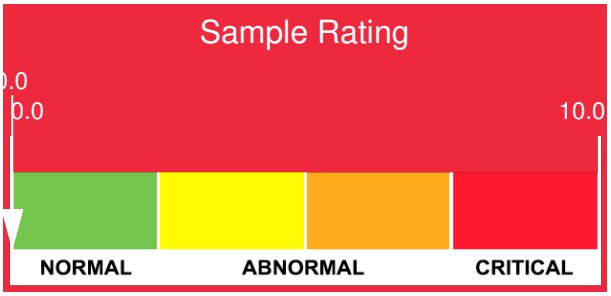
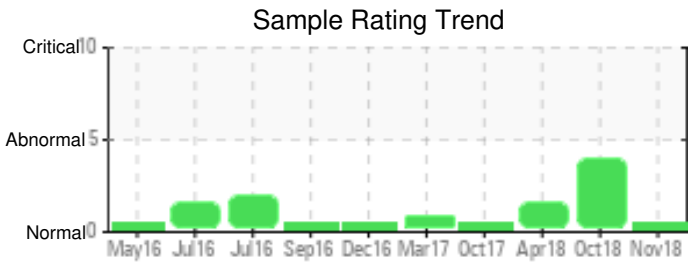
PETRO-CANADA LUBRICANTS





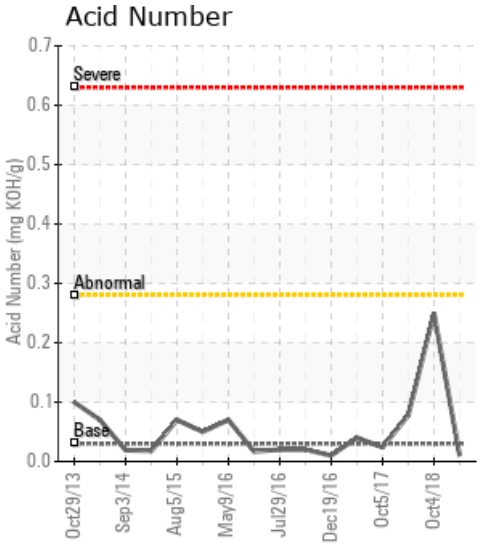
[CENOVUS / LSD 1-8-70-11W6M] WHRU HOT OIL

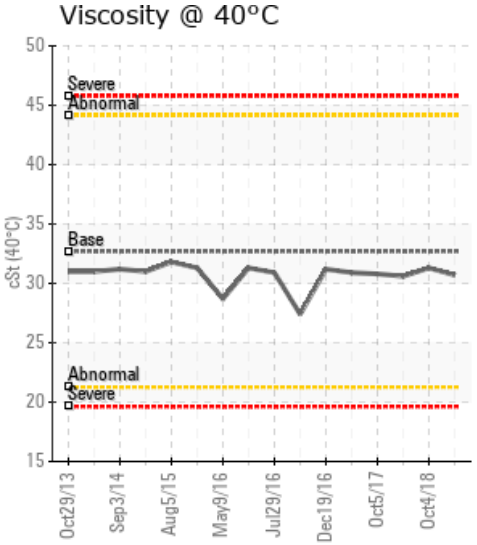
Customer: PTRHTF20131	System Information	Sample Information
CENOVUS 9701 - 116ST 1-8-70-11W6 ELMWORTH, AB T8W 6H6 Canada Attn: William Chandler Tel: E-Mail: william.chandler@contractor.cono	System Volume: 75000 ltr Bulk Operating Temp: 424F / 218C Heating Source: Blanket: Fluid: PETRO CANADA CALFLO AF Make: OPTIMIZED PROCESS	Lab No: 02253877 Analyst: Clinton Buhler Sample Date: 11/19/18 Received Date: 11/27/18 Completed: 12/06/18

