

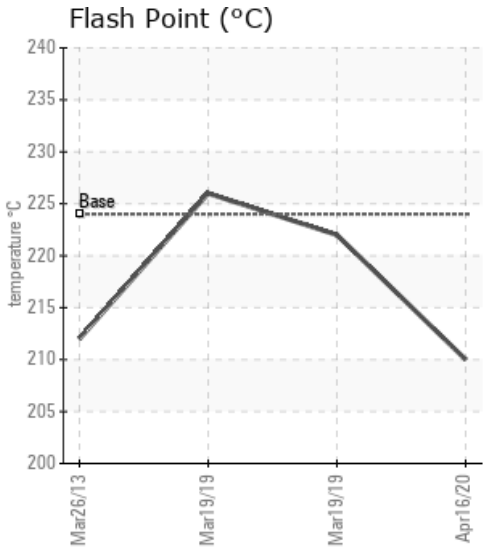
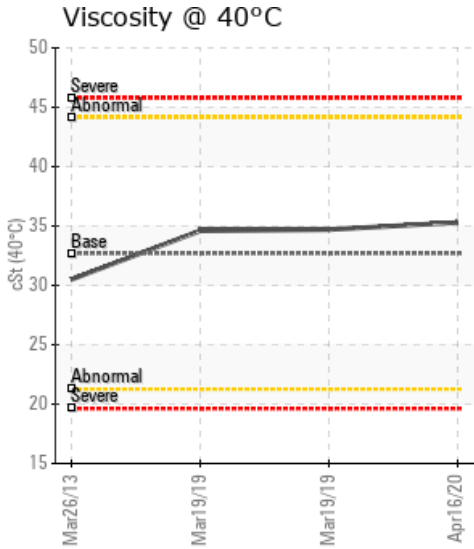
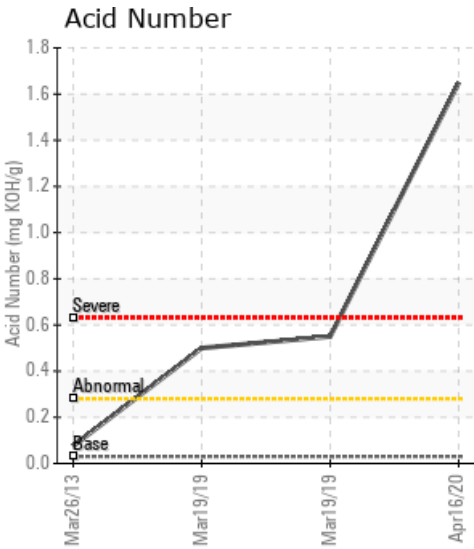
KILN THERMAL FLUID

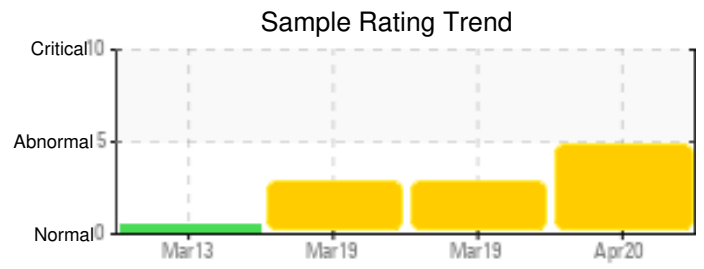
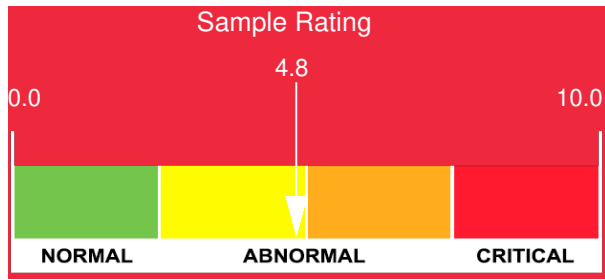
Customer: PTRHTF20101	System Information	Sample Information
CANADA MALTING 3316 BONNEYBROOK ROAD SE CALGARY, AB T2G 4M9 CANADA Attn: Earl Vanzeeenter Tel: E-Mail: earl.vanzeeventer@canadamalting.com	System Volume: 10000 gal Bulk Operating Temp: 446F / 230C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: VALCANNO	Lab No: 02350662 Analyst: Gaston Arseneault Sample Date: 04/16/20 Received Date: 04/27/20 Completed: 05/26/20 Gaston Arseneault gaston.arseneault@petrocanadalsp.com

Recommendation: The current fluid has decent viscosity, flash point and the distillation point. The solid content stays at the same level of the samples in 2019. However, the TAN (Acid Number) is much higher, meaning the oil oxidation rate has been accelerated in the past 12 months. Considering the 30 years fluid life without any system cleaning and flushing, it may be the right time to make a plan and budget the future maintenance cost. The alternative option is to drain 20% of the current fluid and sweeten the system by the fresh oil in the near future before the severe carbon deposit forms. Please take one sample in 7 days after the 20% system sweetening to verify the effectiveness.

