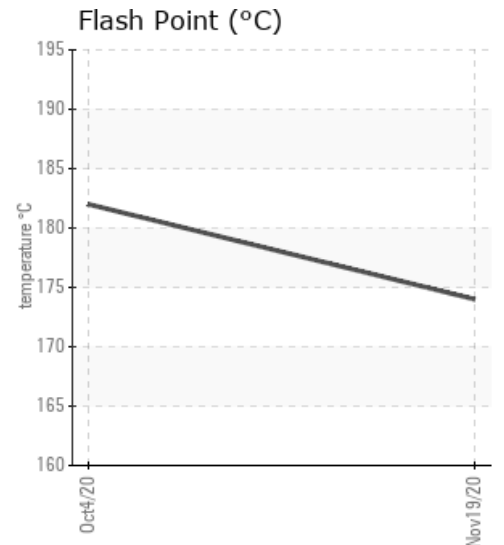
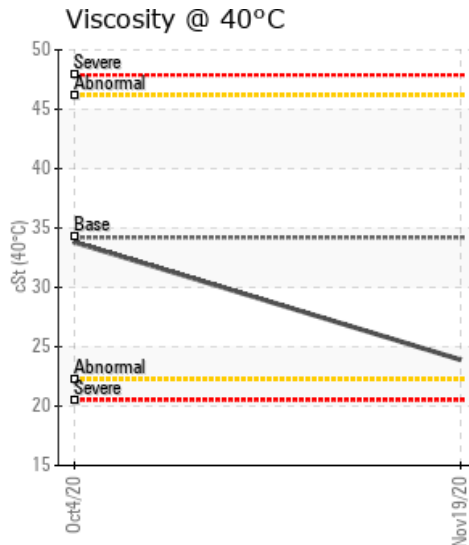
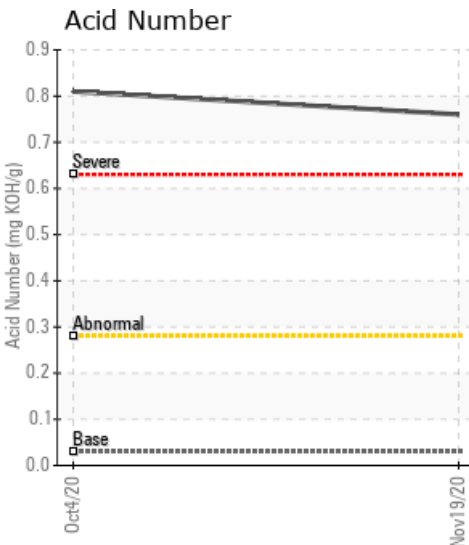
[5-11-29-4W5] ORLEN UPSTREAM

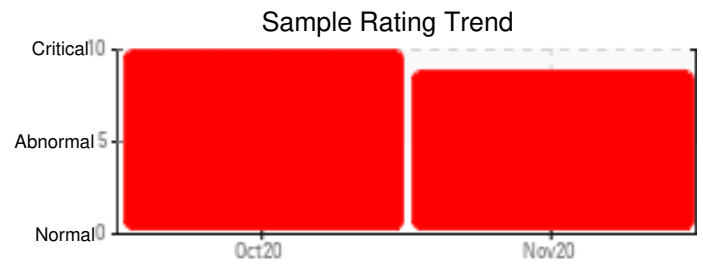
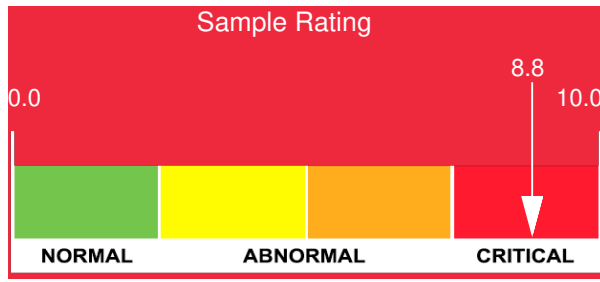
Customer: PTRHTF20243	System Information	Sample Information
CFR CHEMICALS 38451 RRZZ RED DEER, AB T4E 2N6 Canada Attn: Andrew Schacher Tel: (780)982-8478 E-Mail: aschacher@cfrchemicals.com	System Volume: 5000 ltr Bulk Operating Temp: 356F / 180C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make:	Lab No: 02389408 Analyst: Kevin McDermott Sample Date: 11/19/20 Received Date: 11/25/20 Completed: 12/01/20 Kevin McDermott kevin.mcdermott@petrocanadalsp.com

Recommendation: Fluid is in poor condition, very little change from previous sample in October. In the near term, venting the fluid will reduce some of the low boiler content. Eventually the fluid will need to be changed out and system cleaned.

