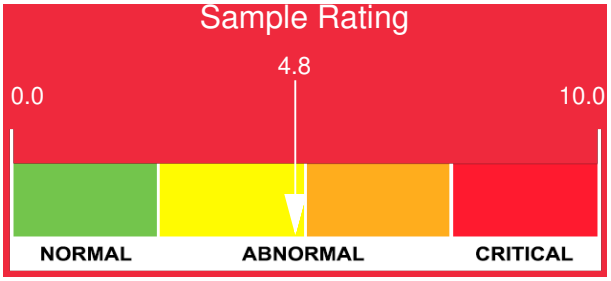
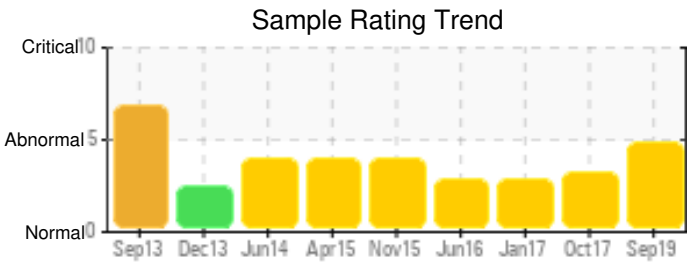




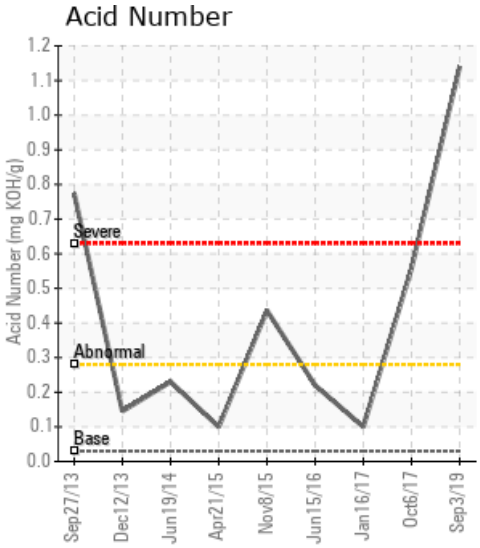
[SPECTRA 4TH CREEK / LSD 16-11-82-9W6] SPECTRA 4TH CREEK PLANT #1

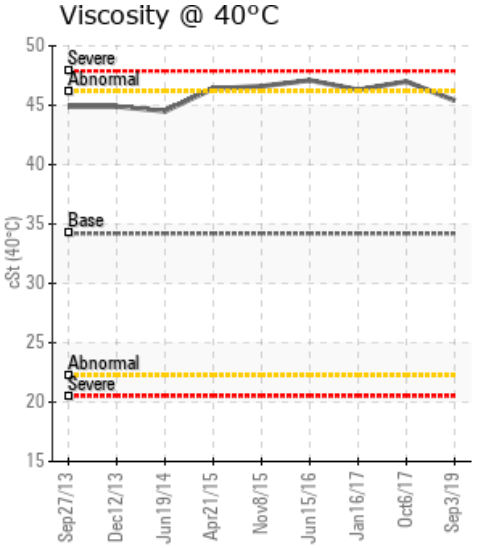
Customer: PTRHTF20127	System Information	Sample Information
SPECTRA ENERGY 16-11-82-9W6 BAG 6180 FORT ST JOHN, BC V1J 4H7 Canada Attn: Dwayne Potratz Tel: (780)351-2131 E-Mail: dpotratz@spectraenergy.com	System Volume: 30000 ltr Bulk Operating Temp: 383F / 195C Heating Source: Blanket: Fluid: PETRO CANADA PETRO-THERM Make: SPECTRA 4TH CREEK	Lab No: 02307346 Analyst: Clinton Buhler Sample Date: 09/03/19 Received Date: 09/10/19 Completed: 09/13/19

