

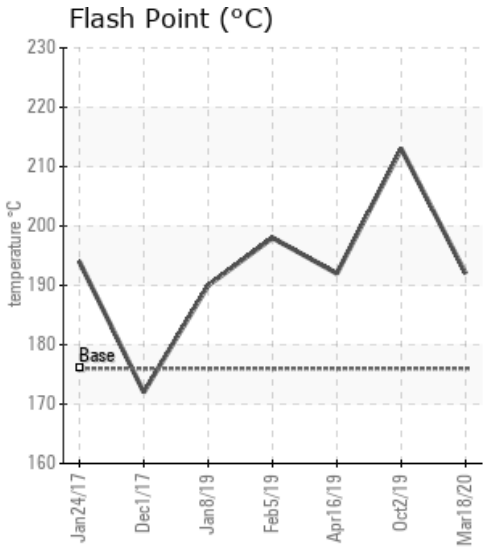
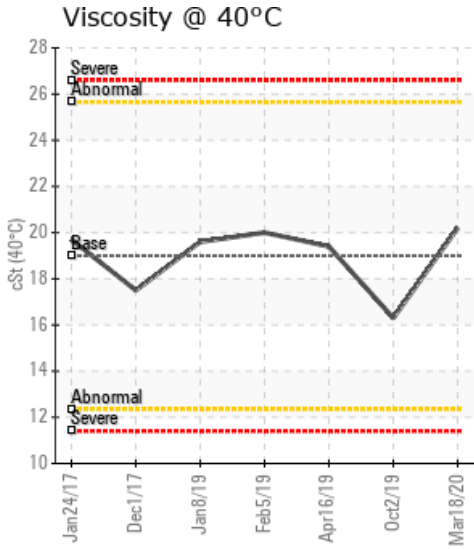
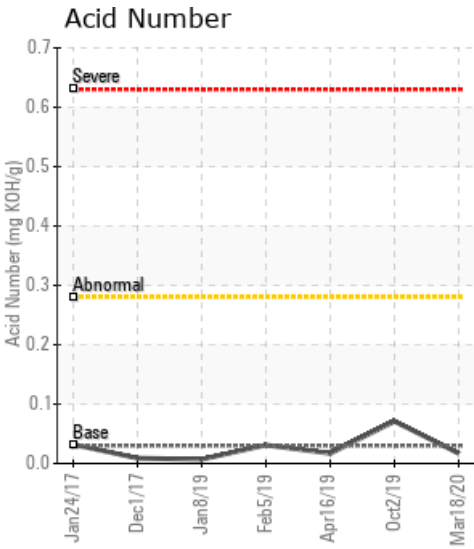
[LSD / 9-16-1-14W2] HEATTRANSFER

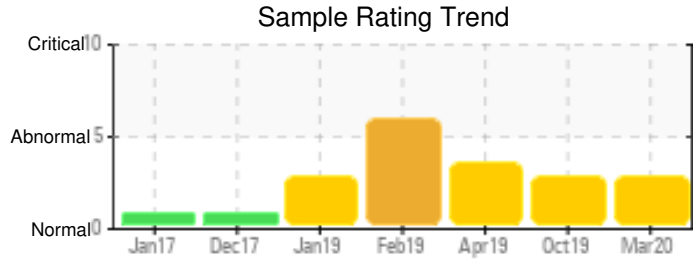
Customer: PTRHTF20193	System Information	Sample Information
STEEL REEF PO BOX 448 LAMPMAN, SK S0C 1N0 Canada Attn: Jared Garnier Tel: (306)861-0940 E-Mail: jared.garnier@steelreef.ca	System Volume: 35000 ltr Bulk Operating Temp: 347F / 175C Heating Source: Blanket: Fluid: EASTMAN THERMINOL 55 Make: HEAT TECH	Lab No: 02345492 Analyst: Kevin McDermott Sample Date: 03/18/20 Received Date: 03/24/20 Completed: 03/30/20 Kevin McDermott kevin.mcdermott@petrocanadalsp.com

Recommendation: Fluid condition continues to be good overall with very little change in properties to the previous sample October 2019.

Comments: (GCD) 90% Distillation Point is higher than normal which can be attributed to the Chevron HT46 & Petro-Therm content.