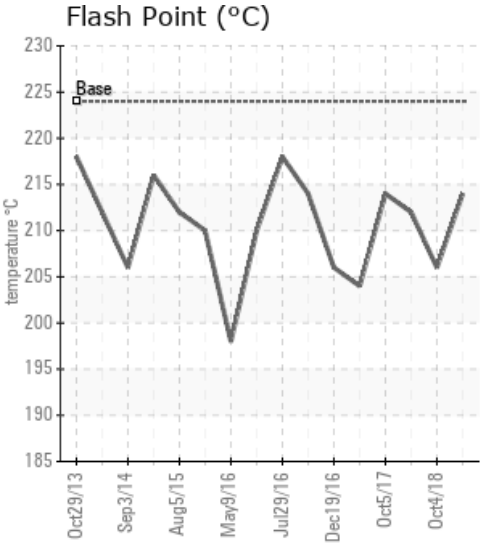
Recommendation: Sample results indicate that the fluid is suitable for continued service. please re-sample in 12 months

Comments:

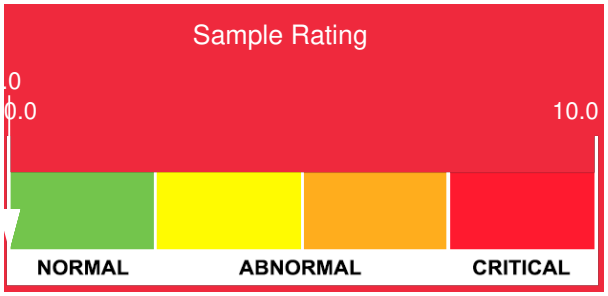
Sample Date	Received Date	Fluid Age	Sample Location	Flash Point (COC)	Water (KF)	Viscosity (40°C)	Acid Number	Solids	GCD 10%	GCD 50%	GCD 90%	GCD % < 335°C
	mm/dd/yy			°F/°C	ppm	cSt	mg/KOH/g	%wt	°F/°C	°F/°C	°F/°C	%
11/19/18	11/27/18	8y		417 / 214	116.4	30.7	0.01	0.025	700 / 371	797 / 425	887 / 475	1.41
10/04/18	10/10/18	8y		403 / 206	3150.4	31.3	0.25	0.049	714 / 379	784 / 418	866 / 463	0.00
04/11/18	04/18/18	7y		414 / 212	765.6	30.6	0.078	0.053	699 / 371	800 / 427	889 / 476	1.56
10/05/17	10/18/17	79y		417 / 214	268.0	30.8	0.024	0.040	702 / 372	800 / 427	889 / 476	1.19
03/30/17	04/06/17	72y	MAIN INLET TO SURGE	399 / 204	237.1	30.9	0.04	0.068	702 / 372	802 / 428	907 / 486	1.31
12/19/16	12/29/16	68y	MAIN INLET-SURGE DRM	403 / 206	216.9	31.2	0.01	0.045	704 / 373	806 / 430	899 / 481	1.19
Baseline Data				435 / 224		32.7	0.03		693 / 367	790 / 421	887 / 475	2.5