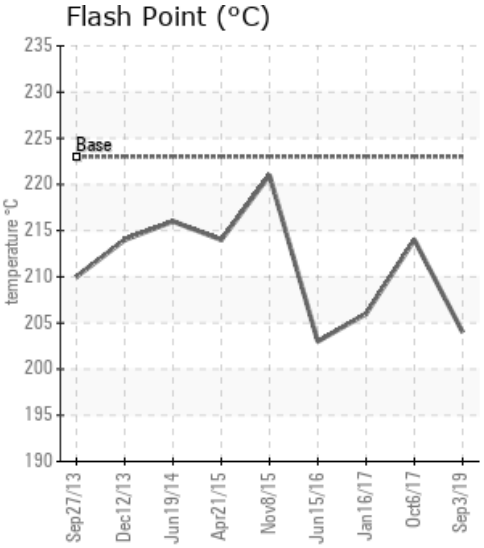
Recommendation: Sample results indicate that the fluid may be experiencing oxidative degradation as evidenced by the increased Acid Number and increased Pentane Insolubles (Solids). Solids content can indicate system fouling. Please ensure that blanket gas is operational. Planning should begin to consider reducing the fluids Acid Number and solids content by performing a cleaning and fluid replacement as the cost to sweeten would also be significant considering the system volume.Please re-sample in 6 months.Contact Petro-Canada Lubricants Technical Services for further assistance.

Comments: Pentane Insolubles levels are severely high. Acid Number (AN) is severely high.

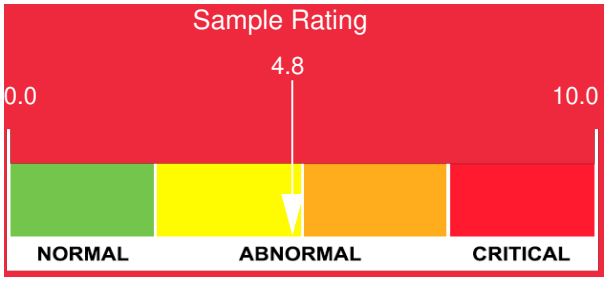
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
09/03/19	09/10/19	0y	HEAT MEDIUM BLDG	399 / 204	53.4	45.4	1.14	1.54	703 / 373	793 / 423	888 / 476	1.03
10/06/17	10/17/17	20y		417 / 214	57.4	47.0	0.558	0.544	707 / 375	817 / 436	932 / 500	2.26
01/16/17	01/23/17	0y	HEAT MEDIUM #1	403 / 206	61.4	46.3	0.10	2.20	698 / 370	809 / 432	935 / 502	3.10
06/15/16	06/23/16	21y	HEAT MED BUILDING	397 / 203	49.9	47.1	0.22	1.52	704 / 374	812 / 434	926 / 497	2.30
11/08/15	11/19/15	12y		430 / 221	125.2	46.6	0.436	1.36	696 / 369	804 / 429	929 / 498	2.89
04/21/15	05/01/15	14y	SHORT LOOP BYPASS	417 / 214	78.0	46.4	0.10	1.80	711 / 377	812 / 433	942 / 506	0.00
Baseline Data				433 / 223		34.2	0.03		720 / 382	817 / 436	900 / 482	1.00

