

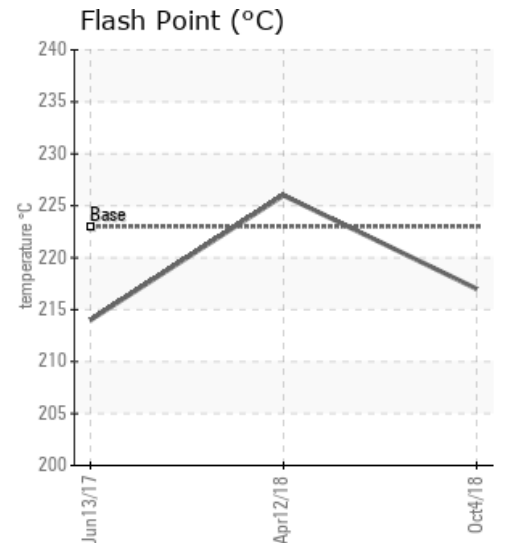
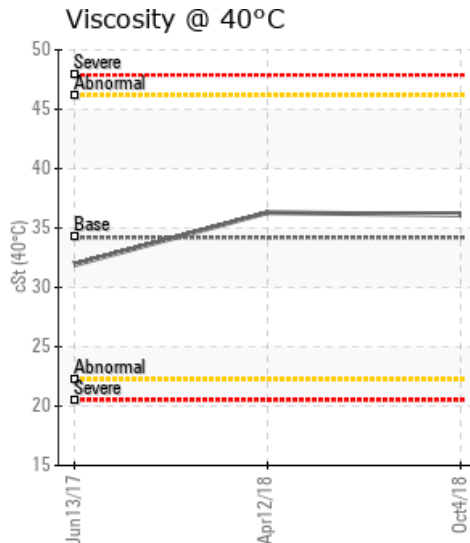
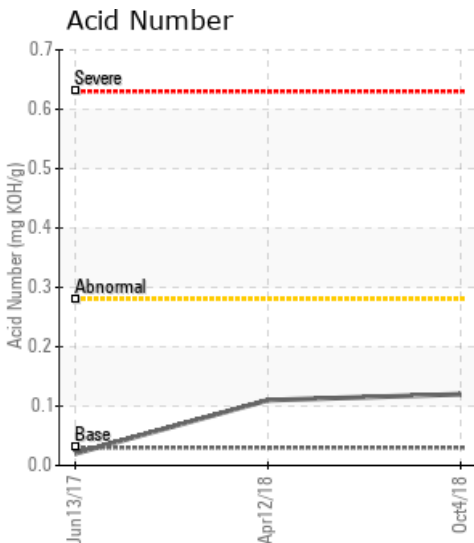
## LSL: 7-36-58-03W6

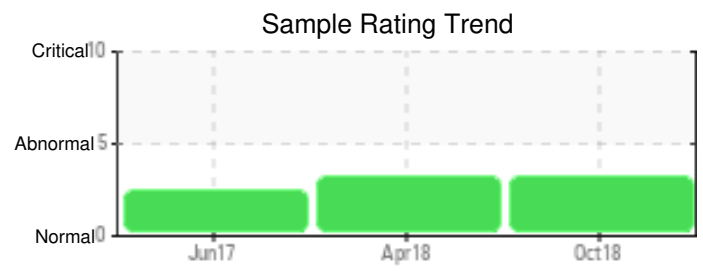
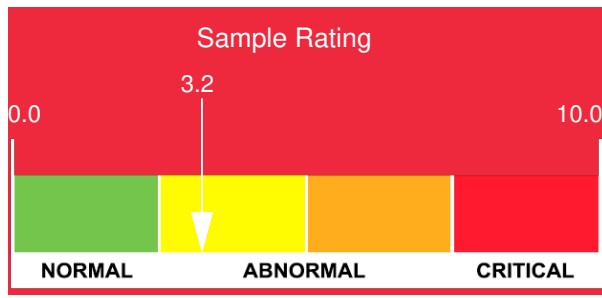
Customer: PTRHTF20103	System Information	Sample Information
CNRL WEST PLANT P.O. BOX 6808 EDSON, AB T7E 1L5 Canada Attn: Rodney Marcichiw Tel: (780)517-3542 E-Mail: rodney.marcichiw@cnrl.com	System Volume: 15500 ltr Bulk Operating Temp: 293F / 145C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: ALCO	Lab No: 02251743 Analyst: Peter Hartevelde Sample Date: 10/04/18 Received Date: 11/15/18 Completed: 11/19/18

**Recommendation:** The fluid is in good condition and suitable for further use. The water content of the fluid is slightly high. Please boil-off and vent to atmosphere. Pentane Insoluble (solids) content has decreased compared with the previous sample. It is still close to the reportable limit (0.5%) and therefore it would be good to start filtration of the fluid. The 90% GCD temperature is low and so is the distillation curve as a whole. This is no concern at this time. Please re-sample in 6 months.