Comments: The solids content is still quite low which indicates the system internals may not be severely fouled. As degradation progresses, carbonaceous deposits will accumulate in the system. Acid number is severely high which is from oxidation. Viscosity & flash point severely low which is either from thermal cracking or process exchanger leaking hydrocarbon liquids into the fluid.

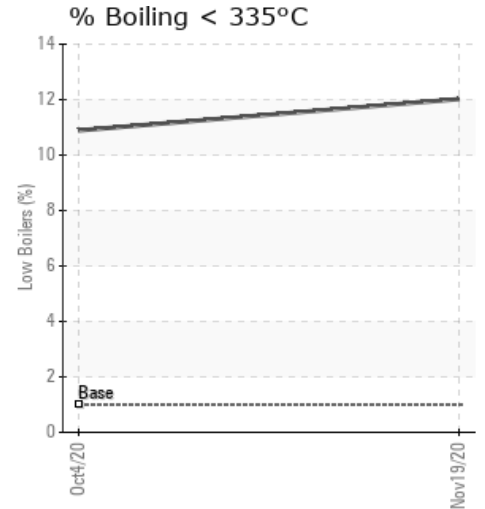
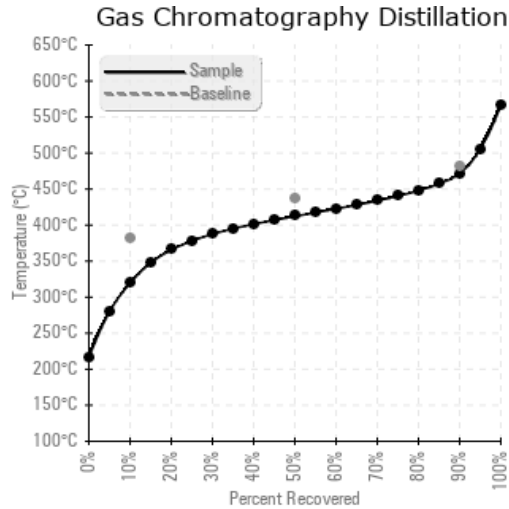
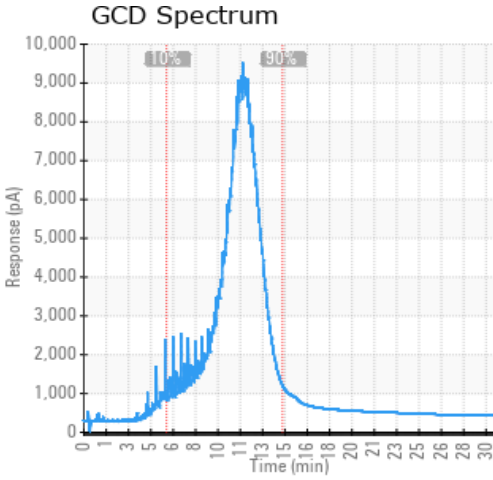
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/19/20	11/25/20	5y	Boiler sight glass	345 / 174	49.2	23.9	0.76	0.282	607 / 320	774 / 412	881 / 471	12.02
10/04/20	10/15/20	5y	BOILER SITE GLASS	360 / 182	25.8	33.8	0.81	0.257	618 / 326	786 / 419	885 / 474	10.89
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
11/19/20	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/04/20	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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

10/04/20	Fluid is in poor condition due to both oxidation and thermal degradation. Full or partial fluid changeout should be considered, as well as cleaning of system internals. Consult PC Technical Services for remediation / degradation prevention strategies. Acid Number (AN) is severely high caused by oxidation. Increase in low-boiler content and reduction in flash point is caused by thermal cracking.

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