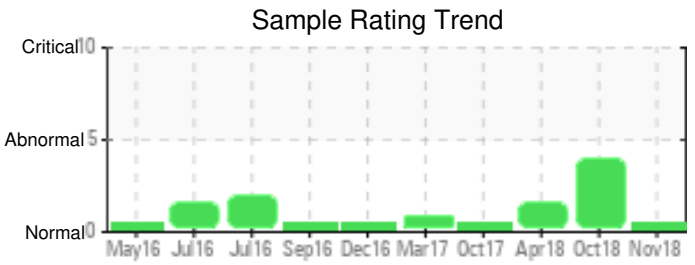






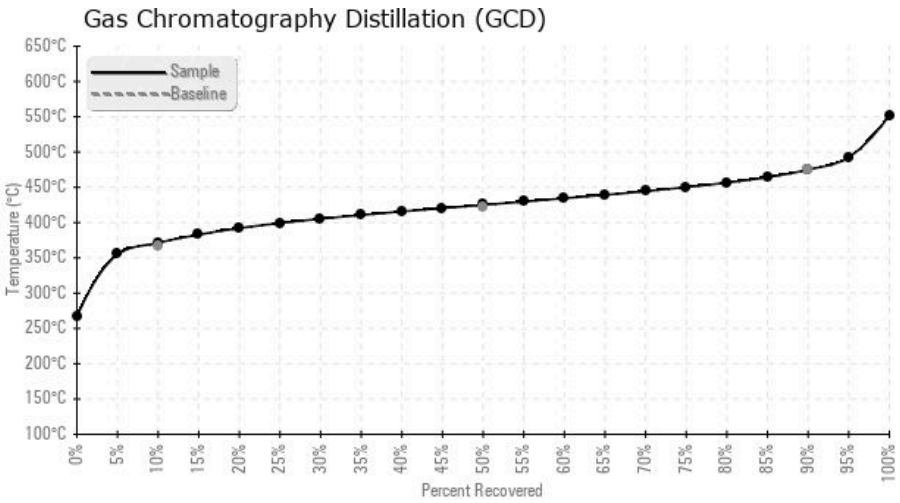
PETRO-CANADA LUBRICANTS

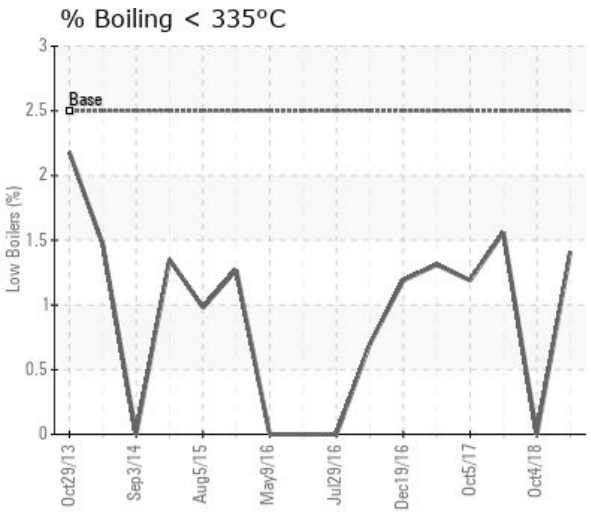




Sample Date	Iron	Chromium	Nickel	Aluminum	Copper	Lead	Tin	Cadmium	Silver	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Antimony	Manganese	Lithium	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
11/19/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	4	0
10/04/18	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	5	0
04/11/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	5	0
10/05/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	6	0
03/30/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	7	0
12/19/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	8	0
Baseline Data			0	0						0			0	0					0				270	

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





Historical Comments

10/04/18	Water contamination is present. This presents a safety risk as fluid could experience boil-over. Please ensure system is sealed off from exposure to outside water and that all fluid transfer devices and hoses are free from water. Ensure that all Petro-Therm added to the system is free from water contamination. Take measures to remove water from system safely.Aside from boil-over, water can accelerate oxidation of the fluid which can also promote corrosion of metal surfaces. Please note that Acid Number has increased from 0.078 last sample to 0.25 this sample. Also note that Iron has increased from <1 ppm to 7 ppm in this sample.Aside from the water, the fluid health is acceptable for continued service. 90% distillation is lower than normal but shouldn't affect system performance.Re-sample once water has been removed and measures to prevent water contamination have been put in place. Water contamination levels are severely high. (GCD) 90% Distillation Point is marginally low.
04/11/18	Sample results indicate that the thermal fluid is suitable for continued service. Please note water level. Ensure system is sealed from outside precipitation. Excess water can also collect in a dead leg, and if sample was pulled from a dead leg or low lying valve without a thorough purge, water content can appear to be more than what is actually in the system.Ensure sample is drawn near pump discharge and that a thorough purge precedes drawing of the sample.Re-sample in 12 months. Water contamination levels are abnormally high. ppm Water contamination levels are abnormally high.
10/05/17	Sample results indicate heat transfer fluid Calflo AF is in healthy condition and is suitable for continued service. Please re-sample in 12 months
03/30/17	Heat Transfer Fluid is in good condition. Although GCD 90% is slightly elevated, it is fairly consistent to previous results and AN indicates that oxidation rate is controlled. Please indicate if blanket gas is utilized in expansion tank. Blanket gas is recommended to reduce oxidation of fluid. (GCD) 90% Distillation Point is marginally high.
12/19/16	This sample looks good although appears to have slight contamination by a lower viscosity fluid evident by the spike in the GCD Chart at 6.5, although this has been evident on every sample. No action is required at this time. Resample in 6 months.