**Comments:** Pentane Insolubles levels are abnormally high. Water contamination levels are marginally high. Water contamination levels are marginally high.. ppm Water contamination levels are marginally high. (GCD) 90% Distillation Point is marginally low.

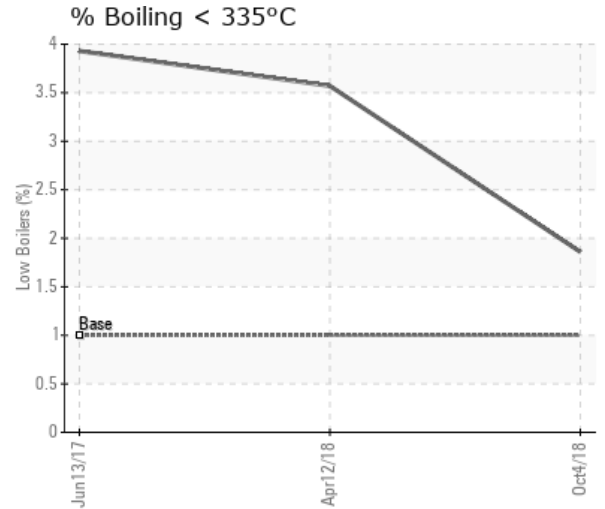
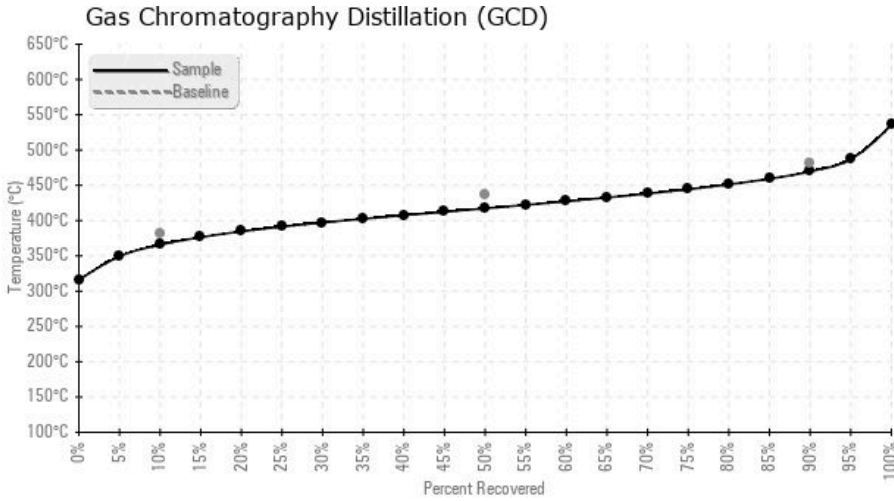
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
10/04/18	11/15/18	0y		423 / 217	577.4	36.1	0.12	0.401	690 / 366	783 / 417	877 / 470	1.86
04/12/18	04/24/18	0y		439 / 226	414.9	36.3	0.11	0.577	695 / 368	802 / 428	909 / 487	3.57
06/13/17	06/20/17	0y	BOTTOM DRAIN	417 / 214	906.0	31.9	0.02	0.526	694 / 368	805 / 429	902 / 484	3.93
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
10/04/18	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/12/18	18	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
06/13/17	4	0	0	0	0	0	0	0	0	0	2	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

04/12/18	Water content is marginally high, however has improved since last sample. Pentane insoluble is also high. Flash point has improved. Consider venting system from high point to eliminate water. Continue to operate and resample in 6 - 8 months Pentane Insolubles levels are severely high. Water contamination levels are marginally high. Water contamination levels are marginally high.. ppm Water contamination levels are marginally high.
06/13/17	The water content of the fluid is high. The combination of slightly elevated boil-off below 335 degrees C and the low 10% GCD temperature indicates thermal degradation of the fluid. This is normal and of no concern at this time but venting/boil-off to atmosphere is recommended to reduce the water- and low boiler vapor content. Pentane Insoluble (solids) content is at the warning limit. Again no concern at this time but as the solids content increases over time filtration of the fluid has to be considered. The fluid is suitable for further use. Please re-sample in 6 months. When sending in the next sample please list fluid service life on the sample label. Water contamination levels are abnormally high. ppm Water contamination levels are abnormally high. Pentane Insolubles levels are abnormally high.

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