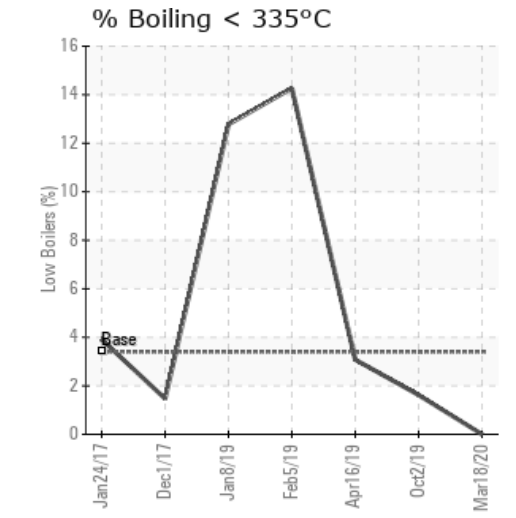
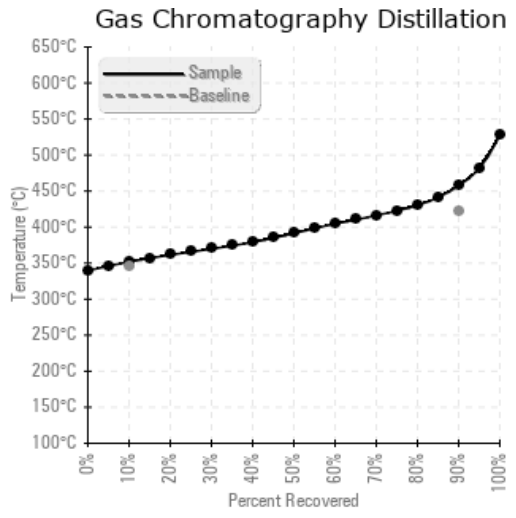
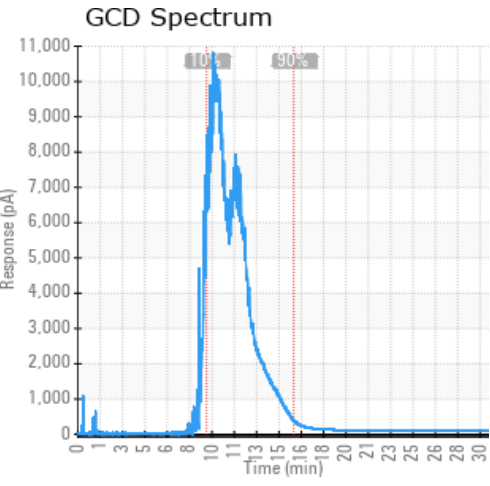
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
03/18/20	03/24/20	53m	PUMP SUCTION	378 / 192	149.8	20.2	0.017	0.059	665 / 352	736 / 391	856 / 458	0.00
10/02/19	10/09/19	47m	PUMP SUCTION	415 / 213	214.0	16.3	0.071	0.050	658 / 348	722 / 384	833 / 445	1.62
04/16/19	04/26/19	41m	PUMP SUCTION	378 / 192	736.6	19.4	0.017	0.054	651 / 344	719 / 382	837 / 447	3.08
02/05/19	02/12/19	40m		388 / 198	462.9	20.0	0.031	0.023	626 / 330	692 / 366	827 / 442	14.27
01/08/19	01/16/19	39m		374 / 190	157.2	19.6	0.007	0.052	629 / 331	697 / 369	818 / 437	12.78
Baseline Data				349 / 176		19.0	0.03		655 / 346		790 / 421	3.40





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
03/18/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10/02/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
04/16/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02/05/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01/08/19	0	0	0	0	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	
10/02/19	Fluid condition remains good overall. The viscosity is slightly lower than previous sample. Suggest annual sample submissions, or sooner if the fluid becomes stressed / contaminated. (GCD) 90% Distillation Point is high, likely due to the ~6% Chevron HT46. The low-boiler content (GCD<335) has come down even further which is good. Water content that was previously concerning is now very low.
04/16/19	The low-boiler content (GCD<335c) has come down to normal level since venting. Fluid condition is good, much improved from previous sample which is due to the venting of the fluid. Suggest another sample in 6 months or so. Water contamination levels are somewhat higher than expected. The low-boiler content (GCD<335c) has come down to normal level since venting. The GCD 90% is high which is likely due to the percentages of other fluids, Petro-Therm & Chevron HT 46.
02/05/19	No significant change since the January sample other than increase in water content. Suggest venting the expansion tank to reduce the low boiler vapors and water content. Re-sample in 6 months. ppm Water contamination levels are marginally high. Water contamination levels are marginally high. (GCD) % < 335°C is abnormally high. (GCD) 90% Distillation Point is abnormally high.
01/08/19	Fluid remains in good condition however there are early indications (see comments from the lab) that some thermal cracking has taken place. Suggest another sample in 6 months to determine the direction of the trend. (GCD) 90% Distillation Point is abnormally high. (GCD) % < 335°C is marginally high.

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