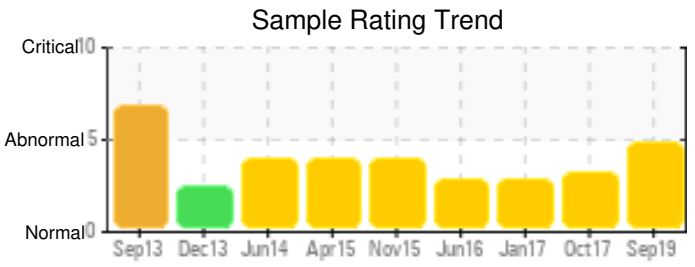






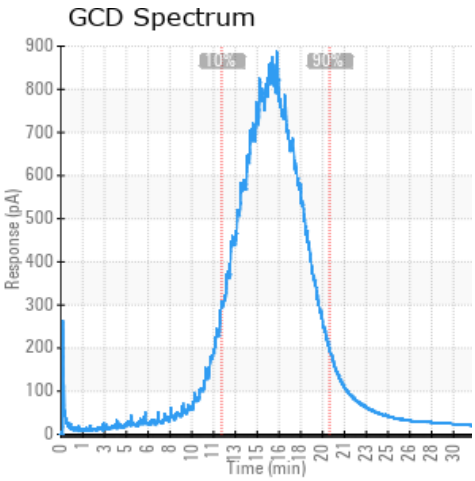
PETRO-CANADA LUBRICANTS

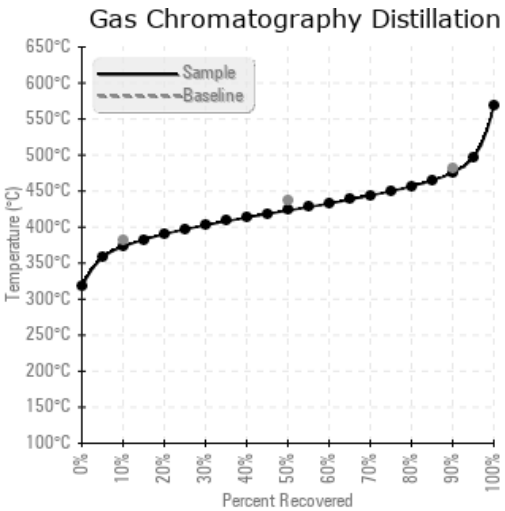


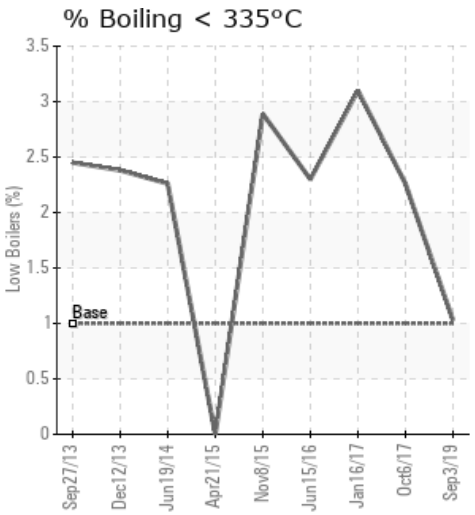


Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
09/03/19	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10/06/17	18	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	2	0	0	0
01/16/17	22	0	0	0	0	0	1	0	0	0	1	4	0	0	0	0	0	0	0	0	2	0	0	0
06/15/16	14	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0
11/08/15	16	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0
04/21/15	18	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	0	0
Baseline Data			0	0						0			0	0					0				0	

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







Historical Comments

10/06/17	Acid Number has increased significantly from previous sample. This is a strong indication of ongoing oxidation. Elevated viscosity and 90% distillation supports this. Solids levels are still high, yet they have improved since last sample. Improvement may be related to the addition of ~5 barrels of fresh fluid during vessel cleaning. Solids can be the result of oxidation by-products or from metals. Increased acidity can cause corrosion of system. Ensure that nitrogen blanket is functioning properly (between 2-3 psi). Begin sweetening with new fluid to bring Acid Number down. Re-sample in 6 months Pentane Insolubles levels are abnormally high. Acid Number (AN) is abnormally high. (GCD) 90% Distillation Point is abnormally high. Visc @ 40°C is abnormally high.
01/16/17	(GCD) @ 90% is slightly elevated indicating some heavier end is the oil sample likely to some oxidation.Pentane insoluble is elevated indicating the same. The TAN and Flash Point are still good. Ensure Nitrogen blanket is in placeto prevent oxidation and continue to operate. Resample in 6 months. Pentane Insolubles levels are severely high. (GCD) 90% Distillation Point is abnormally high. Visc @ 40°C is abnormally high.
06/15/16	Pentane Insoluble is high however TAN is good and GCD@90 has dropped slightly. Continue to operate and resample in 6 months. Pentane Insolubles levels are severely high. Visc @ 40°C is abnormally high. (GCD) 90% Distillation Point is marginally high.
11/08/15	TAN has greatly increased and pentane insoluables are higher then normal. Viscosity still looks good. Ensure Nitrogen Blanket is functioning and continue to operate. Resample in 6 months. Pentane Insolubles levels are severely high. Acid Number (AN) is abnormally high. (GCD) 90% Distillation Point is abnormally high. Visc @ 40°C is abnormally high.
04/21/15	Pentane Insolubles and GCD 90% Distillation point are severly high. Continue to operate and resample in 6 months. Pentane Insolubles levels are severely high. (GCD) 90% Distillation Point is severely high. Visc @ 40°C is abnormally high. Pentane Insolubles levels are severely high. (GCD) 90% Distillation Point is severely high. Visc @ 40°C is abnormally high.