Comments: Solid level is high. Acid Number (AN) is severely high.

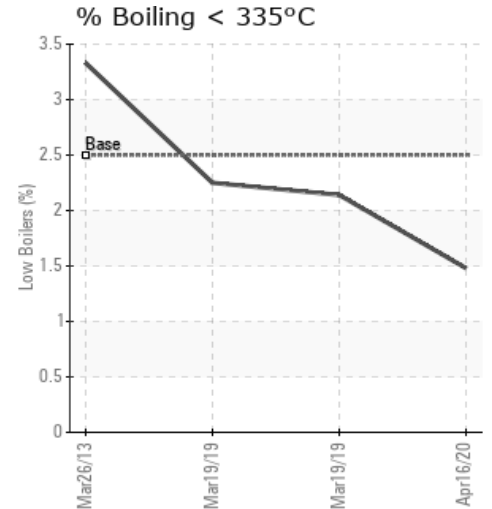
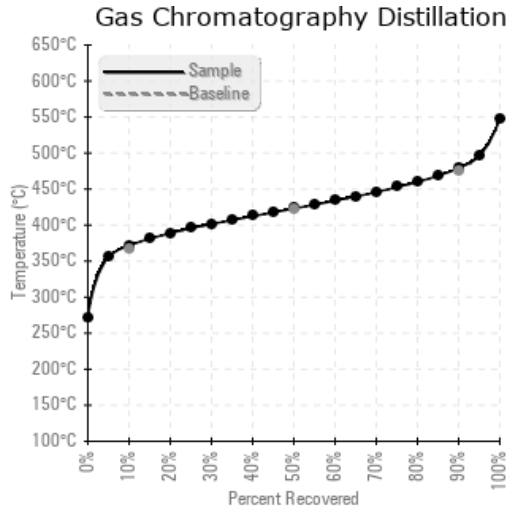
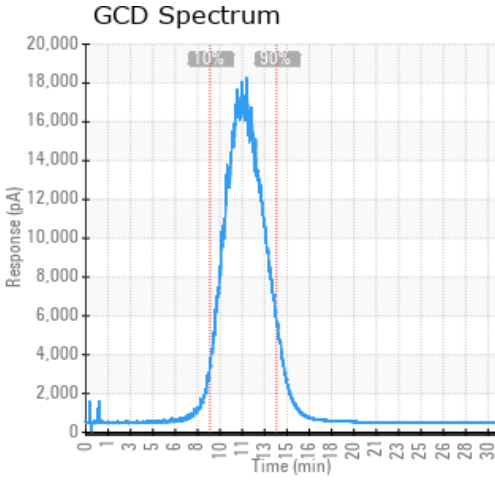
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
04/16/20	04/27/20	30y	BESIDE THERMAL HEAT	410 / 210	13.7	35.3	1.65	0.563	701 / 371	793 / 423	895 / 479	1.48
03/19/19	03/20/19	0y		432 / 222	25.4	34.7	0.55	0.599	687 / 364	786 / 419	891 / 477	2.14
03/19/19	03/20/19	0y		439 / 226	4.5	34.6	0.50	0.563	687 / 364	786 / 419	891 / 477	2.25
03/26/13	04/16/13	0y	RETURN PIPING	414 / 212	0.00	30.5	0.076	0.008	672 / 356	767 / 408	890 / 476	3.33
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
04/16/20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0
03/19/19	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0
03/19/19	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0
03/26/13	7	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	31	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

03/19/19	Please send email to Yutong Gao (Yutong.gao@petrocanadalsp.com) for the fluid time (by years or months or hours).The currently fluid has normal viscosity, normal flash point and adequate distillation points. The elevated Acid Number and the high Solid contents indicate the fluid has intermediate oxidation, but still suitable for operation. Please take one sample in 12 months and monitor the conditions. Please make sure to write down the fluid hours. Solid is high. Acid Number (AN) is high.
03/19/19	Please send email to Yutong Gao (Yutong.gao@petrocanadalsp.com) for the fluid time (by years or months or hours).The currently fluid has normal viscosity, normal flash point and adequate distillation points. The elevated Acid Number and the high Solid contents indicate the fluid has intermediate oxidation, but still suitable for operation. Please take one sample in 12 months and monitor the conditions. Please make sure to write down the fluid hours. Solid is high. Acid Number (AN) is high.
03/26/13	Fluid properties look good. Additives have been severely degraded. This is expected from oil of this age. We recommend sweetening the system with up to 10% fresh oil to partially restore anti-oxidant levels. Please continue to resample at normal interval (9 months).